AN ETHNOHISTORY OF WATERBODY USE ALONG NORTHWEST ALASKA PIPELINE COMPANY'S PROPOSED NATURAL GAS PIPELINE ROUTE.

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Study Introduction

The State of Alaska conducted research on the historic uses of waterbodies along the route of Northwest Alaskan Pipeline Company's proposed gas pipeline from February to August 1981. Documentation of waterbody use covers travel, subsistence, guiding, trade, commerce, and other activities on the rivers, lakes, and streams that are to be crossed or influenced by the proposed gas pipeline route as designated by the State Pipeline Coordinators Office and Northwest Alaskan Pipeline Company. The information contained in this study will be used to help state and federal governments, and Native Corporations to determine the navigability or non-navigability of those waterbodies.

The Submerged Lands Act was created in 1953 and made applicable to the State of Alaska in section 6(m) of the Alaska Statehood Act of 1959. The intent of section 6(m) was to admit the State of Alaska into the Union on an equal footing with other states by vesting title to and ownership of the beds and resources of tidally influenced and non-tidal navigable waterbodies in Alaska on January 3, 1959. This study, then, is tied directly to the purpose of section 6(m).

Lands selected by Native regional and Native Corporations under provisions of the Alaska Native Claims Settlement Act (ANSCA) of 1971 include portions of waterbodies along the proposed route which the State of Alaska contends are navigable and which federal government, acting through the Bureau of Land Management, contends are non-navigable. Consequently, this study is concerned with many variables in establishing evidence or the lack of evidence of waterbody use in the three regions which this study covers. Thus, with the interests of so many at stake, it is this author's intention that this be no determination of navigability, but rather a determination of how, when, where, and why certain waterbodies were used. This study, then, is a history, not a political statement or a testament of legal authority. It is hoped that the presentation contained herein will be a valuable tool to all who may find it useful for their purposes.

In order for this study to be the most effective, I have divided it into three sections: Arctic Slope region, Yukon Basin region, and Tanana River Basin region. Doing this allowed me to maximize my research efforts for each concentrated area. The Arctic Slope region section has much less information than the others because so little has been written about the area. Contrary to that is information contained in the Yukon Basin region; because of gold rushes in this area, and because the Yukon has always been such in important riverine highway, there is an abundance of information regarding waterbody use. The Tanana River Basin region, like the Arctic Slope region, covers much less area, again because of slim documentation.

While each section contains the same basic outlines, Regional Introduction, Russian Exploration, American Occupation and Exploration, Heritage Resource Survey, and Contemporary Use of Waterbodies, the Yukon region also has an extensive section dealing with the history of mining in that area. There is no doubt that this area was used by miners, as documentation proliferates on that subject.

An explanation is needed regarding the Heritage Resource Survey. The majority of research for this part of each region has been modified from the Alaska Department of Natural Resources, Division of Parks "Alaska Heritage Resource Survey" index file, a massive records system which catalogs all known pre-historic and historic resource sites in the state. Included are those sites or properties that had a direct effect on waterbody travel along the route, and those sites that offer, through physical or geographical proximity, an implication or susceptibility to use of waterbodies along the proposed route. As an historic site record, this survey is important because the presence of an historic site near a waterbody may be an implication of waterbody use by the inhabitants of the area in which the site was discovered. Consequently, this survey serves as supporting documentation to other sections of the report.

There is one general section covering the entire three regions. Archaeological evidence of waterbody use attends to the fact that artifacts imply susceptibility to use by the kind of artifact found. There is a general overview of the pre-history of the route as well as a region-by-region delineation of work done to date by archaeologists.

Finally, the appendices deal with other important pieces of information that are germain to the study but require special attention.

I have included in the appendix a section on mineral resources of the proposed route; it came too late to be included in any part of the report, which discusses past and future mineral resources in quadrangles covered by the proposed route. Also in the appendix is a listing of all those people I interviewed as well as those who srote me letters regarding their use of waterbodies. Along with that is a sample copy of the letter I sent to people for information. The International Whitewater Scale is included because it lends more creedence to descriptions of waterbody use by boaters, miners, and others.

Finally, I have included a list of present waterbody names and their historic variations.* I do this because often there is some confusion as to the proper name of a river, lake, or stream. Hopefully, if there is question, one can consult this list in order to clear doubts.

[* Also included in this study is a complete listing of all waterbodies to be crossed or influenced by the presence of the proposed line. Each listing states physiography of the waterbody as well as its main drainage, tributary of, width, depth, description (according to State Pipeline Office as well as Donald Orth of USGS) and a map reference for easy location.]

Study Method

The State of Alaska's current quest in researching navigability remains for the historian a nebulous and often mind-boggling task. This study, like all others done before it, involved hours of searching for minute leads, pouring through old newspapers and magazines, and searching for available sources that might lead to more information regarding waterbody use. The author's basic methods were the stock and trade of all historians, the literature search. But in addition, this report contains elements of ethnohistory, the craft of interviewing people in order to gain evidence of more recent usage of waterbodies. In the end, this study is an example of the efforts put forth not only by the author but by those who were so helpful throughout the months in which he researched and wrote this history.

According to the Submerged Lands Act of 1953, each state obtained all rights to submerged lands and tidally influenced non-navigable waters. In Alaska there are an estimated 16 million acres of submerged land. To obtain title to this land, the state must prove the overlying waterbody to be navigable. Of course there are inherent problems in accomplishing such a task; simply, no one definition exists regarding what is and what is not navigable. Nevertheless, this study documents evidence of waterbody use, be it on navigable or non-navigable waters.

This study is unique when compared with previous navigability studies. Unlike the standard "regional study", this report of navigability along the proposed gas pipeline route is a site-specific study. That is, instead of documenting waterbody use in a general geographic area, with major waterbodies as a focus, the report deals with all waterbodies that may be crossed or influenced by the proposed gas pipeline route. Thus, the number of waterbodies along the proposed route (260) necessarily dictates that this study be a summary of waterbody use rather than a descriptive narrative as has been the rule in the past.

It must be noted however, that compiling information about every lake, river and stream is a nearly impossible task. For the major rivers there is no real problem. However, many waterbodies remain unnamed or have been given names in recent years by pipeline workers. So the problem exists in how to approach writing a history of waterbody use on streams that have such elusive names as Dunders Dribble, Burgers Bayou, or Pamplins Potholes, or with streams that are never mentioned in any books or other literature. Because of those problems, there has to be a narrative of waterbody use in the geographical region in which the waterbody in question lies. Arriving at an implication of waterbody use on a stream is far better than not mentioning the stream at all.

Finally, research for this study was completed after four months of research, and written during a one-month period. Although not all available material was or could have been consulted, it does represent the best efforts of the author to document waterbody use along the proposed route.

Archaeological Evidence of Waterbody Use

Evidence of waterbody use prior to white contact along the proposed natural gas pipeline is largely dependent on archaeological investigations. There has been extensive work accomplished in regions along the proposed route over the last 12 years. However, the core of archaeological activities have occurred in the last eight years as a result of the Trans-Alaska Pipeline System (known hereafter as TAPS). Coupled with the numerous TAPS studies are the current and ongoing surveys conducted by various contractors in relation to the proposed gas pipeline route.

A general overview of the archaeological character of the proposed route, encompassing the Arctic Slope, Yukon Basin, and Tanana River Basin regions, is provided by Dr. John Cook, from an article in the Western Canadian Journal of Anthropology. According to Cook:

> Known sites in interior Alaska may be placed into three broad categories of cultural history: 1) historic or late prehistoric occupations, rather definitely Athapaskan in nature, 2) an older cultural stratum which may, or may not, be early or ancestral Athapaskan, and 3) a vaguely defined early period. (Cook 1975:125)

With that introduction Cook implies that there were significant population centers in interior Alaska, which further implies that there was a great diversity in the material culture of the widely but thinly distributed people of interior Alaska.

From the pre-contact periods, there are numerous sites along the route that suggest a use of waterbodies. The majority of these sites have been discovered where present Athapaskans live, and Cook says, "there are strong indications that, at least in the north, Indians were utilizing regions that are at present normally considered to be Eskimo territory" (Cook 1975:126). This statement, then, supports this author's hypotheses that a widely scattered cultural horizon indicates that travel was a significant proponent of that cultural diversity, and that with increased evidence of further occupation by a single cultural group implies a greater use of travel routes within an area, leading directly to implications of waterbody use, in this case along the route of both the TAPS and the proposed gas pipeline. Cook continues this idea by stating that:

> The Kavik site and the Itkillik horizon of the Onion Portage site as well as finds discovered along the route of the oil pipeline attest to...expanded Athapaskan distribution about 1000 years ago. (Cook 1975:126)

The fact that many sites have been discovered along the proposed route indicates that those previous inhabitants utilized the area quite extensively. There is quite a bit of evidence that substantiates these statements, evidence for a widespread trading system. Copper, a mainstay of trading activity in Alaska by natives, originating in the White and Copper River districts, found its way down the Tanana to Dixthada. Similar material is found as far north as Atigun north of the Brooks Range. The preponderance of the aforementioned material remains a highly valuable indication of trade patterns among the Athapaskan over an immense geographic area, traversed by countless rivers, lakes, and streams. An example of this are sites at Lake Minchumina, Kaltag, and Anaktuvak Pass, all of which exhibit a high degree of similar obsidian specimens.

Cook makes another important statement regarding the susceptibility to waterbody use when he states, "most of the sites are comprised of clusters of semisubterranean houses, located near good fishing places" (Cook 1975:127). Such a statement indicates that by archaeological excavations there seems to be good evidence for there being waterbody travel along the route of the proposed gas pipeline. Taking the latter into account it is wise to consider this last statement by Cook:

> the inhabitants of Alaska had developed regionally distinctive technologies as much as 10,000 years ago. Whether or not these complexes were the antecedents of the diverse cultures of later periods is a moot point at present, although there are certain continuities. This later Pleistocene cultural diversity does, however, strongly argue for habitation.... (Cook 1975:133)

Again, habitation in areas along the proposed route support a susceptibility to use of waterbodies in those regions covered by this study.

Due to the importance of sites found along the proposed route, a brief survey of archaeological investigations among the three regions will follow.

A very interesting paper by Ernest S. Burch delineates methods of transportation used by natives in northern Alaska. Burch also arrives at a number of hypotheses that help to establish an implication of waterbody use in the Arctic Slope region.

According To Burch:

> The traditional Northwest Alaskan Eskimo solved their transportation problems in two basic ways. First, they did so with a transportation technology that was very sophisticated compared to that of other hunting-gathering peoples. Secondly, they followed a strategy of movement that maximized the effectiveness of their technology, and minimized the inhibiting effects of

> their environment. The term "technology" is used here in the sense of a knowledge of how to make and use manufactured goods, in this case those required to transport other goods and/or people from one place to another. By "travel strategy" I refer to a specific plan of movement which involved extensive inter-regional travel as an element in the yearly cycle of every society. (Burch 1975:1).

Burch then goes on to write extensively about the aboriginal travel methods in summer and winter on rivers in northern Alaska:

> Summer:
>
> Rivers were the primary avenues of inland transportation in aboriginal...Alaska. Here again, the primary means of conveyance for purposes of inter-regional travel was the umiaq. The "shipping season" on the rivers was somewhat different than the one on the coast, however, since both freezeup and breakup come earlier in fresh than in salt water. The rivers are fully open for boat travel by mid-June, and they are normally fully closed in mid-October.
>
> Most people who employed an umiaq for inter-regional travel used it in both riverine and coastal settings. In such cases, the structure of the river umiaq was identical to that of the ocean-going craft described in the previous section. However, people who specialized in trading sometimes built boats designed specifically for river travel. Modifications on the basic umiaq model had the objective of increasing the load factor while simultaneously decreasing the already shallow draft; strength had to be sacrified to some extent.
>
> In practice, this meant building a boat with a slightly wider floor than the ocean-going craft, and with a much greater length. According to informants, some of these specialized river umiaq required 15 or 16 bearded seal skins to cover, i.e., twice the number used on the majority of ocean-going craft. Such a boat could carry something on the order of 4 or 5 metric tons of freight and a crew of twelve, while drawing less than 60 cm. of water when fully loaded. It was ideally suited for the shallow rivers of Northwest Alaska. It was too long to withstand the buffeting of waves and surf, however, it could be used on the ocean only during periods of absolute calm. Informants claimed that a boat of this length was actually easier to handle in the river than an 8-skin boat. It required twice the number of men (i.e., 5 or 6) to take out of the water, however, which was a liability since the skins had to be dried frequently when a boat was used in fresh water.

The best boat covers for both fresh and salt water were made from walrus or bearded seal skins, which could be obtained only at the coast. Acquisition of such skins by inland-dwelling people was rarely a problem, because most of them hunted on the coast nearly every summer. In the Kobuk River and Selawik districts, where the majority of the population remained inland during the summer, people who owned umiaq could acquire sea mammal skins from traders, who brought a supply with them from the coast late every summer. When they had no other recourse, inlanders covered their boat frames with caribou skins, with the hair left on and placed outside. The seams were waterproofed with caribou fat, or with a mixture of charcoal and oil.

Travel downriver primarily involved drifting with the current. One or two people in the bow would paddle just hard enough to maintain steerage, while the helmsman would guide the craft with a long paddle, as on the coast. A square-rigged sail might be used with a favorable wind. Sometimes hunters would go ahead in kayaks to look for game, while women, children, and older men would ride in the umiaq.

The strategy of movement to the coast varied somewhat depending on how far inland the people concerned spent the winter. Inhabitants who wintered between 10 and 80 km from the ocean moved to the coast in April to hunt seals basking on the ice, bringing their umiaq with them on sleds.

Those who lived farther inland...traveled downriver on the spring flood, arriving at the coast sometime in June, just as the saltwater ice was beginning to break up. During this period of high water and twenty-four-hour daylight, it was often possible to average 15 km/hr., and to maintain that rate of speed for several hours at a stretch. Halts were called only when an unusual amount of game was discovered, or when the boats had to be hauled and dried to keep the skins from rotting. In freshwater, the latter consideration meant a lengthy halt every day or two, but the average daily rate of travel toward the coast seems to have been on the order of 75 to 80 km nonetheless.

In the case of the Colville, Utukok, and Upper Noatak regions, this early summer movement to the coast involved practically all the occupants of the district concerned. Consequently, it was a relatively large-scale movement of some 50 to 75 boats carrying several hundred people in each case. Much smaller movements took place in the Kobuk River and Selawik districts, where the only people who regularly came to the coast were traders. These people, with their families, wintered on the upper reaches of the rivers concerned, and traded their way down to the coast in June.

Then, after a few weeks there, they returned home, trading their way back up again.

Extensive upriver travel was usually undertaken between mid-August and mid-September, and was much more time and energy consuming than the trip down in the spring. The main method of propulsion upriver was tracking, the boat being pulled either by dogs, by people, or both, as on the coast. People in the boat would assist by poling, while the lone oarsman and the helmsman would steady the craft on its course into the current. When it became necessary for the trackers to cross the river in order to have a better trail, everyone, except the helmsman, would sit in the bow so as to keep the craft headed into the current, and the boat would be paddled across to the other side while it drifted downstream. These precautions were necessary because the umiaq were usually loaded with several tons of freight and people at this time of year, and it was essential to maintain maximum control at all times in the swift and rocky rivers of Northwest Alaska.

The average rate of speed upriver under good conditions was about 3 km/hr. "Good conditions" meant low water and sunny weather, both of which normally occurred together. Low water resulted in many exposed gravel bars, which provided a much better road than the river banks for the trackers. Sunny weather meant good drying conditions, so that the skin boat covers could be dried quickly and frequently. "Good conditions" made possible an average daily total of about 15 km with a fully loaded boat. This could be increased only if there was a following wind, in which case a sail was hoisted to reduce the effort required of men and dogs.

"Poor conditions" for upriver travel were produced by wind, rain, and the associated high water and extensive cloud cover. Unfortunately for the Eskimos, these conditions often occurred in late August, and early September. When they did occur, it sometimes required four to six weeks to cover a distance that had taken only three or four days to travel the previous spring. The ultimate danger was an early freezeup, which sometimes caught the inlanders in the middle of their upriver journey, far short of their home districts. This meant that they would have to proceed the rest of the way on foot after freezeup, collect their winter paraphernalia, then return to the boats and haul their supplies to their home district by sled. It also meant, as a rule, that it would be difficult or impossible for them to undertake their major fall caribou hunt in the maximally productive manner their travel strategy provided for.

Winter:

River travel was in most respects an extension of overland travel, since it was done on foot and/or by dog sled. Indeed, the frozen rivers of Northwest Alaska provided the major highways of winter travel everywhere away from the seacoast. There were some problems, however, and they are worth mentioning for the sake of completeness.

One important problem with river travel, particularly in the fall, was thin ice, with the danger of falling through and eventually freezing (rarely of drowning). Most Northwest Alaskan rivers have swift currents, and in some areas the ice never gets very thick no matter how cold the temperature. This fact is not always apparent, even to the trained eye. Within a distance, the locations of the worst danger spots are well known, and they are avoided at this time of year particularly. But one was not necessarily aware of the danger spots in other districts, and when traveling in a strange area, one had to keep a sharp lookout for them.

Another problem in winter river travel is overflow. Overflow occurs when, during a period of extreme cold, a river freezes right to the bottom in some shallow place, thus cutting off the flow of water from above. Eventually the pressure gets too great, and the water bursts up through a crack and flows out over the top of the ice, sometimes reaching a depth of 50 cm or more. While the water is still flowing it is an obstacle to the traveler but not a threat. After a time the overflow begins to freeze, at which point all the problems associated with thin ice are repeated. The overflow problem is perhaps the more subtle of the two, however, because it takes place long after the ice in general has become quite thick enough for river travel, and one may not be expecting or looking for it. After a light snow has covered a partly frozen overflow area, it is extremely difficult to distinguish visually from thick ice. (Burch 1975:5, 6, 8)

Burch reinforces the archaeological viewpoint findings that lead to susceptibility to use by concluding that "the transportation technology and travel strategy of the traditional Alaskan Eskimos enabled them to move large quantities of goods and people fairly rapidly over relatively long distances. Furthermore, they were able to do it [travel] year-round, and in practically any context, on the ocean, on rivers, and overland. This mobility contributed greatly to a substantial volume of inter-regional exchange of ideas, goods, services, and information" (Burch 1975:8)

Arctic Slope

In March 1979, the North Slope Borough prepared an analysis of historic preservation alternatives along the TAPS Haul Road. The report recognizes the rich archaeology of the area and states that:

> A wealth of data and artifacts has been uncovered at numerous sites and digs along the portion of the Haul Road subject to borough jurisdiction. (North Slope Borough 1979:9)

Sites mentioned include Prudhoe Bay, Gallager Flint Station, Murphy Lake Complex, and Mosquito-Galbraith Lake. These sites have produced a number of artifacts and some of the sites have been determined to date back 10,000 years.

Indications of waterbody use through archaeological investigations first occurred in the Arctic Slope region in the early 1960's. Ralph S. Solecki and Bert Salwen were the archaeologists. An account of their findings was published in 1973 by the Department of Archaeology, University of Calgary, Canada. During the course of their surveys, Solecki and Salwen recorded material from 19 sites and find spots. Most of the sites were east of the Arctic Slope, however, there were important sites found at Franklin Bluffs on the Sagavanirktok River. A number of years later another archaeologist, John Vetter, found more artifacts in the same general area. As a result of these investigations, a number of interesting conclusions have been reached in regard to possible use of waterbodies in the region.

Solecki and Salwen mention a study by George Bryc in which he states that in the Anaktuvak Pass area there appear to be no suitable passes for easy land travel. Such a fact indicates that travelers probably resorted to water travel because of the lack of areas in which to easily travel over land. The significant site found by Solecki and Salwen was at Franklin Bluffs on the Sagavanirktok River. They discovered artifacts which suggested the presence of house sites. Thus, with the discovery of probable house sites within the large Sagavanirktok River floodplains, there is an increased possibility that past inhabitants utilized the waterbodies in the area for food resources as well as for travel.

Close in relation to Solecki and Salwen's work is that which has been done by Dr. John Cook of the University of Alaska. From the very large compilation of survey research completed between 1969 and 1977 concerning the TAPS, Cook produces a number of hypotheses, which in some ways assist in evidencing waterbody use within the Arctic Slope region:

> The boundary between Eskimo and Indian Cultural spheres has been in a state of flux for several millenia. Not only does this problem concern the utilization of an area by one or the other groups, but diffusion of traits and trade patterns are potentially important.
>
> and:
>
> The development of the Eskimo (material) culture can be traced in the northern foothills of the Brooks Range. Although this is largely a problem of historiography, several questions arise concerning the origin and disappearances of diffusion and/or trade contacts and the resultant impact upon a developing Eskimo continum. (Cook 1977:125)

A number of sites were discovered in this region, the Fish Creek site being one of the more well-known and productive sites. In the conclusions regarding the Fish Creek site, the following suggest that aboriginal movements involved waterbody use through seasonal occupation:

> There are three alternatives in regard to the occupation at Fish Creek: 1) each, or a member of the basic analytic unit represents a temporarily and culturally distinct occupation, 2) all the basic analytic units represent a single short-term occupation by a single cultural group, and 3) the site was seasonally occupied for short segments of a longer time by members of single cultural tradition. (Cook 1977:2)

In addition to the latter hypotheses, past enthnographic studies support the conclusions of Cook:

> All of the groups under examination...seem to have an annual cycle of shifting occupations among one or two concentrated settlements and a number of scattered camps, all of which, occupied in turn a certain group of people, seem to remain in one and the same annual subsistence region year after year. (Osgood 1937:55)

A recent study concludes that indeed, natives in the Arctic Slope region used waterbodies, and that concentrated settlements and scattered camps were characterized as being generally permanent and situated on lake outlet streams in order to capitalize upon fish runs in the area. Furthermore, Cook says (in personal correspondence) a paddle fragment was found on the tundra between Pump Station 3 and

Happy Valley, and that probable remains of an umiaq (boat) were found at the confluence of the Ivishak and Sagavanirktok rivers, further enhancing the probability that aboriginals were users of waterbodies in the Arctic Slope region.

Yukon Basin

As with the Arctic slope region, there has been, and still is, a preponderance of archaeological investigations being conducted in the Yukon Basin region. The majority of surveys thus far have been conducted in relation to the TAPS or proposed gas pipeline.

Major representative work has been done by the University of Alaska under the guidance of Dr. John Cook and Dr. Jean Aigner. As most of their work to date is survey- and site-specific, their discoveries are listed in the Heritage Resource Survey contained in this study, and need not be repeated.

Froelich Rainey completed the first professional survey in the Yukon Basin in 1939. At that time, Rainey surveyed sites at the mouth of the Goodpastor River and in that general area. Later, in 1948, J. L. Giddings and Ivar Skarland discovered three sites in the same area. There was a significant lapse until the next important survey. Work by Frederick Hadliegh-West and John Cook in the late sixties made up for the lost time and numerous sites were discovered in the region that indicated aboriginal occupation near waterbodies.

Those early studies set the stage for further, more intensive surveys. Implications of waterbody use abound in the Yukon region, and as the seventies progressed, many new findings gave further indications of human occupation near waterbodies.

Tanana River Basin

Traditionally, archaeological investigations in Alaska have been relegated to the Interior, Arctic and Aleutian Islands. The Tanana region has been investigated minimally until just recently.

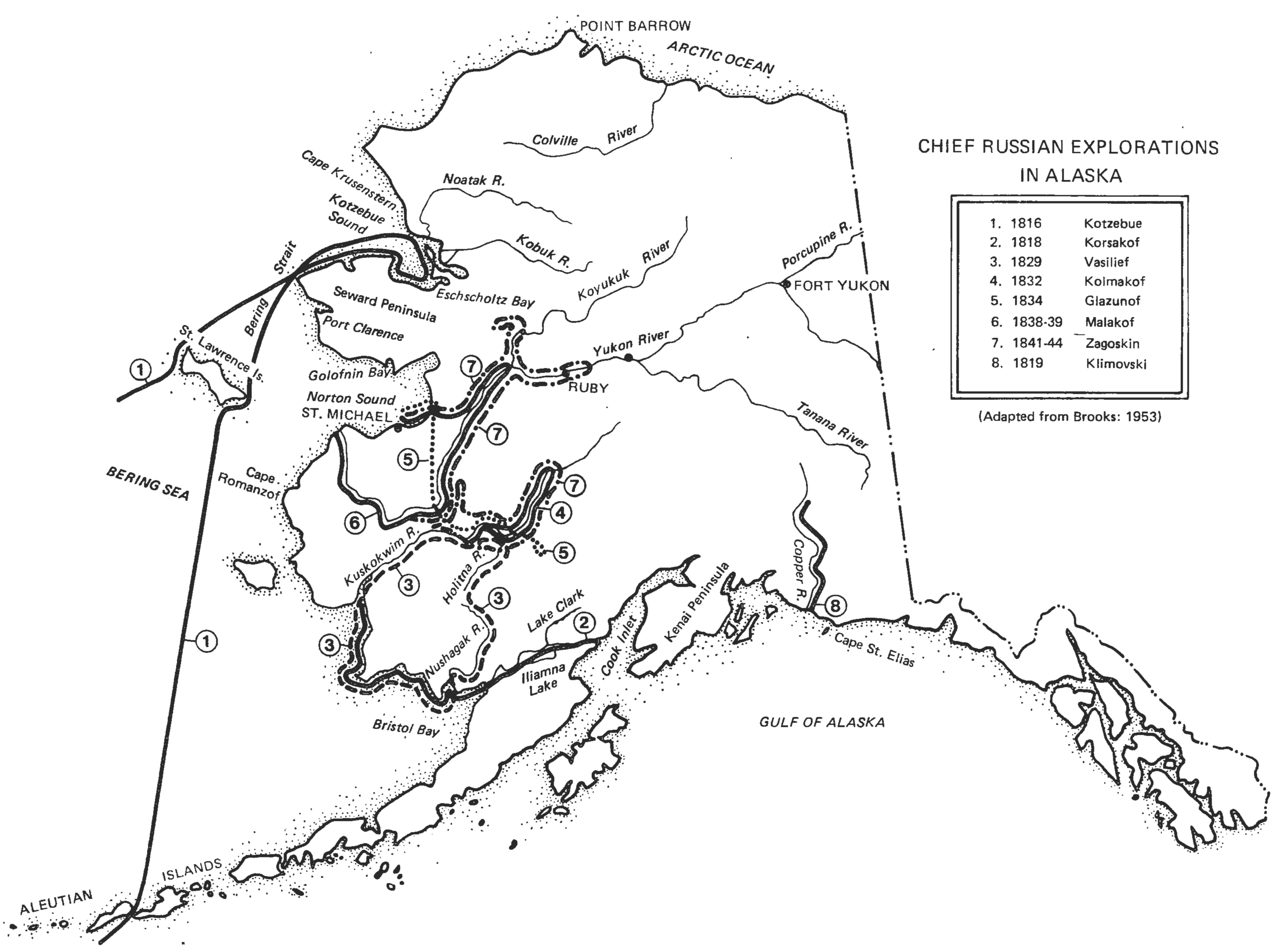
An archaeological survey was conducted along portions of the newly-constructed Alaska Highway in 1945. Frederick Johnson, along with a USGS geologist conducted that survey, which parallels closely the now-proposed gas pipeline route. A previous survey was begun in 1942, but for various reasons was a failure. Johnson discovered no significant sites. However, his final hypothesis contains statements that relate to the probable use of waterbodies in the Tanana region. He stated "as has been pointed out many times, this vast area lies athwart... migration routes into North America" (Johnson 1945:183). The major hypotheses from his survey were:

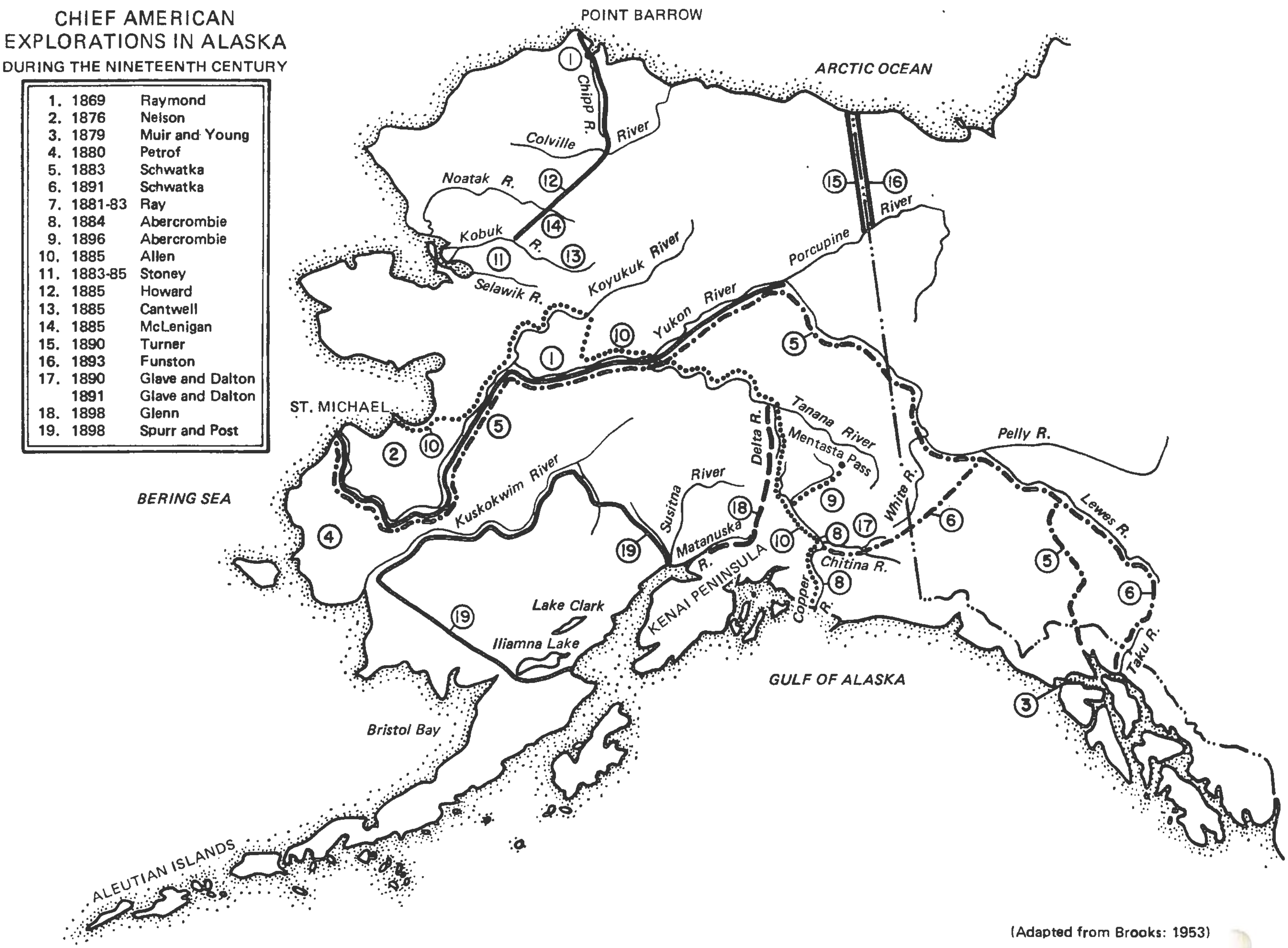
> Discoveries in the Tanana River valley...were all surface discoveries in areas distrubed by the ubiquitous bulldozers and evidence of original provenience

> is tenuous. The sites were all on the edges of old river terraces....
>
> and
>
> The archaeological sites found are, at the moment, significant chiefly because of their geographic setting and because they extend the distribution of a cultural unit over a distance of about 1,000 miles. It seems likely that the specimens belong at least to a broadly definable group of artifacts, having perhaps local variation. So we may trace the prehistoric artisans along a line running southeasterly from Alaska, over low divides and high mountain passes, out into the region where the Peace River drainage runs through northern prairies.... It seems possible that the discoveries during the summer of 1944 may point to one of the areas in North America which have been occupied for a long time. (Johnson 1945:186)

Johnson's hypothsis concerning site location is very important because it presents a probable cause for waterbody use. Sites located in or about river terraces are a good indication that the inhabitants utilized the water resources in their area.

Another archaeological investigation was carried out in the Tanana region in 1974 by the Alaska Division of Parks, Office of History and Archaeology. The survey occurred between Canyon and Shaw Creeks near the Alaska Highway. That survey uncovered a minimal degree of artifact and debris material. However, any evidence of human occupation near water sources may be an indication of potential waterbody use.


CHIEF RUSSIAN EXPLORATIONS
IN ALASKA
1. 1816 Kotzebue
2. 1818 Korsakof
3. 1829 Vasilief
4. 1832 Kolmakof
5. 1834 Glazunof
6. 1838-39 Malakof
7. 1841-44 Zagoskin
8. 1819 Klimovski
(Adapted from Brooks: 1953)
POINT BARROW
ARCTIC OCEAN
Colville River
Noatak R.
Cape Krusenstern
Kotzebue Sound
Kobuk R.
Koyukuk River
Porcupine R.
FORT YUKON
Bering Strait
Eschscholtz Bay
Seward Peninsula
Port Clarence
St. Lawrence Is.
Golofnin Bay
Norton Sound
ST. MICHAEL
Yukon River
RUBY
Tanana River
BERING SEA
Cape Romanzof
Kuskokwim R.
Holitna R.
Nushagak R.
Lake Clark
Iliamna Lake
Cook Inlet
Kenai Peninsula
Copper R.
Cape St. Elias
Bristol Bay
GULF OF ALASKA
ALEUTIAN ISLANDS



(Adapted from Brooks: 1953)

Arctic Slope Region: Regional Introduction

Physiography

The Arctic Slope region is the first of three division covering the proposed natural gas pipeline route. The three major areas within the Arctic Slope region are: 1) Coastal Plain, 2) Arctic Foothills, and 3) Brooks Range.

The Arctic Coastal Plain is a smooth plain rising from the Arctic Ocean to heights of 600 feet in altitude. The plain has poor drainage and is very marshy in summer months. It is characterized by braided and meandering rivers and streams. There are numerous lakes in the area as well. There are no glaciers. The entire area is underlain by permafrost to depths of 500 feet.

The Arctic Foothills consist of rolling plateaus and low mountains. Those foothills are crossed by rivers with sources in the Brooks Range. The majority of rivers are swift, eroded, and characterized by large gravel beds. There are many thaw lakes and morainal lakes present. There are no glacier. The entire area is underlain by permafrost.

The Brooks Range is a vast mountain wilderness with rugged glaciers and towering cliffs and ridges. The range drainage is at the western portion of the range with major rivers flowing north to the Arctic Ocean and flowing south to the Yukon River. Many rock basin lakes dot the landscape at the mouths of large glaciated valleys on the north and south sides of the range. Glaciers are common in this area.

Ecological Resources

The Arctic Slope lies in a zone where tundra predominates, north of the outer limits of the timber line. The tundra is treeless and is quite moist, consisting of water-based and loose gravel beds. This creates the characteristic "berry look" of the tundra, more properly called tussocks. Among the tundra are many lakes. On the Coastal Plain all aquatic vegetation occurs in lakes. In low hills and among major valleys, oxbow lakes are common. Vegetation on the tundra consists of low plants, mostly wet sedge and other grass varieties.

Biological Resources

The two biological regions within the Arctic Slope region are the Colville and Western Arctic regions. The Colville region takes in the entire Colville River drainage and lies within the Arctic Foothills.

The Western Arctic region is very nearly in character with the Colville region. Birds from all major flyways find their nesting grounds in both regions. The mammal population in both regions is high, as are the fishery resources of the area.

Waterbody Name: Putuligayuk River

Main Drainage: Prudhoe Bay

Tributary to: Prudhoe Bay

Width: 10-20 m

Depth: 20-50 cm

Description: A broad shallow meandering stream that drains into Prudhoe Bay. It is located in a broad gravel and silt plan (JFWAT FILES 1981).

Heads in Lake at 69°58' N, 148°52' W, flows NE 40 miles to Prudhoe Bay, 20 miles SE of Beechy Point, Arctic Plain; 70°19' N, 148°58' W. This is the name of an Eskimo that once lived near the mouth of this stream; reported by USC&GS in 1949 (Orth 1967:784).

Map Reference: Beechy Point (B-3)
(1: 63 360)

Waterbody Name: Pump Station #1 Ditch

Main Drainage: Prudhoe Bay

Tributary to: Prudhoe Bay

Width: 2-3 m

Depth: 25-55 cm

Description: An artificial channel that extends from Pump Station #1 to the Putuligayuk River. Water present during periods of high precipitation and periods of high run-off (JFWAT FILES 1981).

Map Reference: Beechy Point (B-3)
(1: 63 360)

Waterbody Name: Grayling Gulch
(Little Putuligayuk River)

Main Drainage: Prudhoe Bay

Tributary to: Putuligayuk River

Width: 0.8-5.0 m

Depth: 40-90 cm

Description: A braided tundra stream characterized by alternating channels and pools. Its course flows through low tundra-lined banks (JFWAT FILES 1981).

Map Reference: Beechy Point (B-3)
(1: 63 360)

Waterbody Name: Lowlife Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 2.0-15 m

Depth: 5-10 cm

Description: A shallow, poorly-defined tundra stream that runs a meandering course through low tundra areas (JFWAT FILES 1981).

Map Reference: Beechy Point (B-3)
(1: 63 360)

Waterbody Name: Telma Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.7-5.0 m

Depth: 35-45 cm

Description: A small, clear, tundra stream that drains a marshland area, just west of the TAPS haul road. Poorly defined, the stream flows through low banks.

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Unnamed Pond

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 100 m

Depth: 4-8 m

Description: A very small tundra pond located within the Sagavanirktok River floodplain (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Short Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 2-6 m

Depth: 15-25 cm

Description: A short, slow-flowing stream that flows into a gravel-based side channel of the Sagavanirktok River (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.7-5.0 m

Depth: 35-45 cm

Description: A very small tundra stream with a meandering course, flowing through low banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Sylvia Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 2-6 m

Depth: 10-40 cm

Description: A small tundra stream that drains several tundra ponds and lakes (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: East Fork Sylvia Creek

Main Drainage: Sagavanirktok River

Tributary to: Sylvia Creek

Width: 2-9 m

Depth: 5-22 cm

Description: A very minute tundra stream that is almost a marsh; no detectable discharge (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Ghost Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.7-5.0 m

Depth: 20-35 cm

Description: A small tundra stream characterized by a network of braided channels that drain the Sagavanirktok River floodplain (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Extension Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-3 m

Depth: 5-15 cm

Description: A narrow tundra stream which meanders through low-cut gravel banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Sagavanirktok River

Main Drainage: Prudhoe Bay

Tributary to: Putuligayuk River

Width: 25-40 m

Depth: 30-80 cm

Description: A braided, meandering, tundra stream characterized by its low banks and its smooth flow (JFWAT FILES 1981).

Heads between Endicott and Philip Smith Mountains at 68°10' N, 149°04' W, flows N 180 miles to Beaufort Sea; Arctice Plain; 70°18'30" N, 147°52'30" W (main channel mouth). Eskimo name "Sawanukto" reported in 1901 by S.J. Marsh, prospector, to mean "strong current" (Orth 1967:824).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Pexcado Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.7-8.2 m

Depth: 3-10 cm

Description: A small tundra stream that originates from several small ponds. Characterized by its alternating pool and riffle areas (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Unnamed Pond

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 80 m

Depth: 2-4 m

Description: An isolated tundra pond; very shallow (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Wood Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-2 m

Depth: 10-25 cm

Description: A small tundra stream that flows parallel to the Sagavanirktok River. Confined to its course by low banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-31 m

Depth: 10-20 cm

Description: A small, beaded tundra stream confined to low banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-3)
(1: 63 360)

Waterbody Name: Sand Creek

Main Drainage: Sagavanirktok River

Tributary to: Toolik River

Width: 1-25 m

Depth: 10-20 cm

Description: A small tundra stream characterized by its narrow channels and many small pools (JRWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Toolik River Tributary

Main Drainage: Sagavanirktok River

Tributary to: Toolik River

Width: 1-25 m

Depth: 10-25 cm

Description: A small tributary of the Toolik River, characterized by its narrow channel; beaded with many small pools and riffles (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Mark Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1.5-2.0 m

Depth: 0.3-1.0 cm

Description: A small tundra stream with origins in upland tundra ponds (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Spoiled Mary Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-2 m

Depth: 0.5-1.5 cm

Description: A shallow, tundra, spring-fed stream that also receives water from the Sagavanirktok River; characterized by its smooth flow (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Stout Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1.2-7.5 m

Depth: 14-24 cm

Description: A moderately-sized tundra stream that drains several tundra ponds and lakes in its headwaters. Characterized by low banks and small pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok A-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1.5-2.5 m

Depth: 5-10 cm

Description: A very small tundra stream characterized by its narrow channel (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Milke Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1.5-2.5 m

Depth: 5-10 cm

Description: A stable foothill stream that flows in alternating riffles and pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Happy Valley Camp Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 2.5-18 m

Depth: 22-30 cm

Description: A moderately-sized foothill stream confined by its low banks; characterized by shallow riffles and small pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Dan Creek
(Charlottle Creek)

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 3.5-14 m

Depth: 15-42 cm

Description: A moderately-sized tundra stream draining a lake in its headwaters, characterized by its small pools and long riffles (JFWAT FILES 1981).

Map Reference: Sagavanirktok (A-4)
(1: 63 360)

Waterbody Name: Lori Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.5-1.5 m

Depth: 5-10 cm

Description: A small tundra stream that originates in a small lake, characterized by its beaded course (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Stump Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 0.3-3.5 m

Depth: 20-40 cm

Description: A small tundra stream that drains Clark Lake. It is slow-moving and has small riffles and pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Arthur Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 2.1-5.5m Depth: 5-40 cm

Description: A small, clear tundra stream that flows over gravel cobbles and boulders to the Sagavanirktok River (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Gustafson Gulch

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1.6-16 m

Depth: 50-64 cm

Description: A moderate tundra stream confined to low gravel banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Polygon Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 8.6-4.5m Depth: 10-25 cm

Description: A small tundra stream that winds through a narrow channel of gravel (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Poison Pipe Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-3 m

Depth: 5-10 cm

Description: A small, beaded tundra stream, characterized by its small pools and long riffles (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Climb Creek

Main Drainage: Sagavanirktok River

Tributary to: Dennis Creek

Width: 1 m

Depth: 2-5 cm

Description: A small, beaded tundra stream characterized by large riffles and small pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Dennis Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 1-2 m

Depth: 20-40 cm

Description: A small tundra stream with a poorly-defined channel characterized by its small riffles and pools (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Bassett Creek

Main Drainage: Sagavanirktok River

Tributary to: Dennis Creek

Width: 1-2 m

Depth: 5-13 cm

Description: A small tundra stream, characterized by its beaded course (JFWAT FILES 1981).

Map Reference: Sagavanirktok (B-3)
(1: 63 360)

Waterbody Name: Rudy Creek

Main Drainage: Sagavanirktok River

Tributary to: Oksrukuyik River

Width: 2.5-17 m

Depth: 27-45 cm

Description: A large tundra stream characterized by its braided and meandering course through low gravel banks (JFWAT FILES 1981).

Map Reference: Sagavanirktok (C-3)
(1: 63 360)

Waterbody Name: Oksrukuyik Creek

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 6-20 m

Depth: 15-25 cm

Description: A large, clear water tundra stream which meanders through low banks and is characterized by riffles and pools (JFWAT FILES 1981).

On Sagavanirktok River, at mouth of Ribdon River, Arctic Slope; 68°49' N, 148°48' W, Eskimo named reported in 1956 by USGS (Orth 1967:719).

Map Reference: (1: 63 360) Sagavanirktok (C-3)

Waterbody Name: Toolik River

Main Drainage: Kuparuk River

Tributary to: Kuparuk River

Width: 2-8 m

Depth: 20-33 cm

Description: A large, beaded tundra stream flowing through low gravel banks (JFWAT FILES 1981).

Heads in Lake at 68°36'30" N, 149°16'30" W, flows N 120 miles to Kuparuk River, 35 miles SW of Gwydyr Bay, Arctic Plain; 69°56' N, 149°30' W, Eskimo name for common Loon (Orth 1967:977).

Map Reference: Sagavanirktok (C-3)
(1: 63 360)

Waterbody Name: Kuparuk River

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 15-20 m

Depth: 10-40 cm

Description: Flows from the headwaters of glacial lakes, the large tundra stream is characgerized by its large pools and many riffles, confined by low gravel banks (JFWAT FILES 1981).

Heads in lake at 68°32' N, 149°12' W, flows N 200 miles to Gwydyr Bay, 8 miles SE of Beechy Point, Arctic Plain; Eskimo name shown on a manuscript map drawn in 1901 by S.J. Marsh, prospector, who spelled it Koopowra and which he translated as "big river" (Orth 1967:553).

Map Reference: Sagavanirktok (D-3)
(1: 63 360)

Waterbody Name: Yan Creek

Main Drainage: Kuparuk River

Tributary to: Toolik Lake

Width: 0.7-2.3 m

Depth: 17-20 cm

Description: A small, beaded tundra stream that drains an extensive marshland (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Hallock Creek

Main Drainage: Terry Creek

Tributary to: Moss Creek

Width: 0.5-1.3 m

Depth: 5-10 cm

Description: A small beaded tundra stream with many riffles and small pools (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Moss Creek

Main Drainage: Kuparuk Creek

Tributary to: Terry Creek

Width: 0.5-0.8 m

Depth: 5-13 cm

Description: An extremely small tundra stream that flows through a tundra marshland in an incised channel (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Terry Creek

Main Drainage: Toolik Lake

Tributary to: Ed Creek

Width: No dtermination Depth: No determination

Description: A beaded, clear water tundra stream that runs through marshland in a poorly-defined channel (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Mack Creek

Main Drainage: Toolik Lake

Tributary to: Ed Creek

Width: No determination Depth: No determination

Description: A small, beaded stream that flows through a marshland in a narrow channel (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Ed Creek

Main Drainage: Koyukuk River

Tributary to: Toolik Lake

Width: 0.5-1.4 m

Depth: 6-12 cm

Description: A small beaded stream that drains a muskeg marshland and flows northwest to Toolik Lake in a poorly-defined channel (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Jill Creek

Main Drainage: Itkillik River

Tributary to: Itkillik River

Width: 0.5-1.5 m

Depth: 5-10 cm

Description: A small, beaded tundra stream that drains a marshland. Characterized by poor drainage and a narrow, confined channel (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Atigun River

Main Drainage: Sagavanirktok River

Tributary to: Sagavanirktok River

Width: 10-25 m

Depth: 10-30 cm

Description: A very large stream characterized by its many channels and braided and meandering course (JFWAT FILES 1981).

In endicott Mountains, heads at glacier terminus, flows NE 45 miles to Sagavanirktok River 20 miles S of its junction with Ribdon River, Brooks Range; 68°31'30" N, 149°01'00" W, Eskimo name reported in 1956 by USGS (Orth 1967:91).

Map Reference: Philip Smith Mountains (A-5)
(1: 63 360)

Waterbody Name: Tee Lake Outlet

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 0.5-1.5 m

Depth: 10-15 cm

Description: A very small stream that flows northwest from Tee Lake through a marshland (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

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Waterbody Name: Holden Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 1-3 m

Depth: 5-10 cm

Description: A moderately-sized stream that flows through a marshland and large floodplain (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Roche Moutnee Spring

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 3.5-5.7 m

Depth: 15-60 cm

Description: A moderately-sized stream that flows through a large gravel and cobble floodplain; has a braided channel with low gravel banks (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Waterhole Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 0.5-1.5 m

Depth: 10-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Bicycle Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 0.5-1.5 m

Depth: 5-15 cm

Description: A small marshland-bound stream (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 1-2 m

Depth: 5-8 cm

Description: A very small stream confined to low tundra banks (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 0.6-1.3 m

Depth: 3-8 cm

Description: A very small tundra stream; nearly a trickle (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Tyler Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 1-2 m

Depth: 10-14 cm

Description: A braided stream characterized by its clear water sources and meandering course (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (B-5)
(1: 63 360)

Waterbody Name: Trevor Creek

Main Drainage: Sagavanirktok River

Tributary to: Atigun River

Width: 1-3 m

Depth: 10-14 cm

Description: A braided stream that meanders through a floodplain. Its glacial waters flow over gravel and boulder beds (JFWAT FILES 1981).

Map Reference: (1: 63 360) Philip Smith Mountains (B-5)

Waterbody Name: West Fork Chandalar River

Main Drainage: Chandalar River

Tributary to: North Fork Chandalar River

Width: 1-30 m

Depth: 10-24 cm

Description: A very large, braided, meandering stream, characterized by its many channels and low gravel bed (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-4)
(1: 63 360)

Waterbody Name: Wetfoot Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 4-13 m

Depth: 1.5-25 cm

Description: A spring-fed tundra stream that originates in the Endicott Mountains; characterized by its many riffles and pools (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-5)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-0.8 m

Depth: 5-7 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-5)
(1: 63 360)

Waterbody Name: Oskar's Eddy

Main Drainage: Miffle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-1.5 m

Depth: 10-12 cm

Description: A steep mountainous stream whose glacial waters run through a deep gravel bank (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-5)
(1: 63 360)

Waterbody Name: Nina Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-1.5 m

Depth: 5-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-5)
(1: 63 360)

Waterbody Name: Dietrich River

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 3.5-10 m

Depth: 5-25 cm

Description: A large well-defined stream that flows through a very meandering and braided course (JFWAT FILES 1981).

Flows S 35 miles to join Bettles River to form Middle Fork Koyukuk River, 4.5 miles NW of Wiehl Mountain and 35 miles WNW of Chandalar, Brooks Range; 67°38'30" N, 149°45'00" W, local name shown on an 1899 fieldsheet by T.G. Gerdine, USGS (Orth 1967:272).

Map Reference: (1: 63 360) Chandalar (D-6)

Waterbody Name: Overwintering Creek
(Schroder's Spring)

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 1-20 m

Depth: 8-45 cm

Description: A very large spring-fed stream and floodplain that drains the Dietrich River. Characterized by its two main channels flowing through low gravel banks (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (C-5)
(1: 63 360)

Waterbody Name: Nutirwik Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 3.7-14 m

Depth: 17-23 cm

Description: A clear water, spring-fed stream which flows down a steep gradient (JFWAT FILES 1981).

Flows N 5.5 miles, then W 4.5 miles to Dietrich River, 10 miles NW of Snowden Mountain and 46.5 miles NW of Chandalar, Brooks Range; 67°56' N, 149°50' W, named and reported in 1939 by Robert Marshall for his Eskimo friend and hunting companion, Nutirwik, or Harry Snowden (Orth 1967:713).

Map Reference: Philip Smith Mountains (D-4)
(1: 63 360)

Waterbody Name: Beaver Dam Brook

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-0.9 m

Depth: 5-9 cm

Description: A very small stream (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (D-4)
(1: 63 360)

Waterbody Name: Burger's Bayou

Main Drainage: Dietrich River

Tributary to: Middle Fork Koyukuk River

Width: No determination Depth: 7-13 cm

Description:

Map Reference: Philip Smith Mountains (D-4)
(1: 63 360)

Waterbody Name: 52+10 Creek
(Buff Creek)

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 1.7-7 m

Depth: 8-17 cm

Description: A steep mountainous stream. Its clear waters flow through many braided channels (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (D-4)
(1: 63 360)

Waterbody Name: Steep Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 1.8-4.3 m

Depth: 10-17 cm

Description: A steep mountainous glacial stream that flows through a braided gravel course (JFWAT FILES 1981).

Map Reference: Philip Smith Mountains (D-4)
(1: 63 360)

Waterbody Name: Uge Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.4-0.5 m

Depth: 10-20 cm

Description: A steep mountain stream with a wide rocky and gravel bed (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Numbers Lake Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-1.5 m

Depth: 5-8 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Snowden Pond Inlet

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5-1.5 m

Depth: 5-10 cm

Description: A small tundra stream headwater to Snowden Pond. Very small and confined to low tundra banks (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Snowden Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 3.5-5.5 m

Depth: 5-28 cm

Description: A small stream that drains a mountainous area; characterized by its narrow channel (JFWAT FILES 1981).

Flows SW 5.5 miles from Snowden Mountain to Dietrich River, 6.5 miles N of the junction of Bettles and Dietrich rivers and 37.5 miles WNW of Chandalar, Brooks Ranges; 67°44'20" N, 149°46'20" W, named in 1939 by Robert Marshall for his Eskimo hunting partner (Orth 1967:893).

Map Reference: (1: 63 360) Chandalar (C-6)

Waterbody Name: Unnamed Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 4.2-5.3 m

Depth: 10-24 cm

Description: A moderately-sized stream characterized by its many channels and small riffles (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Disaster Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 30-40 m

Depth: 50-60 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Airport Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 0.5 m

Depth: 2-5 cm

Description: A collection of small riffles and tiny pools (JFWAT FILES 1981).

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Brockman Creek

Main Drainage: Koyukuk River

Tributary to: Dietrich River

Width: 1-3 m

Depth: 15-20 cm

Description:

Map Reference: Chandalar (C-6)
(1: 63 360)

Waterbody Name: Eva's Alv

Main Drainage: Middle Fork Koyukuk River

Tributary to: Dietrich River

Width: 1.2-1.5 m

Depth: 2.5-5.7 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Chandalar (D-6)
(1: 63 360)

Waterbody Name: Millie's Meander

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.5-1.5 m

Depth: 10-12 cm

Description: A very small side stream channel of the Middle Fork Koyukuk River (JFWAT FILES 1981).

Map Reference: Chandalar (D-6)
(1: 63 360)

Russian Exploration

There is little record of Russian exploration within the Arctic Slope region. The most successful exploration of the region occurred in 1838, and even then the efforts and results were minimal as far as the opening of any significant travel routes on waterbodies in the Arctic Slope region. Aleksandr Filippovich Kasheverov lead the 1838 expedition under the auspices of the Russian American Company. Under the guidance of Kasheverov, the expedition was to:

> proceed in a company ship to Cape Lisburne, or as far as the ice permitted, and from there to continue in smaller boats or whatever manner best suited for exploring and surveying the region. (Tikhmenev 1978:179)

On July 5, 1838, the expedition departed from the brig Polifem which had accompanied the expedition as far as Cape Lisburne. Kasheverov continued on past the Cape and "succeeded in describing the coast in some detail for thirty-five miles beyond Point Barrow" (Tikhmenev 1978:180). It is not known, however, in what direction Kasheverov traveled. It is quite possible he and the members of the party reached the Putuligayuk River, but again records are not clear in this matter. The possibility for further exploration was excellent; however, due to a threat of attack by a group of Eskimos, the expedition members were forced to turn back.

Kasheverov seems to have been the only Russian explorer to approximate navigation of waterbodies within the Arctic Slope region and it is likely that he would have gone further had it not been for the hostile native population.

American Exploration and Occupation

The only significant exploration in the Arctic Slope region by an American had its beginning in May 1901. Walter C. Mendenhall, a geologist with the U. S. Geological Survey, and a large party of men assembled in Seattle arrived in Skagway on May 23rd. Their plans were to complete a reconnaissance from Fort Hamlin on the Yukon River to Kotzebue Sound via the Dall, Kanuti, Allen, and Kowak Rivers.

From Skagway, the party made their way to Whitehorse and, while there, purchased canoes and made their way up the Yukon to Dawson, arriving on June 4th. There, the party was divided and one group of men worked on running a stadia line from Ft. Yukon to Ft. Hamlin. Mendenhall stayed at Dawson until the 10th, gathering supplies and information on the Dall and Koyukuk Rivers for their planned traverse. He and his party arrived at Ft. Hamlin on June 13th, where they purchased three weeks supplies and then met the first party after their initial work. Mendenhall writes about the trip:

> The party assembled in Seattle about the middle of May, 1901, and on May 19 took passage on the steamer

City of Seattle, arriving at Skagway on the 23rd. It was learned that Lake Leberge was still covered with ice and that steamers would not be able to get through until about the 10th of June. The Yukon River from Lower Laberge to Dawson, however, had been open since May 23. Being extremely loath to lose the ten which remained before Lake Laberge would be navigable, canoes were purchased at White Horse, and with these the trip through Lake Laberge was made during the last of May and the early part of June. Open water was found between the ice and the shore for much of the distance, and where these channels had been closed by the crushing of the floe against exposed points the boats were placed upon rude runners and hauled over the ice until open water again appeared.

Finding the steamer Bailey waiting for outside mail at Lower Laberge, the party embarked on the 2nd of June and reached Dawson early on the 4th. Here the party was divided, and Mr. Reaburn, with three men, was equipped with provisions and boats for running a stadia line from Fort Yukon to Fort Hamlin. This portion of the party left Dawson on the 5th of June on the steamer Louise, and began its work at Fort Yukon on the 8th.

The remaining members of the party stayed at Dawson until June 10, buying supplies and securing information concerning the country between the mouth of Dall River and the Koyukuk, which was to be traversed later. A brief visit was made to the producing creeks near Dawson. On the evening of the 10th the party left Dawson and arrived at Fort Hamlin on the morning of June 13. Three weeks supplies were purchased here for the trip to Bergman, and on the 17th the party was reunited by the arrival of Mr. Reaburn and his assistants.

June 18 to June 27 were spent in carrying the traverse line up the Dall River to the collection of cabins on its upper course known as Dall City. Here the overland pack trail from Fort Hamlin to the Koyukuk diggings crosses the river, and prospectors were found, bound for the Koyukuk diggings, but entirely ignorant of the route to be followed in reaching them.

By the evening of July 3 the entire outfit had been transported over the 18 miles of portage to a point on the Kanuti River where boats with their loads would float. The stream here, however, was swift, shallow, and full of boulders, so that boats could be taken through it only with the greatest care, and even then at some risk. On the 5th of July a broad

> valley along the upper course of Kanuti River was reached. Here the stream wanders in tortuous meanders, and as there was abundant water, good progress was made. On the next day rapids were encountered, which extend for a distance of 25 or 30 miles, and in which there is a fall of 700 to 800 feet. Through much of this distance the stream is a practically continuous rapid, full of large boulders, and most careful work was required to get the boats through without wrecking them completely. Notwithstanding the utmost care they were punctured several times, and in two or three instances were swamped, although without much damage to outfit or provisions. The most serious feature of this section, however, was the delay which it occasioned and the consequent exhaustion of supplies, so that by the time the more easily navigable lower portion of the river was reached, on the 10th of July, provisions were nearly gone, and in order not to interrupt the work recourse was had to the game and fish supplies of the river. Fortunately, ducks and geese were abundant, and these furnished the greater portion of the subsistence for the last few days spent on the Kanuti River. At the mouth of Mentanontli Creek a fishing party of Koyukuk Indians was encountered, and from these a few pounds of flour and bacon were purchased. (Mendenhall 1902:8-9)

Mendenhall's trip on the Kanuti and Dall Rivers remains one of the most extensive explorations in the area of the Arctic Slope region. According to Mendenhall's account, he was probably one of the first Americans or white men to ascend these rivers. "Although the route from the Yukon to the Koyukuk by way of the Dall River has been known for a number of years by prospectors, and the headwaters at least of the Kanuti River have been visited by them, no maps of either stream were available, and no accurate information concerning them was obtainable previous to the year 1901" (Mendenhall 1901:18). That statement, made almost 80 years ago, still remains true today; there are few documented sources that indicate use of the Dall and Kanuti Rivers.

Germane to the question of navigation is a section from Mendenhall's report which describes in great detail their conditions and methods of work and transportation:

> Exploring expeditions in high latitudes, which are carried on only in the summer, with no provision for wintering, are limited in time, and hence, where the extent of territory covered is considerable, in the present case between 1,100 and 1,200 miles, certain sacrifices must be made to the paramount necessity of gaining ground. Through difficult regions all the energies of the scientific, as well as of the other members of the party, are of necessity often devoted to overcoming the physical obstacles encountered.

Work under these conditions can not be uniform in quality. Observations made while the observer is struggling ahead at the end of a tracking line, or bending all his energies to the prevention of disaster in the wild waters of a gorge, or perhaps zigzagging up a 1,000-foot climb with 90 pounds on his back, are not always as complete as is desirable. It is hoped, however, that such conditions have not resulted in other inaccuracy than that due to incompleteness.

Geologic observations were for long stretches confined to the line of traverse, but wherever it was possible these were supplemented by side trips. Generally a rough compass traverse was maintained upon which observations were recorded directly: but at times when the geologist and topographer were together, references were placed upon the toipographer's traverse and the geologic observations recorded with corresponding references. Collections were of course made for comparative study later, and information was gleaned from all possible sources.

For transportation Peterboro canoes were used, since the route lay along waterways or over portages where these light boats could be carried. Two were used from Fort Yukon to Bergman, and four from Bergman to Kotzebue Sound. The canoes were propelled by oars, sails, or paddles, or by tracking or poling, as conditions varied.

The route followed by the Geological Survey party during the summer of 1901--i.e., up the Dall to Dall City, across the portage to the head of the Kanuti River, and down the latter stream to the Koyukuk-is not a practicable one for parties traveling in boats, because the portage from the Dall to the Kanuti is long (18 miles) and arduous, involving a climb of 2,500 feet, and the canyon of the Kanuti River, nearly 30 miles in length, is a succession of rapids through which boats must be lined with constant risk of loss.

A trail often followed by packers in summer leaves the Dall at its mouth, crosses the flats westward to the hills, and follows these to Dall City, whence the route coincides with the Kanuti River portage route as far as the divide at the head of the latter stream. At this point those bound for the Koyukuk turn to the north along a ridge separating the Swift River from the Kanuti River, but the trail above timber line is not recognizable. That portion of the route lying between the mouth of the Dall River and the hills is often impassable on account of high water, and pack

> trains may be delayed for two or three weeks waiting for the water to subside, as was the case in June, 1901. This difficulty may be avoided by landing opposite Fort Hamlin, 8 or 9 miles below the Dall River, whence high land, rising from the banks of the Yukon, can be followed directly to Dall City.
>
> A winter route to the Koyukuk lies directly up the Dall to its source; then by a low gap at its head, which can not be reached by boats in summer because of rough water, to the upper basin of the Kanuti River. From the lower end of this basin Fish Creek is reached by another low pass and can be descended to the South Fork of the Koyukuk. The traveler over this route always is within reach of timber and the shelter and fuel which it affords. (Mendenhall 1901:18, 23)

Lastly, Mendenhall writes about the rivers he encountered during his exploration and their character during different times of the year:

> ...the Kanuti River receives a large tributary from the south in the direction of the sources of the Tozi and Melozi.
>
> About 25 miles above its mouth the river plunges into a second canyon about 10 miles long and 500 feet in depth. This is the most beautiful section of the river; the stream is swift, but free from dangerous rapids, and the bluffs of slate and sandstone rise sheer from the water to a height of several hundred feet. Ten miles above the mouth it receives the waters of the Mentanontli, descended by Lieutenant Allen in 1885 after his overland journey from the Yukon.
>
> The hills which border this lower section of the Kanuti River and adjacent parts of the Koyukuk are seldom more than 1,500 feet in height, are not excessively steep, and are well timbered.
>
> Winter temperatures of 60° or 70° below zero are reached for a few days at a time in this interior region adjacent to the Arctic circle, but during these severely cold periods it is usually perfectly calm. The more dangerous times are those of higher temperatures and wind. At such times man can not face the gales and live. Much of the early and late winter weather, however, is not more severe than that in the north-central portion of the United States, and persons who have wintered on the Kowak or the Koyukuk prefer this season for the transportation of supplies and for travel generally, the air being dry and many days in each month bright and clear.

> The summers are short but warm enough to be pleasant, the period from the middle of June to the middle of September, and in favorable years to October, being available for travel by the waterways or for prospecting. June and July are usually bright and clear, but after August 1 rains are to be expected, which often continue until freezing weather in September. There are then a few weeks of bright, cool, clear weather intervening between the beginning of freezing and the beginning of snowfall, which in many respects are the pleasantest part of the year, the mosquitoes and gnats, such intolerable nuisances during the summer, having disappeared entirely. (Mendenhall 1901:50)

Excepting Mendenhall's account, there exists little evidence of water-body use in the Arctic Slope region until the late 1930's and 1940's, but much of that information remains speculative.

A short account of travel in this area appeared in the May 1948 issue of The Alaska Sportsman. Written by Ted Muth, this account tells of his travels in the arctic of Alaska in the search for minerals (mostly gold). He writes, "As I meandered around town [Fairbanks] meeting friends I'd known during my earlier summers in Alaska, I heard that Harry Swanton, then a pilot for Wien Airways, was looking for someone to prospect the south fork of the Man River, the Kanuti" (Muth 1948:6-7). Even at that date, few maps or geological reports mentioned very little about the river 250 miles north of Fairbanks.

Muth continues, writing about his plans to prospect the Kanuti:

> I went up to the Fairbanks library and looked up the geological report on the Ray Mountains, the Kanuti-Dall rivers and so forth, and figured out the lake we were going to land on was at the head of the main Kanuti.... I could cross the Dall drainage, build a raft, and float down the Dall to the Yukon.

and:

> ...[the lake] was entirely different country from the location I had figured. It was on the northwest side of the Ray Mountains, across from the head of the Ray River, at the head of the south fork of the Kanuti. Thus, if one had to get out by land it was a question of floating down the Kanuti.... (Muth 1948:8)

Muth also mentions the Ray River in his article, saying that "in regard to the geology of the lower Ray, there's every reason to believe that the Yukon once flowed up the depression of the Ray for fifteen or twenty miles. Two cross-channels of clear quarts gravel are plainly distinguishable about ten miles up the Ray...and as you approach the Ray it looks as if the Yukon still flows up its valley" (Muth 1948:40).

Heritage Resource Survey (Arctic Slope)

Of the 16 major historic sites listed in the Arctic Slope region, 15 are descriptions of sites on or near major rivers and streams. This readily indicates that those inhabitants who occupied the sites may have utilized the waterbodies for travel and subsistence.

The one site not prehistoric in nature is the historic West Fork Roadhouse situated on the Tolovana River, a known travel route for prospectors and miners during the various gold rushes of the late nineteenth century.

HERITAGE RESOURCE INVENTORY

Name of Site:	Putuligayuk River Delta Overlook
Location:	T 11 N, R 14 E, Section 11 (Umiat Meridian) Latitude: N 70 19' 02" Longitude: W 148 29' 30" Map Series: Beechy Point
Description:	On a low bluff on the west side of the Putuligayuk River Delta.
Significance:	9 firehearths and surface scatters of lithic debris were found in blowouts in an area 180 meters by 25 meters. Artifacts present from the small tool tradition. site is located on stabilized sand dune of aeolin origin.
Source(s):	(Lobdell 1980) (AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Sagavanirktok River, Main Channel (Historic)

Location:

Latitude: N 70 13' 15"
Longitude: W 147 56' 20"
Map Series: Beechy Point

Description: A 3 meter square structure still standing and in good condition. Historic refuse and flattened fuel cans indicate that the structure is recent. A storage cellar located nearby.

Significance: The site may be a fish camp, as many of the post configurations outside the structure may have served as fish drying racks.

Source(s): (Lobdell 1980)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Putuligayuk River Delta Overlook (Prehistoric)

Location:

Latitude: N 70 19' 02"
Longitude: W 148 29' 30"
Map Series: Beechy Point

Description: An archaeological site was detected during construction (TAPS). Deteriorating weather precluded any testing, though a probably artifact was found at the base of the low bluffs. The bluff site consists of 9 fire hearths spread over an area about 180 meters by 25 meters.

Significance: Probably an area of archaic habitation, the lands between the Colville and Canning Rivers have often been terms a 'no man's land'. Archaeologists have assumed that any circumpolar population movements would require passage through or near Prudhoe Bay. This site indicates both past occupations.

Source(s): (Lobdell 1980)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Kuparuk River (Historic)

Location: T 12 N, R 13 E, Section 19 (Umiat Meridian)
Latitude: N 70 23' 13"
Longitude: W 148 56' 40"
Map Series: Beechy Point

Description: A ruin of sod blocks about 35 centimeters high. Dimensions are 8x3 meters. Included at the site are a few scraps of metal. Wooden posts (corner) criven into the ground have been sharpened by a metal axe. The house contains no milled wood.

Significance: The location may be early historic due to the deterioration and lack of modern lumber. The inland location may have served fishing purposes.

Source(s): (Lobdell 1980)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: S-45

Location:

Latitude: N 69 18'
Longitude: W 148 45'
Map Series: Sagavanirktok

Description: A frost feature containing about 60 fragments of worked work.

Significance: An isolated find in which further tests produced no other cultural material.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-45

Location:

	Latitude:	N 69 18'
	Longitude:	W 148 45'
	Map Series:	Sagavanirktok

Description: A frost feature containing about 60 fragments of worked work.

Significance: An isolated find in which further tests produced no other cultural material.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-44

Location:

Latitude: N 69 20'
Longitude: W 148 35'
Map Series: Sagavanirktok

Description: A site with tent rings.

Significance: The tent rings seem to have been occupied at the same time, probably late summer-early fall; c. 1908. Classic depiction of Eskimo cultural transition during early 1900's. Also contains bow fragments and flint knapping tools.

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: S-40: S-41

Location:

Latitude: N 69 25'
Longitude: W 148 30'
Map Series: Sagavanirktok

Description: A stratified test area; evidence of multiple occupations.

Significance: Contained pre- and post-contact materials.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-78

Location:

Latitude: N 68 40'
Longitude: W 149 30'
Map Series: Philip Smith Mts.

Description: Present are a ruin of a sod house and there are 4 stone tent rings.

Significance: A site of Eskimo habitation; probably in the summer for hunting, fishing, and lookout for caribou

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-75

Location:

Latitude: N 68 45'
Longitude: W 148 50
Map Series: Philip Smith Mtns.

Description: The site consists of a small cache; a circular depression with a 10½ inch diameter. With the cache are stones, cut willows, tin cans and cut antler.

Significance: Likely Eskimos in nature.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-92

Location:

	Latitude:	N 68 45'
	Longitude:	W 148 45'
	Map Series:	Philip Smith Mtns.

Description: A site with tent rings.

Significance: The site appears to be of a recent Eskimo hibitation.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-93

Location:

Latitude: N 68 32'
Longitude: W 149 10'
Map Series: Philip Smith Mtns.

Description: A tent ring site that also contains caribou fragments (bone) and unworked wood.

Significance: A camp of short duration.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: S-12 through S-135 (various in between)

Location:

Latitude: N 68 45'
Longitude: W 149 20'
Map Series: Philip Smith Mtns.

Description: Series of tent rings, cultural debris, cut antler, worked and unworked woods, chipping stations, cut willow, flakes, etc.

Significance: Substantiates the claim that Eskimos inhabited this area for centuries. Presence of a small tool tradition--Athapaskan adaptations.

Source(s): (AHRS 1970-1972)

HERITAGE RESOURCE INVENTORY

Name of Site: Wright's Roadhouse

Location:

Latitude: N 67 25'
Longitude: W 150 06'
Map Series: Wiseman

Description: On the MIddle Fork Koyukuk River at the junction of Wiseman Creek.

Significance: On a river that supported a major waterbody travel route.

Source(s): (Smith 1974:63)

HERITAGE RESOURCE INVENTORY

Name of Site:	Logjam Roadhouse
Location:	
	Latitude: N 65 14'
	Longitude: W 148 40'
	Map Series: Wiseman
Description:	On the left bank of the Tolovana River 22 miles south of Livengood.
Significance:	On the path of a major waterbody travel route to gold fields.
Source(s):	(Smith 1974:61)

HERITAGE RESOURCE INVENTORY

Name of Site: West Fork Roadhouse

Location:

Latitude: N 65 27'
Longitude: W 148 39'
Map Series: Wiseman

Description: On the right bank of the West Fork Tolovana River, 6 miles southwest of Wiseman.

Significance: At a community originally established to supply the Livengood Camp in 1915.

Source(s): (Smith 1974:62)

scattered across the river in many places. It required very little maneuvering (Class I water). The last 10 miles are out of the foothills into the heavy timbered flats. Some low 1000'-2000' high hills paralleled both sides of the river at 1-2 miles' distance. White and black spruce were the dominant trees with willows thick close to the river in places. The scenery was not outstanding. Good campsites were still plentiful but the terrain did not offer the good hiking opportunities as were available upstream. We saw a red-tailed hawk, owl, ravens, herring bulls, a loon and four unidentified ducks. Grayling fishing was poor all day.

July 22

We enjoyed the sun again as we made an easy four hour, 16 miles float into Bettles Field arriving about 2 p.m. The koyukuk flowed at a steady 4 mph, often through two main channels 100'-150' wide and 4'-6' deep. There was no rapids (Class I water) and only a few sweepers creating little hazard. While in the "flats" we could see the Brooks Range in the distance much of the time. The NF appeared similar to the MF but the Wild River was smaller and noticeably a more clear green in color than the others.

We got a BLM fire pickup to take our boats and gear to the airstrip. Had missed the Wien flight to Fairbanks so Jules chartered a plane. We were not sure where the truck was (Dietrich Camp or Fairbanks), called both places and couldn't locate it. We flew to Dietrich Camp (no truck) then to Ft. Wainwright (BLM Fire Control headquarters) at Fairbanks arriving about 11 p.m. Spent the night at Fire Control quarters.

July 23

Jules, Tom and I picked up the truck at BLM District Office, then our gear, and drove back to Anchorage arriving at 5 p.m.

General

We covered (floating) 2 1/2 miles of the Dietrich, the 64 mile long MF and 16 miles of the main Koyukuk (total 82 1/2 miles) in six extremely easy days on fast Class I water. It is an enjoyable float trip for the intermediate canoeist. The scenery is varied and grand for most of the distance. Gold mining (past and present) activities add historical interest to the area. There is no public access, air or road, to the upper MF or the Dietrich Rivers. (Dapkus 1976:1-6)

The second trip took place between June 19-30th, 1978, and was a river study of the Sagavanirktok River and that river's relation to the wilderness resources surrounding it. Again, this group was under the guidance of David Dapkus of the Bureau of Outdoor Recreation. The in-depth account follows (members of the party were: Hope Reed, Div. of Parks, State of Alaska; Terry O'Sullivan, Elliot Lowell, and Don Pendergast, BLM, Fairbanks District; LaRalle Smith and Mike Brown, BLM, State Office; and David Dapkus, BOR, Anchorage):

Field Inspection of the Sagavanirktok River June 19-30, 1978.

A field inspection of the Sagavanirktok River (Sag River) was conducted June 19-30, 1978, by an interagency team as part of a HCRS study of the river area. The HCRS study is being done as technical assistance to the Bureau of Land Management in evaluating river related resources within BLM administered areas. The area in this study is in part of the Trans-Alaska Oil Pipeline corridor under the administration of BLM. The lower 1/3, including the Prudhoe Bay area, is on lands that are owned by the State of Alaska.

Two 17 foot (shoe keep) gruman canoes and one 17 foot (standard keel) gruman canoe were used for the river inspection.

June 19

I picked up a GSA Form van at 7:30 a.m., drove to the office and loaded the gear. Hope Reed and LaRalle Smith met me there for the drive north. We left the office at approximately 9:30 a.m., and drove to Fairbanks. We overnighted at the Fairbanks Inn.

June 20

The remainder of the inspection team met us at the Fairbanks Inn for breakfast. We all then left at 7:00 a.m., in two vehicles to drive to the Sagavan irktok River via the Trans-Alaska Oil Pipeline (TAPS) haul road. We had a two hour delay at the Yukon River bridge crossing, which I've found not unusual. We arrived at Galbraith Lake which is the start at the Atigun River at 8:00 p.m. The plan was to float ten miles of the Atigun to where it joins the Sagavanirktok and then float the Sag to Franklin Bluffs. We observed six black bear between the Yukon River bridge and Dietrich camp, three red fox and two moose. We camped overnight near the bridge crossing of the Atigun River near Galbraith Lake.

June 21

While most of the team remained in camp getting ready for the start of the float Terry and I shuttled vehicles to Franklin Bluff's camp which was our planned take-out point. The road was extremely muddy. During the drive Terry and I saw two sandhill cranes, about two dozen ducks, 30 caribou and a wolf.

Broke camp early afternoon and floated down about two miles down the Atigun before making camp again. The Atigun is a small clearwater river, 50 feet wide, one to five feet deep, with an average 4 to 5 mph current. The water appeared high. There were numerous stove and refrigerator size boulders in the river and some sand along the banks. This part of the Atigun River was Class II on the International Whitewater Scale.

Dominant vegetation was alpine tundra with some low (4') willow burch immediately along the river. We found many good campsites on the gravel bars, limited firewood was available. The narrow valley offered good hiking from the river up the fairly steep ridges which are part of the northern mountains of the Brooks Range. The scenery was no less than spectacular. The Atigun River flows through a 1/2 to one mile wide valley that lies within the northern mountains of the Brooks Range. These rugged mountains are either talus sloped or have vertical rock walls that were capped with heavy snow.

The weather was quite cool with heavy clouds that omitted sprinkles first and then rain. The clouds and rain dissipated by evening, leaving a brilliant blue sky to magnify the beauty of the Brooks Range.

June 22

It was a windy, rainy, and cold day. The river appeared high and all Class II water as we started out. About 1/2 hour floating time down the river we were into Class II mixed with some Class III water. The river was covered on this area with refrigerator size boulders. All of a sudden a large boulder jumped out of the river and tried to eat our canoe. The next 45 minutes were spent fighting the vicious rock. During this process I was swept away but finally managed to swim to shore. Terry continued the battle while standing chest deep in the river, finally freeing the canoe. We tossed two lines to him, one he attached to the canoe and the other to himself; we then pulled both to shore. It was a wonder that Terry had not gone under considering the time spent in near freezing water. The only damage done was we lost one of the office raincoats and had gotten most of Terry's gear and the tent wet. No one was hurt. Elliot and LaRalle had quickly come to our rescue. Hope and Don were downstream some distance, but quickly came upstream to aid. We spend the rest of the day drying out. We put the Coleman stove inside of the wet tent, which dried quickly and well. This is somewhat dangerous, therefore no one should spend much time in the tent due to possible carbon monoxide poisoning.

June 23

We awoke to a fresh 1/2" cover of snow and 30°F temperatures. It proceeded to snow lightly all day, and remained cold (32°F). The river continued to rise. Before going further we decided to dry more clothing, by the previous evening most of the team had much set clothing and hiked downstream through Atigun Canyon to ascertain the river's character.

The map (and our view from camp) indicated that the canyon was getting narrower, I was concerned that we might encounter non-navigable water in a walled canyon that would be difficult and dangerous to the extent that someone might get seriously hurt. Terry and LaRalle stayed at camp drying more clothes, while Hope, Elliot, Don and I hiked down Atigun Gorge. We hiked about three miles in the snow before being stopped by an almost vertical talus slope which ran into the river at a bend. We could not see past the talus slope to ascertain the river was runnable, lineable, or practically impassable. The river from camp to where we had walked was all Class III water, was high and silt laden, with boulders the size of a refrigerator and bigger. Four foot high rollers were common. The river was also fairly narrow averaging maybe 60', with no recognizable shoot. Precipitation the prior week changed what must have been Class II into Class III water. Two weeks earlier the Atigun was reported as being shallow, and perhaps too low to float. Heavy June rains in the Brooks Range probably account for the high water. Perhaps later in the summer it is shallow and requires lining. There are several clear side streams (3' wide, 1' deep) running down to the Atigun. One stream had cut a beautiful waterfall through limestone rock about 150' above the valley floor. After consultation with Don, an excellent canoeist, I decided to line back upstream to the road and then put in on the Sag where it and the road are in close proximity. Don and Hope had their canoe tied about 1/4 mile downstream from camp. They decided on the return to camp to start lining their canoe back upstream. While lining they dumped the canoe, almost losing Hope, and losing a fiberglass paddle.

The scenery along the Atigun River was very beautiful. The rugged mountains exhibited talus sloped and vertical rock faces. Some caves were spotted. We also saw a band of twelve sheep on the south bank of the Atigun. They were all ewes and lambs. We also found a fresh fox track. Spent a second night in the same camp.

June 24

We broke camp in mixes of sun and snow. It was still very cold (32°F) and had snowed more overnight. It took us three physically taxing hours to line up to the highway bridge. After finally arriving there we found that someone had siphoned gas out of the pickup, leaving us only about 1/2 gallon. LaRalle and Hope took the pickup to Pump Station #4, which was approximately five miles away and after two hours of begging managed to obtain some gas.

Terry and I then took LaRalle down to Happy Valley Camp where we were to meet Mike Brown (who was being flown in by BLM). We got there about 8:30 p.m., but the plane had left 15 minutes earlier. It was not supposed to have come in until 9:00 p.m., and then was supposed to wait a reasonable time. The pilot had told Mike to call Fairbanks if we needed an airplane. Happy Valley Camp was closed (TAPS completion) as are most of the camps, so phones are not readily available. We drove back to Pump Station #3 where the guard was kind enough to let us phone Fairbanks. After two hours LaRalle was promised a plane which was to pick him up the next day at Chandalar Camp.

At 10:00 p.m., LaRalle dropped Terry, Mike, and I at the put-in spot on the Sag River, this was approximately at Township 8 South and Range 14 East, Section 5, where the road and river are close together. LaRalle then went back to the others that were camped at the Atigun River and spent the night.

We observed several animals along the road, including six moose and more that 10 caribou.

June 25

The remaining team at Atigun River took LaRalle to Chandalar Camp (south side of the Brooks Range), then drove back to where Terry, Mike, and I were on the

Sag. They arrived about 1:00 p.m. We floated about 10 miles through the first really nice sunshine of the trip. The wind picked up at about 3:00 p.m., and was very hard to maneuver against. The river was split in several channels, each loaded with basketball to refrigerator sized boulders. It was fairly clear, flowed along about 3 mph. The channels were 75' wide and 5' deep except there was only one channel then and was approximately 150 feet wide. It was all fast Class I water broken every eighth of a mile by Class II and some Class III rapids. These rapids can be easily lined. We ran all the Class II and some Class III, lining for three Class II water. After traversing the Class II and Class III rapids without any problems, Elliot and Mike camped in a very snow easy spot about one hundred yards from the evening's camp.

The Sag followed the pipeline and haul road the entire day. Scenery consisted of rolling foothills and tundra on three sides with the magnificent Brooks Range on the south. We saw two rough legged hawks and numerous Arctic ground squirrels, several with young. Made a comfortable camp on one of the numerous large gravel bars along the Sag.

June 26

We had an exciting float through, consistently encountered Class II and easy Class III rapids as we floated to the Lupine River. The Lupine was a very clear, large creek. It was a very scenic stream. It was cloudy with some wind and very cold. This part of the Sag is for an experienced canoeist or rater. The rapids were filled with VW to stove size boulders. These rapids occurred every mile and were usually a series of two or three Class II rapids to two Class II rapids then a Class III rapid. Each set of rapids were approximately 150 feet long. All could be lined. The Sag was very clear, running at 4 mph. Where there is one main channel, it was usually 150 feet wide. There were many gravel bars of sufficient length for a small wheeled plane to land. The TAPS line was within view the entire day.

The scenery remained basically the same as the previous day. Low bluffs appeared further diversifying the scenery. One can easily hike the ridges lining the river. Good campsites with sufficient firewood are plentiful. The source of firewood is the low willow (up to 10') brush scattered along the river. This wood is either standing deadwood or washed down during high water.

We observed a peregrine falcon, several long tailed gaegers, terns, gulls, and ducks. Elusive grayling were observed in several of the side streams. Three caribou were also seen.

June 27

We woke up to bright sun that stayed all day. A light breeze made it a very comfortable warm day. We floated from the Lupine River to the Ivishak River, a distance of 32 miles. We did not find a good place to land a small plane at the confluence of the Ivishak, which was hoped for. The Ivishak has been recommended as a wild river. Gravel bars were plentiful, but not sufficiently long enough for wheel planes and the river is not sufficiently deep or straight enough for a float plane. The Sag continued to be clear, running at 4 mph, had many 50 to 150 foot wide channels, and was inches to six feet deep. It was mostly Class I water with the exception of one nice Class II rapid about 200 yards long near the Lupine River. The large boulders encountered previously changed to fist size rocks.

The scenery was high quality with Sagwon Bluffs and two smaller bluffs just before and after Sagwon Camp adding to the surrounding rolling tundra covered countryside. The Brooks Range was easily seen in the background. The evening sun turned the foothills and the Brooks Range striking shades of red. There continued to be plentiful campsites with lots of firewood. Hiking was also easy along the rolling ridges that lined the river.

Sagwon Bluffs consist of sandstone, but were reported by F&WS to be a peregrine falcon nesting area. We floated by these bluffs very quickly and quietly, observing only one peregrine falcon at the upstream end of the bluffs. Other wildlife seen along the river included 30 caribou, 2 rough legged hawks, gulls, and ducks.

The riverbed and gravel bars change drastically a few miles after the Lupine River. As previously mentioned, the boulders disappeared and became fist size rocks with only an occasional boulder, the bars became a mixture of fist size rocks and sand. The TAPS line continued to be in view of the river. The Sag flowed under two abandoned road bridges which where connected to roads from the highway on the west side to material sites on the right side. These were obviously no longer used since this spur road had been washed out between the bridge and the haul road. Passed the abandoned Sagwon Camp which lies on the old (TAPS) winter road (right bank of the river).

Observed debris along the riverbanks in this area. The debris consisted of different kinds of markers, drainage pipes, and 55 gallon drums. Also saw a small caterpillar and a truck, both appeared abandoned.

June 28

The day dawned sunny, but not warm. A light breeze blew all day. We floated approximately 18 miles in five hours to our take-out point about three miles below Franklin Bluffs camp. The take-out point was approximately 150 yards from the haul road, a very easy walk across the tundra flats. Franklin Bluffs camp was easily seen from the Sag River, however, the camp is about a mile away from the river.

The river was braided and continued to clear. It was up to six feet deep, but averaged two to three foot deep. It was all Class I water. The channels merged in some areas into half mile wide lakes with 1/2 mph current. Current outside the "lakes" was 3 to 4 mph.

The surrounding countryside was FLAT except for Franklin Bluffs. The countryside is so immense that it appears to engulf Franklin Bluffs and diminshed their effects. Tundra vegetation remains dominant along the river. Animals observed were 15 caribou, Arctic ground squirrels, and small passerines. We loaded all the gear into the van, putting three canoes on top and proceeded to drive south on the haul road to camp where we had originally put in on the Sag.

June 29

Departed camp at approximately 9:00 a.m. Ran out of gas at the north end of Atigun Pass. After siphoning two gallons from the pickup we alomst made it to the top of the pass but ended with the pickup pushing the van over Atigun Pass. We coasted within 1/2 mile of Chandalar Camp on the south side of the pass. Gassed up there again at Five Mile Camp and drove on to Fairbanks arriving about 8:00 p.m. Saw only a few animals along the way. Traffic was heavy, particularly large trucks, between Livengood and Fairbanks. The weather was mixed sprinkles and sunshine. We overnighted at Fairbanks Inn.

June 30

Checked out of motel at 7:30 a.m., to find a flat tire on the van, changed to spare, finally leaving Fairbanks at 9:00 a.m. We arrived at Anchorage at

5:30 p.m., dropped gear at office and van at motor pool by 6:45 p.m. Arrived home at 7:30 p.m.

General

We covered about four miles of the 10 miles planned on the Atigun River and about 76 miles of the 100 miles planned on the Sagavanirktok River (the Sag is approximately 180 miles long). The Atigun River Gorge should be observed carefully just before attempting to float, water levels are assumed to change drastically. The Sagavanirktok River (portion floated) offered a good mix of Class I-II-III Whitewater and was extremely fast except near Franklin Bluffs Camp. I estimate that the 110 miles between the TAPS bridge on the Atigun River and Franklin Bluffs Camp could be run in six river days. The haul road and/or pipeline are almost always in view from the Sag. Attributes of the river are the easily observed animals (also just as easily seen and in greater number, from the haul road) and the good Whitewater floating.

The Atigun and Sag Rivers are accessible by float-plane on the put-in and the Sag is accessible by wheeled plane and possibly float-plane for the take-out. (Dapkus 1978:1-8)

The latter two accounts of river travel in the Arctic Slope region illustrate the availability of navigable rivers within that region. That these runs did not involve commerce is beyond importance; what is significant is that the Sagavanirktok, Atigun, Dietrich, and Middle Fork Koyukuk Rivers can indeed support watercraft.

Personal Communication Regarding Waterbody Use

The majority of responses I received regarding waterbody use in the Arctic Slope region came from registered guides, pilots, and professional hunters and fishermen. Their replies to my letters of inquiry covered all aspects of their respective jobs: float-plane landings, river running, guided hunting trips, guided fishing trips, and sight-seeing travel. Other replies were in regard to leisure trips people were involved with.

Lynn Castle, President of the Alaska Professional Hunters Associated, wrote that "In the Arctic I know of guiding activity in most every river...again in the headwaters for the most part" (Castle: p.c.). From Harmon Helmericks, long-time Alaskan, comes this note: "Generally speaking, all the places listed by you under Arctic, I used from time to time in our guiding, subsistence hunting or fishing and recreation. This has been so for the last 35 years as we live here....The upper Sagavanirktok River is my guide area" (Helmericks: p.c.). Varied use of rivers in this region are offered by Dennis Weltz, who says, "I have camps and guided extensively on the Jim River, also to a lesser extent on the Toolik, Chandalar, and South Fork Koyukuk River. The Dietrich and Sagavanirktok Rivers are associated with my summer business: bird and natural history tours and pack-trips...transportation primarily by horseback, some rivergoat and airplane use" (Weltz: p.c.). Charles Gray, registered guide, related, "I have a guide district on the Matthews River (complete drainage) just east of the Dietrich River (flows into the Bettles River). Consists of a small cabin and a wheel landing strip on a patented headquarters site. Have used some of the waterbodies on list, I have guided in this area since 1960" (Gray: p.c.). I spoke with someone over the phone who never gave his name. He said, "I have used the indicated drainages [Putuligayuk, Sagavanirktok, Kanuti, and Ray Rivers] for float-plane landings, recreation and subsistence use, as have many of my friends and acquaintances over the years. I have used canoes and riverboats, as well as 2-man and 6-man rubber rafts" (anonymous: p.c.). Alfred Wright, owner of Alaskan Adventures and a registered guide, indicates that "we no longer are allowed to hunt or guide in many of the places listed. The past history should show that we have utilized all of the places listed. [They have used the following rivers.] Upper Sagavanirktok, Toolik, Atigun, Galbraith, Chandalar, and Ray Rivers for guided sheep hunts... had a sheep camp on the Dietrich...hunted caribou on the Hammond River...moose and bear hunts on the Jim, Kanuti, and Ray Rivers... have a commercial fishing camp on the Yukon River...hunt sheep, caribou, and moose on the Tolovana, Tatalina, Chatanika, Chena [live there], Salcha, and Little Salcha River....Some sheep hunting on lakes in the Tanana region...land in the winter on all the above [enclosed waterbody list] with skis and used to hunt wolves in this area" (Wright: p.c.).

Another guide wrote, "...use the Hammond River as a trappping area each winter. We use the Middle Fork Koyukuk River as a winter trapping area and fishing area in the summer; it is also a very good clean water supply area. I have used the Dietrich River as a hunting area for ten years prior to the pipeline. We have our main hunting camp on the Chandalar River and have used that drainage for 10 years of hunting, sport fishing, and as a fresh water supply" (Reakoff: p.c.). And from another guide: "I use the Hammond River as a guiding area" (Tarnowski: p.c.). In a long distance interview, Delbert Covey told me, "I have floated down all four rivers [Kanuti, Ray, Hammond, Chandalar] at some time between 1972 and 1980. Mostly for pleasure and for wildlife photography. I used a Zodiak 3-man raft with up to 250 lbs. of gear per trip. On the Kanuti (1973 and 1975) it was a nice navigable river. I floated it in June and July, seemed to have the best water depth then. Saw three people on the Kanuti in 1975, all with rubber rafts of various makes. I had a rough time on the Ray in 1977, lost some gear when my raft capsized, but I wasn't really prepared for Class III water either. I floated the Hammond River in 1980 using a fiberglass canoe. A good trip with few problems. I fished the Chandalar in 1977 and 1978 for salmon and I saw many others doing the same; was on the river for two months both years" (Covey: p.c.). From another interview I received the following information: "I have floated the Putuligayuk, Toolik, Atigun, and Dietrich Rivers many times between 1965 and 1973: (Felonger: p.c.). William Salvea wrote me and related, "I fished and hunted on the Sagavanirktok and Dietrich Rivers in 1968. I used a canoe on all of them, they are all navigable to me" (Salvea: p.c.). Lastly, from another hunter came this reply: "Have been hunting and fishing on the Hammond River in 1971 and also on the Middle Fork Koyukuk River" (Carter: p.c.).

Yukon Basin Region: Regional Introduction

Physiography

The Yukon Basin region is the second of three division covering the proposed natural gas pipeline route. The three major areas within the Yukon Basin region are 1) Yukon-Tanana Upland, 2) Yukon Flats, and 3) Koyukuk Flats.

The Yukon-Tanana Upland is an area of ridges characterized by gentle side-slopes. The entire area is underlain by patches of permafrost. Lying in the Yukon River drainage, the upland streams flow south to the Tanana River and north to the Yukon River. There are a few lakes, most of which are thaw or valley lakes.

The Yukon Flats consists of marshy lake-dominated flats rising to 600 feet in altitude in the east. The major tributaries originate in the surrounding uplands and mountains and are braided and meandering waterbodies. Thaw lakes abound and thaw sinks are common as well. There are no glaciers. It is likely that permafrost underlies most of the area, excepting rivers and large lakes.

The Koyukuk Flats form a large lowland at the junction of the Yukon and Koyukuk Rivers. The flats are characterized by rolling silt plains. A few bedrock hills rise from the lowland center. The flats are drained by the Yukon River and its tributaries. The area has many meander scroll and oxbow lakes. Most of this area is underlain by marginal permafrost.

Ecological Resources

The Yukon Basin region contains a complex environment because of its interactions with severe climate, repeated fires, discontinuous permafrost, and wooded river and drainage systems. The tundra regime in the basin runs a complete ground cover and is fairly uniform in growth. The tundra occupies the foothills and lower elevations of the Alaska and Brooks Range and parts of the Lower Yukon River. Often described as the harshest forest environment in North America, the forest reaches its northern limits in the Yukon Basin region.

Biological Resources

The two biological regions within the Yukon Basin region are the Upper Yukon and Tanana regions.

The Upper Yukon includes drainages of the Yukon, Procupine, Sheinjik, and Chandalar Rivers. As a result, the Yukon region has one of the most productive waterfowl areas in Alaska.

The Upper Tanana is also a productive waterfowl area. It is generally more fertile than the other areas because of climate and water resource availability.

Both regions enjoy diversified mammal populations and both also support large fishery resource bases.

Waterbody Name: Middle Fork Koyukuk River

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 20-40 m

Depth: 10-30 cm

Description: A very large stream characterized by its many channels, braids, and meandering course (JFWAT FILES 1981).

Heads from junction of Bettles and Dietrich Rivers, flows SW 62 miles to join North Fork, to form Koyukuk River; 67°02'30" N, 151°04'00" W; local name shown on fieldsheet (1899) (Orth 1967:638).

Map Reference: Chandalar (D-6)
(1: 63 360)

Waterbody Name: Access Road Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.5 m

Depth: 5-10 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Cushing Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.3-2.5 m

Depth: 4-8 cm

Description: A fast-flowing runoff stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Sheep Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.8 m

Depth: 25-40 cm

Description: A very deep tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Wolfpup Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Yukon River

Width: 1.5 m

Depth: 20-30 cm

Description: A very deep tundra stream (JFWAT FILES 1981).

Heads from Wolf Pup Ravine, trends NW 2 miles to Middle Fork Koyukuk River, 1 miles S of Gold Creek, 67°30' N, 149°52' W; local named reported in 1956 (Orth 1967:1057).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Nugget Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 2.5 m

Depth: 20-25 cm

Description: A fast-flowing runoff stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Over Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 2 m

Depth: 0.3-0.6 cm

Description: A small tundra stream (JFWAT FILES 1981).

- Flows NW 2 miles from NW of Minnie Creek Lake to Middle Fork Koyukuk River, 3 miles SSW of mouth of Gold Creek and 38 miles W of Chandalar, Brooks Range; 67°29'00" N, 149°55'30" W; name reported in 1931 by Robert Marshall (Orth 1967:733).

Map Reference: (1: 63 360) Wiseman (A-1)

Waterbody Name: Richardson Slough

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 20 m

Depth: 67-75 cm

Description: A very deep slough that drains into the Middle Fork Koyukuk River (JFWAT FILES 1981).

Flows SE 6 miles to Koyukuk River, 60° 40' N, 156°28' W; local name obtained at Huslia in 1954 by USGS (Orth 1967:803)

Map Reference: Wiseman (A-1)
(1: 63 360)

HERITAGE RESOURCE INVENTORY

Name of Site: S-42; S-43

Location:

Latitude: N 65 25'
Longitude: W 148 55'
Map Series: Sagavanirktok

Description: An area of weathered and frost-cracked rock--some resemble cherts.

Significance: On S-43 a tent ring was excavated. Thought to be a possible cace, but lacking cultural material.

Source(s): (AHRS 1974)

Contemporary Waterbody Use 1950-1981

Even today, there seems to be little documentation of waterbody-related activities in the Arctic Slope region. In an article from Alaska Magazine about skiing in the Arctic comes the brief account, "After leaving the fish camp we moved through the Brooks Range between the headwaters of the north-flowing Hulahula and the south-flowing East Fork of the Chandalar River and skied the East Fork to Arctic Village" (anonymous 1975). The article is accompanied by a photograph of a man skiing on a frozen river, identified as the East Fork of the Chandalar River. Another Alaska Magazine article discusses the village of Wiseman. "Wiseman is a crumbling village of log cabins in the vast wilderness of the arctic Brooks Range. It lies next to the crystal waters of the Middle Fork Koyukuk River at the junction of Wiseman Creek, which was named for a miner who once paused there..." (Rearden 1972:12). Two very in-depth reports of river recreation use on the Atigun and Sagavanirktok Rivers were written by the Bureau of Outdoor Recreation in 1976 and 1978.

In mid-July, 1976, four people representing various federal and state agencies participated in a river survey of the Dietrich and Middle Fork Koyukuk Rivers sponsored by the Bureau of Outdoor Recreation. Under the guidance of David Dapkus, the group inspected the rivers as to their possible inclusion in the National Wild and Scenic Rivers System. The in-depth account follows (members of the party were: Jules Tileston and Tom Trent, BLM State Office; Robert Fedeler, ADF&G, Fairbanks; and David Dapkus, BOR, Anchorage):

> Field Inspection of the Middle Fork of the Koyukuk River and the Dietrich River, July 14-23, 1976.
>
> In interagency inspection of the Dietrich and MF of the Koyukuk rivers was conducted July 14-23, 1976, as part of a BOR study of the two rivers for potential inclusion in the National Wild and Scenic Rivers System. The entire Dietrich River and almost the entire MF Koyukuk River lie within lands which were withdrawn for transportation uses by Public Land Order 5150 (Oil Pipeline). The lower 10 miles of the Middle Fork lie with Section 17(d)(1) lands (first seven miles) and lands withdrawn for Native village selection (last three miles).
>
> Two seventeen-foot Gruman aluminum canoes were used for the river inspection.

July 14

Tom and I left Anchorage about 7 a.m., driving a BLM 4x4 pickup loaded with all the gear, arriving in Fairbanks at 3:30 p.m. We met Jules, who had flown to Fairbanks, at six p.m. The plan was to drive the pipeline haul road to the headwaters of the Dietrich then float down to Bettles Field, have a BLM employee (Fairbanks) bring the pickup back to Fairbanks, then we would fly to Fairbanks and get the pickup, then back to Anchorage with it. The haul road, from the Yukon River on north, is closed to public use: however, we had obtained a permit from Alyeska to drive it because of our official purpose. After checking with Alyeska officials in Fairbanks we found that another permit was needed which would not be obtained until the next day. We spent the night at BLM fire control facilities at Ft. Wainwright.

July 15

By 11 a.m., we had (through expeditious, friendly, Alyeska people) obtained necessary permission to drive the haul road, picked up Bob and were on our way. We drove to the boat ramp on the Yukon River, which was the winter crossing for the haul road before the bridge was installed (it lies about 3/4 of a mile downstream), and camped. The road from Fairbanks to just beyond Livengood was extremely poor, from there north is an excellent, well-maintained, wide, two-lane gravel road. A black bear sow and cub crossed the road just a few miles before we reached Livengood. The day was mostly sunny and warm with only a little rain.

July 16

Day was sunny and warm except between 5 p.m. - 8 p.m., when it rained hard. We crossed the Yukon bridge, checked through Alyeska security on the north side, then drove to about 10 miles north of Dietrich Camp on the Dietrich River where we camped overnight. The haul road was even in better condition on the north side of the Yukon River. There was a fair amount of traffic on the road and activity along the pipeline. The pipeline closely parallels the road most of the way to Atigun Pass. We could see it from the road except where it was buried and in a few places where it was 1/2 mile away. Alyeska has seeded some of the gravel removal sites and cutbanks along the road and pipeline.

The vegetation consisted of large stands of white spruce and black spruce interspersed with tundra. About 1/2 of the streams crossed by the road/pipeline were clear and 1/2 were silty. Bonanza Creek and Jim River were clear, South Fork and MF Koyukuk and the Dietrich were muddle due to pipeline activity. From the Yukon River to near Coldfoot we crossed the rolling 3500' high foothills of the Brooks Range, then started into the high mountains of the Brooks. The road begins to steeply climb just north of Dietrich Camp up to Atigun Pass. Saw a cow moose feeding in a small lake adjacent to the road, who was quite oblivious to the activity around her. Also had a weasel visit our morning camp.

July 17

We drove up the Dietrich to Atigun Pass in the morning. After closely observing the Dietrich Rivers low water levels and small braided channels, we decided it did not have a channel deep enough to float a canoe until Snowden Creek (about four miles above Dietrich Camp and 6 1/2 miles above its confluence with the Bettles River). Due to the distance from the road to the deep floatable channel (would have to cross several fast shallow channels) we put in at Dietrich Camp.

From the put-in downstream to Vi Creek, the Dietrich and the MF (Middle Fork of the Koyukuk River) rivers were braided with the main channel 1'-5' deep, 50' wide, and a current of 3-5 mph. It flows over a rocky bed. Some maneuvering was required around rocks and sweepers, however, bridge abutments (2 on the Dietrich - 1 on the MF) are the biggest hazards. There was sufficient room between the abutments (15'-20') but current is fast and runs at a slight angle to them making it potentially dangerous. The rivers were muddle due to present construction activities. Both are good Class I water on the International Whitewater Scale.

The scenery was outstanding of high snowcapped mountains, many with sheer rock faces. The U-shaped valley averages about one mile in width. The haul road and pipeline were observed from many spots along the river; the present construction activity created noise levels that were bothersome only at times. Vegetation consisted of heavy stands of white spruce along the river valley, and willows adjacent to the river, and tundra on the mountain slopes. No animals were observed, we did however see some grayling in tributary streams. Hiking opportunities on the tundra covered ridges were good once away from the thick willows along the river. Gravel bars were frequent which offered good campsites. We stopped at Vi Creek to camp after traveling about 12 miles. It was sunny almost all day (as it was to be every day hereafter) except for what was to be regular passing afternoon showers from 4 p.m. to 6 p.m., which we enjoyed for the rest of the trip. We found evidence (picks and shovels, etc.) of past mining activities along Vi Creek about 1/4 miles from the MF.

July 18

Floated from Vi Creek to Kelly Gulch, covering about 21 miles. The MF was still muddy as it flowed mainly in one large channel that was 1'-5' deep, varied between 50'-100' in width, with a current of 3-5 mph. It is a rocky bottom river which requires minimal maneuvering; it is good, fast Class I water for the intermediate canoeist. Most of the tributaries were clear including the Hammond River. Gravel bars are plentiful which offer a good wood supply and level ground for camping. The Hammond River was about 50' wide, current of 3-4 mph and 4" deep at its confluence with the MF. Access from the nearby haul road to the MF is available at several places where roads were created to obtain gravel from the river's edge. The road, pipeline, and material sites can be seen in many places. Berms separate those material sites immediately adjacent to the river from the river. The scenery remained grand with snowcapped mountains, and jagged rock pinnacles towering above the green valley. Vegetation remained the same as observed yesterday. We saw three Dall sheep on a high mountain slope. Saw a few fish but did not do any fishing due to the ban on fishing within five miles of the pipeline (placed by ADF&G). We hiked up Kelly Gulch (at camp) to discover more evidence of old mining activities. We had passed, in the early afternoon, the historic but active mining town of Wiseman which has several dozen buildings and an airstrip.

July 19

Floated about 11 miles to camp at Twelvemile Creek. Then took a six hour, six mile hike up the creek to an old cabin marked on the map. Newer cabin was still standing (not in good shape) and had been used recently; old cabin was fallen down. Hiking was difficult for the first mile until we found an old trail apparently used by whomever built the cabin. Followed it back to 1/4 mile of camp and found a second cabin about halfway back which was in ruins. The river remained muddy and fast (3-5 mph), 1'-5' deep, 50'-75' wide, with an increasing number of boulders and sweepers (still good Class I water).

Scenery remained grand with the pipeline not as close except in a few places and not seen (or heard) often. A few 55 gallon drums were washed up on the riverbanks as well as some other litter. Vegetation was unchanged. Saw grayling and schulpin in the tributary streams and a cow moose with twin calves at camp.

July 20

Extremely hot and sunny (81°F) all day. Floated about 13 miles to a point about 5 miles below Tramway Bar. River remained good Class I flowing at 3-5 mph but slowing in deep pools (2 mph) late in the day. It widened to 100' at a varied depth of 1'-5' and continued to run across a rocky bottomed channel.

A highly scenic canyon about 250' wide with 100' high vertical rocks walls and pinnacle rocks rising 50'-75' high right at the riverbanks starts about 2 miles above Tramway Bar and continues about 6 miles below Tramway Bar. Although large boulders were present in the river, it required only minimal maneuvering, and there were no rapids or other hazards. The water began to clear to a slate green color.

As we started into the canyon we also began to leave the mountains to enter the lower foothills. Vegetation remained the same as previous days. The scenery continued to be grand, especially in the canyon. There is active mining taking place at Tramway Bar; several buildings are located close to the river and can be easily seen, an airstrip lies close by cannot be seen from the river, appears that 2-4 families live there at least part of the year. The river moves fairly fast by the area and so it was not long in view. Also we left the pipeline about two miles below this morning's camp (Cathedral Mt.) as the river turned S.W. Camped on another gravel bar near a small stream (good camp again - level, firewood). Hiked up a nearby (to camp) creek looking for an old cabin marked on the map, did not find it. Hiking was good along the ridges above the river, however. We saw two rough legged hawks on a nest in the canyon and fresh moose and bear sign near camp.

July 21

Floated down to where the North Fork of the Koyukuk and the MF join to form the Koyukuk, a distance of about 13 miles. River remained about 100' wide, 1'-5' deep, flowed at 2-3 mph, and was finally clear. Its rocky channel continue into the main Koyukuk. There were no rapids but were many large boulders

Waterbody Name: Sukakpak Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.5-1.7 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Chandalar (D-6)
(1: 63 360)

Waterbody Name: Valve Site Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.5-0.8 m

Depth: A small tundra stream (JFWAT FILES 1981).

Description: Wiseman (A-1)

Map Reference:
(1: 63 360)

Waterbody Name: Linda Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1-1.3 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows SW 5 miles from Linda Lake Creek to Middle Fork Koyukuk River; 68°31'15" N, 149°51'00" W; prospector's name obtained in 1909 by A.G. Maddren, USGS (Orth 1967:577).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Gold Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 4.5-6.5 m

Depth: 0.3-0.9 cm

Description: A very fast-flowing runoff stream, but extremely shallow (JFWAT FILES 1981).

Flows N 3 miles, then W 5 miles to Middle Fork Koyukuk River, 67°30'45" N, 149°51'30" W; prospector's name reported in 1899 by Shrader, USGS (Orth 1967:374).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Coon Gulch

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.5-1.2 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: One-o-One Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1-2 m

Depth: 8-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Hammond River

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.3-1.5 m

Depth: 10-12 cm

Description: A varying width and depth stream, dependent on the seasons; completely dry in the winter. Has a wide floodplain and many channels (JFWAT FILES 1981).

Heads on Alhamblar Mountain, flows S 38 miles to Middle Fork Koyukuk River, 4 miles NE of Wiseman, 67°27'35" N, 150°02'00" W; local name shown on an 1899 fieldsheet by T.G. Gerdine, USGS (Orth 1967:403).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Confederate Gulch Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.5-2.4 m

Depth: 10-15 cm

Description: A small tundra stream that drains a very marshy muskeg area (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Fry Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.5-1.3 m

Depth: 8-14 cm

Description: A small tundra stream that drains a muskeg area and drains a number of small tundra ponds (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Minnie Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 2-15 m

Depth: 20-30 cm

Description: A moderately-sized stream (JFWAT FILES 1981).

- Flows W 14.5 miles from S of Poss Mountain and 36 miles WSW of Chandalar, Brooks Range; 67°27'15" N, 149°52'00" W; local name reported in 1956 ty T.E. Taylor, USGS (Orth 1967:646).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Confusion Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1-2 m

Depth: 10-14 cm

Description: A narrow stream with a gravel bottom (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Pence's Pond Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.8-1.3 m

Depth: 18-30 cm

Description: A small clearwater stream that flows down a steep gradient (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Marion Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 4.5-19 m

Depth: 10-30 cm

Description: A moderately-sized tundra stream (JFWAT FILES 1981).

Flows W 17.5 miles to Middle Fork Koyukuk River; 67°19'12" N, 150°10'00" W; local name shown on an 1899 fieldsheet by T.G. Gerdine, USGS (Orth 1967:622).

Map Reference: (1: 63 360) Wiseman (B-1)

Waterbody Name: Mary Angel Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Middle Fork Koyukuk River

Width: 0.9-2.3 m

Depth: 5-14 cm

Description: A small stream characterized by heavy marshland banks; flows down a moderate gradient (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Mary Angel Creek

Tributary to: Mary Angel Creek

Width: 0.5-1.3 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Clara Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.2-1.3 m

Depth: 10-15 cm

Description: A small, slight turbid stream that flows down a moderate gradient (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Calf Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 3.5-4.5 m

Depth: 10-15 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Slate Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 8-16 m

Depth: 10-20 cm

Description: A large, clear, swift-flowing stream with a large meandering course (JFWAT FILES 1981).

Flows W 19 miles to Middle Fork Koyukuk River; 67°15'30" N, 150°11'30" W; local name shown on an 1898 fieldsheet by T.G. Gerdine, USGS (Orth 1967:887).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Spring Creek

Main Drainage: Yukon River

Tributary to: Koyukuk River

Width: 8-16 m

Depth: 10-20 cm

Description: A small slough (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Rosie Creek

Main Drainage: Yukon River

Tributary to: Koyukuk River

Width: 3-4 m

Depth: 2-14 cm

Description: A small, swift, clearwater stream (JFWAT FILES 1981).

Flows from Rosie Creek Pass N and W 5 miles around Cathedral Mountain to Middle Fork Koyukuk River; 67°11'30" N, 150°18'00" W; local name reported in 1932 by Robert Marshall (Orth 1967:816).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Lower Mud Creek

Main Drainage: Yukon River

Tributary to: Koyukuk River

Width: 0.7-0.9 m

Depth: 10-15 cm

Description: A swift clearwater stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Cathedral Mountain Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Middle Fork Koyukuk River

Width: No determination

Depth: No determination

Description: A small runoff channel confined by high tundra banks (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Jackson Slough

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 1.2-3.5 m

Depth: 20-45 cm

Description: A very deep slough (JFWAT FILES 1981).

Anabranch of the Yukon River, 2 miles long; 65°59'45" N, 148°59'40" W; local name published by USGS in the 1950's (Orth 1967:468).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Trent's Trickle

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.7-30 m

Depth: 29-40 cm

Description: A very wide marshland that flows northerly through wetlands (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Trent's Trickle

Tributary to: Trent's Trickle

Width: 0.3-0.5 m

Depth: 29-40 cm

Description: A very deep stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Windy Arm Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 0.3-0.5 m

Depth: 5-13 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Chapman Creek

Main Drainage: Yukon River

Tributary to: Middle Fork Koyukuk River

Width: 2.4-3.2 m

Depth: 0.2-1.2 cm

Description: A very shallow creek that drains several large lakes in its area (JFWAT FILES 1981).

Flows W 3 miles from a lake to Middle Fork Koyukuk River, at Tramway Bar; 67°05'30" N, 150°29'30" W, reported by G.H. Wonson, master of the steamer Dorothy, on his manuscript map of the Koyukuk River published in 1899 (Orth 1967:200).

Map Reference: Wiseman (A-1)
(1: 63 360)

Waterbody Name: Crossroads Creek

Main Drainage: Middle Fork Koyukuk River

Tributary to: Chapman Creek

Width: 0.9-1.3 m

Depth: 27.5-31.5 cm

Description: A very deep stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Abba Dabba Creek

Main Drainage: Yukon River

Tributary to: South Fork Koyukuk River

Width: 1-5 m

Depth: 6-20 cm

Description: A shallow spring-fed stream (JFWAT FILES 1981).

Map Reference: Wiseman (B-1)
(1: 63 360)

Waterbody Name: Jim River

Main Drainage: Koyukuk River

Tributary to: South Fork Koyukuk River

Width: 15-20 m

Depth: 14-29 cm

Description: A moderately-sized stream characterized by its two channels. It flows through a meandering and quite braided course (JFWAT FILES 1981).

Flows SW 60 miles to South Fork Koyukuk River; 66°47'30" N, 151°11'30" W; named by prospectors and reported as "Jim Creek" in 1899 by G.H. Wonson (Orth 1967:473).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: Douglas Creek

Main Drainage: South Fork Koyukuk River

Tributary to: Jim River

Width: 6-9 m

Depth: 30-90 cm

Description: A very deep stream characterized by its mandering course (JFWAT FILES 1981).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: Gas Bubble Creek

Main Drainage: Douglas Creek

Tributary to: Jim River

Width: 5-3 m

Depth: 12-13 cm

Description: A tundra stream characterized by its very deep waters (JFWAT FILES 1981).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: Prospect Creek

Main Drainage: South Fork Koyukuk River

Tributary to: Jim River

Width: 6-15 m

Depth: 15-20 cm

Description: A clear and shallow, fast-moving stream that has many alternating riffles and pools (JFWAT FILES 1981).

Flows W 14 miles to Jim River, 12 e of its junction with South Fork Koyukuk River; 66°47'30" N, 150°44'00" W; local name reported in 1956 by T.E. Taylor, USGS (Orth 1967:779).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: Little Nasty Creek

Main Drainage: Fish Creek

Tributary to: Bonanza Creek

Width: 1-2 m

Depth: 0.5-2.3 cm

Description: A small stream that flows within a sharply-defined channel (JFWAT FILES 1981).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: Bonanza Creek

Main Drainage: South Fork Koyukuk River

Tributary to: Fish Creek

Width: 2-7 m

Depth: 10-12 cm

Description: A small, meandering stream with alternating riffles and pools (JFWAT FILES 1981).

Flows W 35 miles to Fish Creek 14 miles E of its junction with South Fork Koyukuk River; 66°33'35" N, 151°03'30" W; name used by prospectors and reported in 1899 by G.H. Wonson (Orth 1967:151).

Map Reference: Bettles (C-2)
(1: 63 360)

Waterbody Name: Oxbow Lake

Main Drainage: Bonanza Creek

Tributary to: North Fork Bonanaza Creek

Width: 15-20 m

Depth: 50-300 cm

Description: A series of very clear and deep pockets of water that drain into Oxbow Lake and Bonanza Creek (JFWAT FILES 1981).

Map Reference: Bettles (C-2)
(1: 63 360)

Waterbody Name: Pung's Crossing Creek

Main Drainage: Fish Creek

Tributary to: Bonanza Creek

Width: 1-5 m

Depth: 10-12 cm

Description: A small stream divided into two braided channels (JFWAT FILES 1981).

Map Reference: Bettles (C-1)
(1: 63 360)

Waterbody Name: Alder Mountain Creek

Main Drainage: South Fork Koyukuk River

Tributary to: Fish Creek

Width: 3-4.5 m

Depth: 12-15 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Bettles (D-1)
(1: 63 360)

Waterbody Name: Netsch's Creek

Main Drainage: Koyukuk River

Tributary to: Kanuti River

Width: 0.4-0.9 m

Depth: 12-24 cm

Description: A small headwater stream (JFWAT FILES 1981).

Map Reference: Bettles (B-2)
(1: 63 360)

Waterbody Name: Kanuti River

Main Drainage: Yukon River

Tributary to: Koyukuk River

Width: 10-15 m

Depth: 2 m

Description: A deep meandering stream that drains the wouthern slopes of the Philip Smith Mountains (JFWAT FILES 1981).

Flows W 175 miles to Koyukuk River, 66°27' N, 153°00' W, Koyukan Indian name obtained in 1885 by Lt. Allen (Orth 1967:495).

Map Reference: Bettles (B-2)
(1: 63 360)

Waterbody Name: Caribou Mountain Creek

Main Drainage: Koyukuk River

Tributary to: Koyukuk River

Width: 2.3-2.5 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Bettles (B-2)
(1: 63 360)

Waterbody Name: Kristie's Creek

Main Drainage: Koyukuk River

Tributary to: Koyukuk River

Width: 1.2-1.4 m

Depth: 12-15 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Bettles (B-2)
(1: 63 360)

Waterbody Name: Olson's Lake Creek

Main Drainage: Koyukuk River

Tributary to: Kanuti River

Width: 1-3 m

Depth: 10-12 cm

Description: A small tundra creek (JFWAT FILES 1981).

From Olson's Lake, 47 miles E of Bettles, 66°24'30" N, 150°28'30" W; local name reported in 1956 to T.E. Taylor of the USGS (Orth 1967:723).

Map Reference: Bettles (B-2)
(1: 63 360)

Waterbody Name: Finger Mountain Creek

Main Drainage: West Fork Dall River

Tributary to: West Fork Dall River

Width: 1-2 m

Depth: 12-16 cm

Description: A small stream that flows down a moderate gradient (JFWAT FILES 1981).

Map Reference: Bettles (D-1)
(1: 63 360)

Waterbody Name: West Fork Dall River

Main Drainage: Dall River

Tributary to: Dall River

Width: 1.5-2.5 m

Depth: 40-45 cm

Description: A small stream characterized by its narrow channel and small riffles and pools (JFWAT FILES 1981).

Map Reference: Bettles (D-1)
(1: 63 360)

Waterbody Name: Federal Creek

Main Drainage: Ray River

Tributary to: North Fork Ray River

Width: 1.2-4.3 m

Depth: 14-25 cm

Description: A moderately-sized creek; characterized by its fast flow in a gravel-washed bed (JFWAT FILES 1981).

Map Reference: Bettles (D-2)
(1: 63 360)

Waterbody Name: North Fork Ray River

Main Drainage: Yukon River

Tributary to: Ray River

Width: 9-15 m

Depth: 2-3 m

Description: A very deep slow flowing stream that is marked by its meandering course (JFWAT FILES 1981).

Map Reference: Tanana (D-1)
(1: 63 360)

Waterbody Name: Fort Hamlin Hills Creek

Main Drainage: Yukon River

Tributary to: Ray River

Width: 1-3 m

Depth: 80-120 cm

Description: A moderately-sized stream. Its deep waters flow through a deep confined bank (JFWAT FILES 1981).

40 miles NE of Rampart, 65°53'45" N, 149°13'15" W (Orth 1967:346).

Map Reference: Livengood (D-5)
(1: 63 360)

Waterbody Name: Phelps Creek

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 1.3-2.3 m

Depth: 10-12 cm

Description: A small stream that flows down a moderate gradient (JFWAT FILES 1981).

Map Reference: Tanana (D-1)
(1: 63 360)

Waterbody Name: Woodchopper Creek

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 1.2-2.1 m

Depth: 30-90 cm

Description: A deep stream characterized by its swift flow rate and well-defined channel (JFWAT FILES 1981).

Heads at 65°11' N, 148°46' W, flows NE 20 miles to the Yukon River 16 miles NW of its junction with Charley River, local name found on a manuscript map by E.F. Ball dated 1898. The name may allude to woodchopping on the banks of this stream to furnish fuel for river steamboats (Orth 1967:1058).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Burbot Creek

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 0.3-1.2 m

Depth: 15-40 cm

Description: A moderately-sized stream that drains a small lake and whose course is in a well-defined channel (JFWAT FILES 1981).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Yukon River

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 700-850 m

Depth: 200-500 cm

Description: The largest "stream" in Alaska, characterized by its extreme width and deep slow-flowing waters (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Isom Creek

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 0.3-5.5 m

Depth: 50-150 cm

Description: A deep stream that drains a large marsh and muskeg area (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 1.5-3.3 m

Depth: 11-17 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 0.5-1.3 m

Depth: 20-34 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Hot Cat Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 0.3-0.5 m

Depth: 10-18 cm

Description: A small stream with a narrow channel (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 1.2-1.5 m

Depth: 10-13 cm

Description: A small stream with a poorly-defined channel that is characterized by its meandering course (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 0.6-1.3 m

Depth: 12-24 cm

Description: A small but moderately deep stream that flows over gravel and cobble beds (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Two-Bit Creek

Main Drainage: Hess Creek

Tributary to: Unnamed Creek

Width: 0.2-3.2 m

Depth: 2-7 cm

Description: A very shallow stream with a moderately-sized channel (JFWAT FILES 1981).

Flows S 1 miles to Half Dollar Creek; 65°25'30" N, 144°47'00" W; named by prospectors and reported in 1910 by USGS (Orth 1967:1000).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Hess Creek

Tributary to: Two-Bit Creek

Width: 0.2-3.2 m

Depth: 2-13 cm

Description: A stream that flows down a steep gradient and is characterized by its narrow channel with seasonal fluctuations (JFWAT FILES 1981).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Two-Bank Creek

Main Drainage: Hess Creek

Tributary to: Unnamed Creek

Width: 0.6-0.9 m

Depth: 10-18 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (C-5)
(1: 63 360)

Waterbody Name: Hess Creek

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 15-30 m

Depth: 20-40 cm

Description: Flows from the western slopes of the White Mountains, characterized by its moderate size and its alternating pools and riffles (JFWAT FILES 1981).

Heads at junctions of its north and south forks, flows W 50 miles to Yukon River; 65°40' N, 149°48' W; named by prospectors for Mike Hess who discovered gold on this creek (Orth 1967:418).

Map Reference: Livengood (C-5)
(1: 63 360)

Waterbody Name: Erickson Creek

Main Drainage: Yukon River

Tributary to: Hess Creek

Width: 1-1.5 m

Depth: 10-15 cm

Description: A small stream that flows down a moderate gradient through well-defined banks (JFWAT FILES 1981).

Flows NW 15 miles to Hess Creek, 36 miles NE of Rampart; 65°40' N, 149°00' W; name reported in 1902 by Lt. Hjalamr (Orth 1967:316).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: Lost Creek

Main Drainage: Chatanika River

Tributary to: West Fork Tolovana River

Width: 4-6 m

Depth: 10-30 cm

Description: A moderately-sized tundra stream that meanders through poorly-defined banks (JFWAT FILES 1981).

Flows S 1 mile to Chatanika River; 65°±6'30" N, 146°41'15" W; originally reported in 1903 as Nome Creek....however the name was later changed by local usage because there is a Nome Creek a few miles north of this stream (Orth 1967:397).

Map Reference: Livengood (D-6)
(1: 63 360)

Waterbody Name: West Fork Tolovana River Tributary

Main Drainage: Tanana River

Tributary to: Tolovana River

Width: 0.2-1.7 m

Depth: 12-13 cm

Description: A small stream that meanders through gravel banks (JFWAT FILES 1981).

Map Reference: Livengood (B-5)
(1: 63 360)

Waterbody Name: Tolovana River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 10-15 m

Depth: 20-30 cm

Description: A medium-sized, meandering stream, characterized by its wide channel and moderate depths (JFWAT FILES 1981).

Heads at junction of Livengood and Olive Creeks, flows SW 117 miles to Tanana River; 64°5±' N, 149°50' W; a Tanana indian name reported in 1902 by A.H. Brooks (Orth 1967:974).

Map Reference: Livengood (B-4)
(1: 63 360)

Waterbody Name: Shorty Creek

Main Drainage: Tanana River

Tributary to: Tolovana River

Width: 0.1-3.3 m

Depth: 14-18 cm

Description: A small meandering stream (JFWAT FILES 1981).

Flows NW 4 miles to Tolovana River; 65°26'30" N, 148°38'00" W; local name published by USGS in 1950's (Orth 1967:870).

Map Reference: Livengood (B-4)
(1: 63 360)

Waterbody Name: Wilber Creek

Main Drainage: Tanana River

Tributary to: Tolovana River

Width: 0.6-1.3 m

Depth: 12-16 cm

Description: A small stream with a narrow channel and with a meandering course (JFWAT FILES 1981).

Flows NE 7 miles to Tolovana River; 65°27'45" N, 148°20'45" W; local name reported in 1915 as Wilbur Creek by USGS; local usage had changed the spelling (Orth 1967:1047).

Map Reference: Livengood (B-3)
(1: 63 360)

Waterbody Name: Ski Jum Ramp Creek

Main Drainage: Tatalina River

Tributary to: Slate Creek

Width: 0.2-3.2 m

Depth: 6-7 cm

Description: A shallow stream characterized by its meandering course with many chutes and falls (JFWAT FILES 1981).

Map Reference: Livengood (B-4)
(1: 63 360)

Waterbody Name: Slate Creek

Main Drainage: Chatanaika River

Tributary to: Tatalina River

Width: 2.4-3.6 m

Depth: 10-30 cm

Description: A moderately-sized stream that flows over a gravel and cobble plain (JFWAT FILES 1981).

Flows SW 17 miles to Tatalina River; 65°±6' N, 148°24' W; local name published by USGS in the 1950's (Orth 1967:887).

Map Reference: Livengood (B-4)
(1: 63 360)

Waterbody Name: Tatalina River

Main Drainage: Tanana River

Tributary to: Chatanika River

Width: 10-15 m

Depth: 25-35 cm

Description: A large stream of alternating pools and riffles that flows over a meandering course (JFWAT FILES 1981).

Heads at 65°30' N, 147°55' W, flows SW 60 miles to Chatanika River, 48 miles NW of Fairbanks; Indian name published in 1907 by USGS (Orth 1967:950).

Map Reference: Livengood (B-3)
(1: 63 360)

Waterbody Name: Globe Creek

Main Drainage: Tatalina River

Tributary to: Tolovana River

Width: 6-9 m

Depth: 6-40 cm

Description: A fast-flowing, clearwater stream that flows through a well-defined channel (JFWAT FILES 1981).

Flows SW 15 miles to Tatalina River; 65°15' N, 148°24' W; local name shown on a manuscript map of the Alaska Railroad dated 1923 (Orth 1967:372).

Map Reference: Livengood (B-3)
(1: 63 360)

Waterbody Name: Washington Creek

Main Drainage: Tanana River

Tributary to: Tolovana River

Width: 5-8 m

Depth: 2-14 cm

Description: A moderately-sized stream that flows through a well-defined but meandering channel (JFWAT FILES 1981).

Flows SW 50 miles to Tatalina River, 40 miles NW of Fairbanks; 65°04' N, 149°03' W; named by prospectors (Orth 1967:1029).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Tributary to Chatanika River

Main Drainage: Tolovana River

Tributary to: Chatanika River

Width: 0.8-1.3 m

Depth: 12-16 cm

Description: A braided, clearwater stream (JFWAT FILES 1981).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Shocker Creek

Main Drainage: Tanana River

Tributary to: Chatanika River

Width: 0.6-2.3 m

Depth: 10-14 cm

Description: A small, braided tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Chatanika River

Main Drainage: Tanana River

Tributary to: Tolovana River

Width: 10-15 m

Depth: 20-34 cm

Description: A large stream characterized by its meandering course through gravel beds (JFWAT FILES 1981).

Heads at junction of McManus and Smith Creeks, flows SW 128 miles to Tolovana River, 48 miles NW of Fairbanks; Tanana Indian name obtained in 1903 by T.G. Gerdine (Orth 1967:201).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Treasure Creek

Main Drainage: Chatanika River

Tributary to: Vault Creek

Width: 1.5-2.3 m

Depth: 10-15 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows NE 4.2 miles to Vault Creek; 65°01'50" N, 147°42'45" W; named by prospectors (Orth 1967:983).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Vault Creek

Main Drainage: Chatanika River

Tributary to: Chatanika River

Width: 1-3 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows NW 7 miles to Chatanika River, 15 miles N of Fairbanks; 65°04'15" N, 147°45'40" W; local name originally reported in 1903 as Moose Creek by USGS (Orth 1967:1018).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Fox Creek

Main Drainage: Chatanika River

Tributary to: Gold Stream Creek

Width: 0.6-3.4 m

Depth: 9-13 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows S 4.5 miles to Goldstream Creek, 7 miles N of Fairbanks; 64°56'45" N, 147°41'00" W; local name reported in 1903 by T.G. Gerdine, USGS (Orth 1967:351).

Map Reference: Livengood (A-2)
(1: 63 360)

Waterbody Name: Gold Run Creek

Main Drainage: Chatanika River

Tributary to: Fox Creek

Width: 1-3 m

Depth: 9-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (A2)
(1: 63 360)

Waterbody Name: Rose Creek

Main Drainage: Chatanika River

Tributary to: Chatanika River

Width: 0.4-1.2 m

Depth: 12-23 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows NW 1.5 miles to Gilmore Creek; 64°58'30" N, 147°31'30" W; local named published by 1908 by USGS (Orth 1967:815).

Map Reference: Livengood (A-4)
(1: 63 360)

Waterbody Name: Tributary to Nugget Creek

Main Drainage: Smallwood Creek

Tributary to: Nugget Creek

Width: 0.3-5.2 m

Depth: 10-18 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Livengood (A-4)
(1: 63 360)

Waterbody Name: Pedro Creek

Main Drainage: Chatanika River

Tributary to: Chatanika River

Width: 1-4 m

Depth: 10-12 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows SW 6.7 miles; joins Gilmore Creek to form Goldstream Creek; 64°59' N, 147°33' W; named for Felix Pedro who discovered gold while prospecting in the valley in July 1902 (Orth 1967:746).

Map Reference: Livengood (A-4)
(1: 63 360)

Waterbody Name: Gilmore Creek

Main Drainage: Chatanika River

Tributary to: Chatanika River

Width: 2-3 m

Depth: 12-18 cm

Description: A small tundra stream (JFWAT FILES 1981).

Flows SW 4 miles to join Pedro Creek to form Goldstream Creek; 64°59' N, 147°33' W; named for Tom Gilmore, Felix Pedro's partner (Orth 1967:367).

Map Reference: Livengood (A-4)
(1: 63 360)

Waterbody Name: Smallwood Creek

Main Drainage: Little Chena River

Tributary to: Unnamed Creek

Width: 0.4-2.8 m

Depth: 4-2 cm

Description: A shallow, clearwater stream (JFWAT FILES 1981).

Heads at junction of Johnson and Victoria Creeks, flows SE 7 miles to Little Chena River; 64°00'54" N, 147°15'00" W; local name reported in 1903 by T.G. Gerdine, USGS (Orth 1967:891).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Iowa Creek

Main Drainage: Chena River

Tributary to: Little Chena River

Width: 3.5-12 m

Depth: 12-76 cm

Description: A moderately-sized stream that is fast-flowing and rains a muskeg area (JFWAT FILES 1981).

Flows S 7 miles to Little Chena River; 64°53'30" N, 147°14'20" W; name given by prospectors, reported in 1907 by USGS (Orth 1967:458).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Potlatch Creek

Main Drainage: Tanana River

Tributary to: Chena River

Width: 0.7-1 m

Depth: 30-100 cm

Description: A deep but narrow stream with a moderate flow rate (JFWAT FILES 1981).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Tanana River

Tributary to: Chena River

Width: 1-2 m

Depth: 12-34 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Chena River

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 12-18 m

Depth: 75-250 cm

Description: A large stream with a meandering course and deep waters (JFWAT FILES 1981).

Heads at junction of North and West Forks Chena River, flows SW 100 miles to Tanana River; 64°47'45" N, 147°54'45" W; Indian name reported in 1898 by F.C. Schrader, USGS (Orth 1967:203).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Moose Creek

Main Drainage: Tanana River

Tributary to: Unknown

Width: 0.1-0.3 m

Depth: 2-15 cm

Description: A marshland that drains a tundra area, not really classified as a stream (JFWAT FILES 1981).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Tanana River

Tributary to: Yukon River

Width: 1-3 m

Depth: 13-23 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Tanana River

Tributary to: Unnamed Creek

Width: 0.2-1.3 m

Depth: 12-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Fairbanks (D-1)
(1: 63 360)

Waterbody Name: Knokanpeover Creek

Main Drainage: Tanana River

Tributary to: French Creek

Width: 3-5 m

Depth: 80-150 cm

Description: A very deep moderately-sized stream characterized by its meandering course (JFWAT FILES 1981).

Map Reference: Big Delta (B-5)
(1: 63 360)

Russian Exploration

While much of the Yukon River was utilized as a major trade and commerce route, the Russians made few trips beyond present-day Fairbanks/Nenana into the upper northern Yukon River country. Virtually all exploration was brought to a point on the Yukon 200 miles above Nulato. Lieutenant Lovrentii Zagoskin is the most notable of Russian explorers in the interior Alaska. His travels on the Yukon River would result in significant amount of geographic and ethnographic information. But his travels were generally limited to the lower Yukon. There are written accounts that suggest he explored upper reaches of the Yukon River, but those remain speculative.

Alfred Brooks writes that "Nulato throughout the Russian Occupation continued the highest trading post on the Yukon of the Russian American Company" (Brooks 1953:234). The Russians did make brief ventures up the Yukon to the mouth of the Tanana, but those explorations are not well-documented. At one time Ivan Semenovich Lukin was sent up the Yukon River to Ft. Yukon of the Hudson's Bay Company. His mission was to obtain information about the Company's activities, and to do so he passed as a deserter. Lukin, as most evidence indicates, was the first Russian (Creole) to pass through the area of the present proposed gas pipeline route.

In the book A History of the Russian American Company, there is a map of major Russian explorations from 1818, and one route shown outlines the length of Lukin's exploration on the upper Yukon River. But there is little in this book or any other document that clearly shows how far and what activities Lukin was involved with on the Yukon River.

Russian exploration in the Yukon region was limited and not extensive. Despite the relative lack of documentation of Russian exploration, that which did occur well illustrates the potential for waterbody use in the Yukon Basin region.

American Exploration and Occupation

Exploration and travel in the Yukon Basin region increased many times over during the period of American occupation and exploration. The period between 1865 and 1940 was a time of extensive trade, commerce, and exploratory ventures, all of which assisted in a better understanding of the Yukon Basin region.

When the United States purchased the territory of Alaska in 1867, "it was a vast *terra incognita*" (Sherwood 1965:2), and indeed it was. Very little exploration had taken place in the territory and so it was true for the Yukon Basin region. In an 1887 U. S. Army report, Henry T. Allen wrote, "It is a very remarkable fact that a region under a civilized government for more than a century should remain so completely unknown" (H. T. Allen 1887:15). Allen was referring to the Copper River region, but it applies quite well to the extent of discovery in the Yukon Basin region prior to 1865.

The first major exploration into the Yukon Basin region was undertaken in 1865 by a very international expedition. Though sponsored by the Western Union Telegraph Company, the company's expedition was guided by "an American adventurer, a Russian creole, a French-Canadian, and English artist, and a Yankee scientist", whose "combined background represented the past, the present, and the future of North America" (Sherwood 1965:15).

The Western Union Telegraph expedition was a project of grand design that ultimately failed. However, knowledge gained during the expedition attempt vastly improved an understanding of the interior of Alaska, specifically in the Yukon Basin region.

The expedition was the brainstorm of two men, Perry M. Collins and William H. Seward (later to be Lincoln's Secretary of State). The planning stage for the project began in 1857 when Collins sought and obtained permission from the Russians and the British to build such an international communications system. The line was to be divided into three phases, one in Canada, one in Russian-America, and one in Asia. The chain of command revolved around Colonel Charles Bulkley, Captain Charles M. Scammer, and Robert Kennicott. Certainly most famous for work on the telegraph was Kennicott. His establishment of a "Scientific Corps" for the expedition stands as a stellar example of scientific investigation in Alaska.

Much of the history of exploration during the expedition is reliant upon the Lukins: Father Simon or son Ivan. The Lukins were creole who often were explorers when not trapping. There is confusion as to which Lukin explored the proposed route of the telegraph line. Father and son often worked together and available records don't make clear when the elder Lukin died.

The Russian-American phase of the telegraph expedition was divided into two segments, one for exploring the Yukon River east from the village of Nulato, and the other to explore the area between the Yukon River and Bering Strait.

The first American party landed at St. Michael in August 1865 to establish the first section of the Western Union Telegraph line. The group had planned to ascend the Yukon by steamer, but the boat provided proved worthless. Thus Kennicott, leader of this party, ordered his parties to ascend the Yukon River via the Unalakleet River portage. For the following year, explorations took place along the Yukon, and then in May, 1866, Kennicott died, leaving Lukin to do the exploration. After Kennicott's death, Lukin with two white men, ascended the Yukon River by boat to Fort Yukon, thus traveling through the heart of the Yukon Basin region. Twice more Lukin traveled the Yukon River; the next winter and the following summer he went as far as Fort Selkirk. Another person who ascended the Yukon was William H. Dall, who did so in June of 1867. He then descended the river in the spring of 1868.

It was found that the laying of the Atlantic Transcontinental Cable superceded the practicality of the Western Union Telegraph expedition. After three years of exploration and as many millions of dollars, the expedition was abandoned because it was no longer economically feasible.

Though a failure as a communications system, the Western Union expedition served as an information storehouse regarding the Alaskan interior. For the first time, the Yukon Basin region was penetrated and the explorations assisted in a new understanding of that untouched region of Alaska; previously, the map of the region between the Yukon and the Arctic coast had been blank.

Shortly after the aborted telegraph expedition, Charles Raymond, a Captain in the U. S. Army Corps of Engineers, was directed to determine the latitude and longitude of Fort Yukon, and to report on the trade activities of the Hudson's Bay Company. Raymond "was authorized to represent the Treasury Department temporarily, to declare importation of British goods illegal, to take official possession, and to order the Honorable Company to vacate the post: (Sherwood 1965:91). Raymond left St. Michael on July 4, 1869, and ascended the Yukon River to Fort Yukon by steamer. The downstream voyage of the Yukon illustrated well the use of the Yukon River. There being no steamer available:

> Raymond and his two assistants were left to their own devices. There were no bark canoes available, so a small skiff was made of spruce drift logs, caulked with rags, coated with pitch, and christened the Eclipse. The boat was launched, then tethered to shore with a strip of moose hide. Next morning the party discovered that hungry sled dogs had eaten the fastening, and the skiff had begun an independent journey to the coast.... The Eclipse was recovered and on August 28...the Raymond party left Fort Yukon. (Sherwood 1965:92)

It is evident that their downstream trip, once started, was unadventurous and frequent landings were necessary for boat repairs.

Another expedition responsible for waterbody travel in the Yukon Basin region was that headed by Frederick Schwatka in 1883:

> Crossing the Chilkoot Pass with a small party, Schwatka built a raft at the headwaters of the Lewes and continued down river...to Fort Silkirk.... (Brooks 1953:275)

From Fort Selkirk, Schwatka descended the Yukon River to the Bering Sea, once again showing the navigability of waterbodies in the Yukon Basin region.

Of particular importance to waterbody travel in the Yukon Basin region were activities of the United States Geological Survey. In 1898 the Geological Survey began systematic surveys and explorations in the interior of Alaska. In the first year of operation E. C. Barnard made a survey of about 2,000 square miles in the Fortymile River basin of the Yukon River region. Greater explorations took place in 1899 when:

> The work of exploring the great waterways was extended north of the Yukon to the Koyukuk, which was mapped by Schrader and T. G. Gerdine. Leaving Fort Yukon in canoes, they ascended the Chandalar River, and after making a 16-mile portage reached Koyukuk waters. (Brooks 1953:286)

The geologist most responsible for opening the interior of Alaska to national understanding was Alfred Hulse Brooks. His travels and written accounts of such have helped to make more clear the geology and cultural resources of Alaska.

His book, Blazing Alaska's Trails, serves as a good example of those exploratory efforts. In 1898 Brooks, coming from the Tanana river, struck north to the Fortymile River and then descended it to Eagle on the Yukon. In 1899, F. C. Schrader and T. G. Gerdine proceeded down the Chandalar River from the Yukon River, which they ascended 200 miles before coming to the headwater of the Koyukuk River.

The era of exploration during the American period was extensive and well-documented. The examples I have provided clearly show that waterbody travel occurred with regularity in the Yukon Basin region, and for those waterbodies tributary to major rivers, one can assume that their courses were utilized in explorations; often portages were the standard fare in getting successfully through an exploration route.

W. E. Priestly writes of his adventures on the Tanana River in 1910:

> At the time this story commences the writer had been in the Fairbanks mining camp for over two years, but in the spring of 1908, after the ice had started on its long trip to Bering Seas, made up my mind to try my luck in another part of Alaska.
>
> I watched the water...rushing down on its three-hundred-mile trip to the Yukon River. An idea got hold of me to take advantage of the current and float downstream on a raft. At Chena, a small ways down the river, I got the necessary timber to build the raft.
>
> With the assistance of a friend it took only a short time to construct the raft. In case any of my readers should...care to try their hand at this I will give the dimensions of the raft I built, on which I drifted for three hundred miles. It was twelve feet long and five feet wide, built in three tiers, the wood used being black spruce. At each end of the raft a long oar, or sweep, to be used in steering the raft through swift currents and also to make landings.

> At three o'clock in the afternoon on May 24 the raft was finished. I packed my baggage, and took the prevention to lash it securely to the raft. ...I was well loaded with baggage, as in addition to my personal belongings, I had a fur robe, gun, camera....
>
> About three miles below Chena the raft got stuck on a sand bar, and in my efforts to free it I managed to break one of my oars. As soon as it swung into the current again I found it impossible to keep a straight course, as the raft would persist in turning round and round, very much after the fashion of a dog trying to bite his own tail. I at once saw that I should make very little progress until I got another sweep. With the raft still turning I drifted along in this aimless manner for about two miles, until I struck another sand bar, opposite to an Indian camp. With my remaining sweep I endeavored to push the raft ashore, but finding this impossible I was forced to step into the water, and dragging the raft after me managed to reach shore, feeling almost frozen after my trip through the ice-cold water. (Priestly 1910:281)

The churches' role in exploration is given little credence in Alaskan history, however, churchmen were quite visible in the Yukon Basin region and in their various journals they often wrote of their travels on waterbodies in this region:

> Last Summer was a season of unprecendented rainfall. On the watersheds, the rain melted the glacial ice, and the resultant floods rushed down the Tanana, until the height of the water was above that in the history of white occupation of this country. The Indians have a legend of a greater flood, but this is so clouded by ages that it is almost certain that it is only the common legend which prevails among all peoples, of the flood of Biblical history.
>
> Only one who has been acquainted with the swift reaches and rapids of a glacial stream can understand just what this flood meant to the Upper Tanana country. There were men drowned who will never be heard of in any way, and whose names will be added to that already too-long roll of "Missing" which Alaska exacts as its toll. The writer has personal knowledge of six tragedies on the Tanana this Summer, at times when he was near the place. Three among white men and three among Indians. The one which is hardest to explain, from the Missionary's standpoint, is that of Chief Jarvis, of the Salchaket Indians. Accustomed by a life-time of traveling on the swift waters above Salchaket, he was accounted one of the most careful men and one of the most proficient men, in a poling-boat, of all the Indians, and no one can understand what caused his drowning. (Alaska Churchman 1914:8)

and:

Duck hunting in Interior Alaska does not differ so very much from duck hunting in any other part of the United States, so far as the actual hunting is concerned. One naturally goes prepared in pretty much the same sort of way, with the same ammunition, firearms, and appetite that can be found at any other place where there is hunting indulged in.

Of course, there is a difference in this, that there is probably better shooting, in that the game is not so wild, as there are so few hunters compared to the quantity of the game, and then a difference in that our best hunting grounds are more difficult to reach, and sometimes almost inaccessible. These it must be remembered that the Alaskan open season is only from fifteen to thirty days long. The season opens on the first of September, and by the first of October, almost all of the birds have left us, flying South to warmer climes. So that what shooting we manage to get at the ducks must be swiftly done or not at all.

Then the hunting varies. On some lakes will be found almost every variety of water bird that may be considered game. Ducks of many varieties, snipe, swan, wild geese, sandhill cranes and other varieties of game birds may be seen at one time or another. Again, on such a lake as our hunting party visited, there would be found little beside duck, and they for the most part mallards.

It took a trip of near eighty miles down the swift flowing Tanana river to bring us to our destination. The launch which carried us is probably fastest in the North and besides a considerable load in the launch itself, towed a large poling boat, which was loaded to the gunwales with camp equipment, shells, and all other accoutrement of camp life, including room in the prow for four dogs, and in the stern for three men.

The trip down took about seven hours, but so swift is this stream that on our return, we were the better part of two days bucking the current, and pushing steadily upstream. At the end of the long river trip, we turned into a slough or branch of the main stream, and felt our way up this cautiously for some distance, till a boat, partly hidden by the bank, showed us our distination. This was the beginning of the portage. This was where the hard part of our work lay, for not only must all the camp equipment be carried across for some two hundred yards, but also

> the canoe, and two other much heavier boats, to be used in conveying our goods up the lake to the camping ground. It is an interesting fact that this lake in which we were to hunt is known to but few white men, but that the portage is work deep by the feet of innumerable Indians, who for generations have come across here, portaging this birch bark canoes for hunting. Fish are few in the lake. Probably in days gone by, there was also good big game hunting around the lake, but that has for some reason moved, and only occasional tracks of bear, moose and caribou, show that they visit here at times. (Alaska Churchman 1916:92)

Olaus J. Murie did a great deal of biological field work in this region and his journals and logbooks of his activities present a good example of waterbody use in the Yukon region. The following are excerpts from various logbooks of the archives of the University of Alaska, Fairbanks. The first covers the period from September 2 to October 10 of 1921:

> On the morning of Sept. 2 I left Fairbanks for a trip to the head of Chena River, to investigate the migration of the caribou. I went by auto stage as far as Fairbanks Creek the first day and stopped at a cabin until Mr. White, who was to accompany me, arrived with the pack horse. Sept. 4 we left Fairbanks Creek with the pack horse loaded with our supplies and outfit. We took the Circle trail, following the high divide between the Chatanika and the Chena Rivers. The first night we camped in the vicinity of Twin Buttes, I believe at the head of Juniper Creek. The next night we reached the head of Smith Creek and the following morning left the trail at that point, passing near Mt. Ryan and reaching the head of Pool Creek, where we camped for the night. The following day we arrived at the head of Boulder Creek, at Mr. White's cabin, Sept. 7th. Most of the time was spent in this vicinity, observing the caribou in their migration and securing specimens. Oct. 14 I left Boulder Creek and returned to Fairbanks by way of the Chena River. The trail was not frozen enough for the use of horses at that time. It was necessary to leave my specimens with Mr. White, to be brought down later with his team. I took with me what outfit I needed for further work, carrying it in a pack sack. I stopped at the various road houses down the river, where I secured information about the caribou. I arrived at Fairbanks Oct. 19. Mr. White's cabin on Boulder Creek is approximately 75 or 80 miles from Fairbanks, by way of the Chena River trail.

> On my return trip I had an opportunity to observe the character of the Chena River valley itself. Starting from Mr. White's cabin there is practically no valley, the hillsides dropping almost to the stream itself, which is characteristic of most of the small water courses. About opposite Far. Mt. the creek bottom widens, having been joined by several branches. Below that point there are extensive flats, wet and swampy in some portions, some parts rather heavily timbered. Near Chena River Hot Springs the valley is perhaps 200 yards across. Continuing down the North Fork, the stream grows in volume. Its course is winding, with deep pools and alternating shallow riffles. The nearest hills become smaller in size and gradually receded from the river, until below the mouth of Flat Creek they almost disappear from view entirely. Below the mouth of Flat Creek the valley becomes very wide, the ground is swampy and a number of small lakes or ponds appear. From here on the country is generally termed "the flats".
>
> In general this whole region has a tendency to be swampy wherever there is flat low ground. Even on steep hillsides wet places occur where water oozes out and gradually finds it way to the creek below. All the creeks have little feeders on the adjoining slopes, indicated in the landscape by strips and patches of willows. Springs are common. The so-called Chena River Hot Spring is the best known. This spring is on Monument Creek, a branch of the North Fork of the Chena River. The water is warm and contains considerable sulphur, which is evident both from the taste and the odour. A bath house has been built over the spring and the place is kept as a winter resort where people have been accustomed to go to treat rheumatism. The ground in that vicinity is warm permitting a rapid growth of vegetables. (Murie 1921:2)

This next set of excerpts come from his two journals discussing his work on the Chatanika River in the spring and fall of 1921:

> ...I left Fairbanks on a trip to Circle to study the distribution of Caribou along the way. With a dog team and sled loaded with camp outfit I traveled on the Chatanika River.... I stopped at various roadhouses in order to get all possible information on the Caribou and other game. After visiting the Circle region I returned to the head of Chatanika River. The time spent on the Chatanika and its tributaries was not particularly cold, in fact some days were quite mild. The winter mail trail follows the Chatanika River.

and:

In an effort to observe the migration of the caribou two trips were made over the Circle trail, about the headwaters and tributaries of Chatanika River. The first trip was made in August, from the 10th to the 16th, with a few camp supplies and two dogs I took the stage from Fairbanks to Meehan, a distance of about 30 miles. There I placed packs on the dogs and carried a pack sack myself, and thus equipped, started up into the hills, following the old Circle trail. I went as far as Smith Creek, which is a good caribou crossing, and camped there a few days. A few photographs were secured, but the caribou were rather scarce, the migration evidently not being in progress. I returned to Fairbanks to await further developments, arriving there on the 16th.

The weather on this first trip was favorable as a while. Twice it rained heavily. As I carried no tent I sought shelter under a large spruce on one occasion and the other time made camp under an overhanging rock. Most of the time the sky was clear, with bright sunshine, but the atmosphere was filled with a dense haze as a result of forest fires so that the hills at a moderate distance were hidden from view. It was impossible to take landscape photographs.

I started into the hills again Sept. 10. This time I had a companion for five days, Mr. H. N. Nelson, a photographer who had spent the summer in Alaska taking motion pictures. We had a pack horse and guide. We stopped to camp for a few days at the head of Smith Creek. The weather was rainy almost continuously, giving us little opportunity to photograph caribou. Often, when Mr. Nelson had his motion camera set up to photograph some caribou another shower would come on and he had to throw his coat over the camera for protection. On Sept. 16 Mr. Nelson started back for Fairbanks, taking the horse and guide with him. I continued eastward, taking what supplies I could carry. I reach a cabin on Faith Creek, where I stopped that night. Next day I went on and reached the road house at Twelve Mile Creek late that night. This was a bright day, ideal for photographing, but caribou were not very plentiful. I remained in the vicinity of Twelve Mile Creek until Sept. 24 and during that time there were several very fine bright days, but almost invariably the caribou were not at hand to be photographed at such times. There had been a rather heavy snowfall in the hills in the early part of September but that had nearly all disappeared before this trip. Some of the higher hills, particularly the White Mountains, were still capped with snow. Several inches of snow fell on the 24th and it snowed a little more for several days after that. On the morning of the 25th I started back for Fairbanks. Upon reaching Smith Creek I found the track of a grizzly and spent several days hunting in that vicinity. Then I continued on and reached Meehan Sept. 29. The next day was spent hunting for fossils where a prospector had been making a cut. The stage was no longer running as far as Meehan, but I rode on a truck the next day, Oct. 1, as far as Gilmore and there caught a stage to Fairbanks.

> The Circle trail follows the divide between the Chena and Chatanika waters. Like most streams in this region the Chatanika and its tributaries are hemmed in by the charactistic rounded hills. The valleys are narrow and steep. The whole country is cut up by an intricate network of creeks, mostly small shallow water courses. The creek bottoms are often swampy and many of the slopes are wet, where water seeps out to the surface and sometimes collects in small pools on the tundra-like ground above the timber. The mossy surface of the ground usually absorbs the moisture which falls but during a rainy spell water runs freely in the main trail, where the vegetation has been tramped out and in many of the caribou trails. Such places are sometimes the only source of water for the traveler unless he wants to descend all the way to the creek bottom. Here and there on the divide one can find an occasional rocky pillar or outcrop and on many of the high slopes are beds of loose angular rocks. Most of the hills are work smooth and more or less covered with soil. The divide at the head of McManus Creek separates the Tanana and Yukon Waters. (Murie 1921:2)

This last excerpt deals with Murie's travel on the Tanana River in July of 1921:

> After my return from Ketchumstuk several days were spent at Tanana Crossing packing up and attending to various details preparatory to leaving for Fairbanks. One day I went up in the Alaska range to observe summer conditions there; a prospector and trader, Mr. Fry and Mr. Fredericson, were preparing to go down the river and arrangements were made with them to accompany them and help with the boat. The river trip therefore was without expense, but as my companions were anxious to make this trip in a very short time, I had hardly any time for collecting specimens and missed some opportunities to secure Duck Hawks and Gulls which I regretted very much.

> We left Tanana Crossing putting our baggage, specimens, and my two dogs in the poling boat. As the water was high we made good progress down the stream and traveled 75 miles the first day. The next day we went about 55 miles. (Murie 1921:2)

Murie then discusses the physiography of the Tanana River and how it affected his travel:

> My travel was confined almost entirely to the Tanana River itself and little study could be done of the surrounding territory.
>
> The water of the Tanana is very muddy, being fed by a number of large glacial streams, such as the Robertson and Johnson Rivers. These tributaries were at a low stage at this time, and there was no sign of ice at the mouth of the Robertson River. The Tanana varies somewhat, but throughout most of its length it is split into numerous channels and gravel bars, which are continually changing. Considerable driftwood is stranded on the various bars and on banks which are being eroded. (Murie 1921:2-3)

Mining in the Yukon Basin Region

Mining in Alaska had always been credited with a major contribution to the exploration and establishment of travel and trade routes in Alaska; because of this, a separate section on mining activities in the Yukon Basin region is needed.

Lieutenant Allen of the U. S. Army conducted the first official exploration in the upper Koyukuk River drainage. In 1885 he crossed overland from the Yukon River along the divide between the Tazitna and Melozitna Rivers, down the Kanuti River and then up the Koyukuk River as far north as the John River confluence. With Allen was John Bremner. Bremner and his partner Pedr Johnson seem to be the first prospectors in the upper Koyukuk River area. Although not documented, it is believed they found gold at Tramway Bar on the Middle Fork Koyukuk.

The Klondike Gold Rush in 1898 brought an influx of prospectors and miners into the Yukon Basin region:

> In the summer of 1898 over 1000 persons are reported to have taken steamers up the Koyukuk in search of gold in the upper drainage. According to Robert Marshall (Arctic Village), only 200 persons over-wintered in the upper Koyukuk that year.
>
> The following spring of 1899 saw even more of the "Ninety-eighters" leave the Koyukuk district. Those that stayed were the more seasoned prospectors, and their persistence quickly paid off when new strikes were made that spring and summer on Slate Creek and Myrtle Creek, tributaries of the Middle Fork [Koyukuk]. (Pourchot 1975:2)

The greatest influx of prospectors and miners into the Yukon Basin region occurred between 1900-1920. Evidence of waterbody use is well-documented in this region at the height of mining and prospecting.

In 1902 A. M. Collier of the USGS investigated coal resources along the Yukon River. Collier found that coal existed on Washington, Bonanza and Coal Creeks. Coal had been discovered on these creeks as early as 1898 and by 1902 over four tons had been mined. Later, L. M. Prindle, in 1905, surveyed the extent of gold mining in this area and found:

> A few small tributaries of the Yukon, notably Woodchopper, Coal, Washington, and Fourth-of-July Creeks, have produced during 1905 at least $15,000, and according to some reports were expected to produce, before the close of the season, about $30,000.... The gold is often coarse, and a nugget found on Washington Creek was worth $167.50. Most of the work in the Woodchopper Valley has been done on Mineral Creek and on Colorado Creek. (Prindle 1906:23)

In a 1910 U.S.G.S. report A. H. Brooks relates that placer gold was discovered on Myrtle Creek in 1899. He also writes that between 1899 and 1910 "the production of placer gold in the Koyukuk...has been more worthy when its difficulty of access and small population are considered, and has probably averaged higher per-capita than that of any other district in Alaska" (Brooks 1910:291). L. M. Prindle who spent a good deal of time in the Yukon region, noted during the 1905 field system that "there are two main trails to the forty-mile country. One is by way of...Dome Creek to the junction of Forty-mile and Steel Creeks. The other trail, known as the government route, leaves the first at the thirteen mile camp, follows the long divide to the southwest between the headwaters of Champion and O'Brien Creek" (Prindle 1905:9). Prindle also found that in the summer of 1902 gold was discovered on Pedro Creek, about one-half mile below the mouth of Twin Creek. The following year, claims were being worked on Twin Creek, Gilmore Creek, Pedro Creek, and Goldstream Creek. By 1904, gold mining in those areas was confined to Twin and Gilmore Creeks. In 1903 several claims were being worked on Cleary Creek and Discovery Creek.

As most of the information in this section about mining comes from U.S.G.S. reports, there is a lot of information about fieldwork techniques and transportation. Brooks writes in 1907 that:

> There is only one natural highway for approaching this part of Alaska--that by way of Koyukuk River. From the middle of June until early in September the main Koyukuk may be ascended by medium-sized stern-wheel steamboats having a draft of about two feet. By this means all the supplies for the region are now transported up the river to the vicinity of a warehouse station named Bettles, a few miles below the mouth of John River and about 60 miles below Coldfoot. During some seasons of low water it has been found impracticable to reach Bettles, and at certain periods of high water it is possible for steamboats to ascend a short distance above that place. The general practice is to take all supplies from Bettles, or near by, upstream to Coldfoot or the mouth of Wiseman Creek during the summer by shallow-draft scows that carry from 8 to 12 tons, towed by horses, or by poling boats that carry about one ton, propelled by men. Both of these methods are tedious and expensive. From June 15 to September 15 may be considered the boating season on the Koyukuk. Winter sledding of freight from Coldfoot to Nolan Creek is done for four cents a pound and horse packing in summer from the mouth of Wiseman Creek to Nolan Creek for six cents a pound.
>
> To reach this district during the winter or closed season it is necessary to travel with dog-drawn sleds. A monthly winter mail service of this kind is maintained and a few persons occasionally travel in this manner. (Brooks 1908:45)

Continuing the series, in 1909, Brooks writes about the extensive use of waterbodies in the Fairbanks region of the Yukon River Basin region:

> On Fairbanks Creek there was no notable development during 1907, but operations were continued down as far as Claim 10 below Discovery. On Cleary Creek the interest was centered in the operations which were carried on in the Chatanika Flats, near the mouth of the creek. Much mining was, however, done on the upper part of the creek also. On Dome Creek the pay streak was traced down into the Chatanika Flats, and the largest production was from this part of the valley. In September about eight groups of claims on Vault Creek were being operated in a large way. Goldstream Creek, which has been found to carry placers for the upper several miles of its course, made one of the large outputs of the district. Many of its tributaries also contain workable placers. Ester Creek, which previously had been a comparatively small producer, took second rank in 1907. In fact, the latter part of the summer it was the scene of greater activity than in any other part of the district. Cripple Creek, to which Ester Creek is tributary, carried gold, but so far only a series of bench claims about a mile below the mouth of Ester Creek have been productive. It seems as if the rest of the creek would be worth careful prospecting, but the width of the valley floor had deterred many operators from searching for the pay streak. Alder Creek, a westerly tributary of Cripple Creek, was carefully prospected last year, but it was not learned by the writer whether values were found. An event of special import was the discovery of gold on the bench on the east side of Ester Creek. Though this bench is not defintely proved to carry commercial values, yet it is suggestive of a further extension of the mining operations in this stream valley. The upper part of Smallwood Creek, a tributary of the Little Chena, has been prospected for several years, and a little gold taken out.
>
> In 1907 more prospecting was done and some values were found on the creek. Of more interest, however, is the fact that gold was discovered about five miles below at a depth of 320 feet. It was not known at the time of the writer's visit whether these deposits are of commercial value, but they indicate a wide distribution of the alluvial gold and suggest at least an extension of the district in this direction.

> Among the smaller creeks which have become producers in 1907 is Little Eldorado, where there was a small output. Our and Big Eldorado Creeks also made small productions, as did a number of other tributaries of Goldstream Creek.
>
> The lines of development during the next few years would seem to be in the direction of further prospecting on the lower part of Goldstream Creek and on Smallwood Creek beyond the point where commercial values have been found, and the prospecting of the Chatanika Flats to look for old channels of streams tributary from the southeast--that is, buried and abandoned channels of the present drainage system. It is also suggested that it might be profitable to prospect both the streams lying southwest of Ester Creek and those tributaries to the Little Chena, which would fall into the general extension of the auriferous belt, so far as it has been outlined. Above all, the systematic effort should be made to reduce the cost of extraction, thus making avilable large bodies of auriferous gravel which now must remain untouched. (Brooks 1908:43)

Brooks' next report with significant information about transportation and mining in the Yukon region is in 1910. In writing about population and settlements in the region, Brooks relates:

> The population of the Koyukuk region during the eleven years in which it has been occupied by whites has not been large. In the Klondike rush 1,000 or more inexperienced gold seekers entered the Koyukuk Valley in the fall of 1898, but nearly all of them departed during the early summer of 1899 and only about 100 of the more hardy ones remained. Although a revival of interest was caused in 1900 by the discovery of gold on Myrtle Creek and the reports of rich finds on Hammond Creek, the population again reached 1,000 or more, by 1901-2 it had dwindled to about 200. About 350 are reported to have been there in 1903-4, and since then the average population of the district has been about 200 persons.
>
> Since mining was established in 1900 the principal settlement in the Koyukuk region has been the town of Coldfoot, located on Koyukuk River, about 586 miles from the Yukon, at the mouth of Slate Creek. Here the postal and recording offices are established; but within the last two years a new settlement has been formed about 16 miles farther up the Koyukuk at the mouth of Wiseman Creek, and this place is now the largest town in the district. A small group of cabins on the north bank of Chandalar River near the mouth of Flat Creek is named Cairo.

and:

Bettles River. Native copper and silver are reported to have been found in small amounts on a northern tributary of Bettles River, associated with placer gold.

On the Middle Fork, just above Tramway Bar, in the southern part of the Koyukuk district, there is at least one coal bed of workable thickness. It is about 12 feet thick, of which the middle 9 or 10 feet is good fuel of a low-grade subbituminous quality, but no development of it has been undertaken up to the present time, though it should prove to be serviceable for local use.

Placer gold was first found in this region in the river bars of the Koyukuk sometime between 1885 and 1890, when it was visited by a few of the first prospectors who came to the lower Yukon Valley. John Bremner, who was killed by an Indian in 1888 on Hogatza River, was one of these pioneers.

Previous to 1808 Tramway Bar bench and two other localities, named Hughes and Florence Bars, appear to have been the best-known occurrences of placer gold in the Koyukuk Valley, and it's estimated that about $4,000 worth of gold was mined from them.

Since 1898 prospectors have searched for gold within the valleys of all the headwater branches of Koyukuk River, with the result that placer gold has been found in greater or lesser amount in the gravels of some of the tributaries of John and Wild Rivers and the North, Middle, and South Forks of the Koyukuk. This search has been best rewarded on the tributaries of the Middle Fork, so the deposits and operations within this drainage basin will be considered first. At present placer gold is known to occur in many of the creeks and gulches tributary to the Middle Fork, from Chapman Creek and Tramway Bar on the south to the head of Bettles River, but it is only from five or six of these streams that gold may be mined profitably under present conditions, and in many places work has been carried on from year to year with considerably uncertainty as to the result of the enterprise. This uncertainty is due in part to the nature of the gravel deposits, but largely to the high cost of all supplies and to the primitive methods of mining, which in turn may be attributed to the general remoteness of the region.

and:

> Placer gold was discovered in Myrtle Creek in March, 1899, in the present stream-bed gravels, which are from two to four feet deep and from 100 to 300 feet wide. These gravels have been worked more or less from a point near the mouth of the creek up to Claim No. 20, but have not proved profitable above Claim No. 15. The seven creek claims from No. 9 to No. 15 have been the most productive. Considered in a general way, the gold has been found well scattered across the width of the present bed of the stream and mining has yielded an average of $5 to $15 a day to the man. All the work along the creek has been done with shovel, pick, and sluice box, the loose shingle gravels from two to four feet thick being favorable for this kind of mining. This work has been carried on more or less actively during each summer for the last ten years. Nearly all of this shallow ground is now worked out. The largest yield of gold has been mined from Claim No. 11, and Claims No. 12 and No. 9 have been the second and third best producers, respectively. These three claims are on the part of the creek from two to three miles above its present confluence with Slate Creek, just below the point where it leaves its mountain valley. Below these claims Myrtle Creek flows through the bench gravels of the Slate Creek Valley, and these compose its banks. Above Claim No. 12 the bed-rock slopes of the mountains that bound the real Myrtle Valley come down near the stream on both sides, and here and there it cuts rock bluffs at the bases of these slopes. Thus the richest concentration of gold appears to be just beyond the mountains, in that part of the creek that was its mouth when the main drainage along the Slate Valley may have occupied a more northerly position or when Myrtle Creek was at a higher level and dumped its gold-bearing gravels out upon the gravels of Slate Valley, to be mixed with the bench deposits. The gold of this locality is probably all derived from the wearing down of the bed-rock of the mountains from which the valley of Myrtle Creek has been eroded. (Brooks 1911:288, 299-300)

These observations clearly establish a documented use of waterbodies in the Yukon Basin region. It makes sense too, that such great numbers of prospecting in this area would involve a constant use of waterbodies in order to attain access to areas rich in minerals.

Writing again in 1911, Brooks provides interesting insights into the use of rivers and creeks in the process of mining and prospecting:

During the last 11 years, since the discovery of gold in 1899, most of the rich creek gravels of Slate Creek and Miller Gulch have been worked out, yet there still remain creek claims of lower grade and bench gravels that have not been touched. The total production of Slate Creek and Miller Gulch is about $1,500,000.

There are about 20 creek claims on the channel of Slate Creek and seven on Miller Gulch. Between 40 and 50 men were employed in the Chistochina district in 1910, most of whom were on Slate Creek. They were scattered along at several camps, from "No. 3 below" to the lower end of the creek.

The first three claims above the mouth of Slate Creek are virgin ground but are difficult to work because of the depth of the gravel and the large amount of water. A hole 21 feet deep near the south side of the gravel bar did not reach bedrock. Tailings from the claims above are another source of trouble. A dam was built on the lowest claim in 1910 to furnish water for booming a low bench on the north side of the creek. This was not complete in July, 1910, when the creek was visited.

On the fourth, eighth, and ninth claims above the mouth of Slate Creek mining was confined to the bank on the south side of the stream. A heavy deposit of glacial material, consisting of blue clay or glacier mud and large boulders, is exposed on that side. It is overlain by a deposit of frozen yellow talus material or shale rock from the mountain side on the south, ranging from 5 to 25 feet in thickness. The glacial material contains gold and is exploited by undermining and caving. Boulders are piled back from the butt to form a channel along the foot of the bank and then the water is turned in to cut the bank, and wash away the fine gravel. Afterward the remaining gravel and gold is shoveled into the sluice boxes. This work is slow and very dangerous, because the high bank of frozen gravel above sloughs off continually as it thaws and at times breaks down in large masses, so that men must be constantly on the alert and ready to jump to a place of safety.

The largest force of men on the creek was at work near the mouth of Miller Gulch on ground that has been the richest of the district and is still producing gold. This Tacoma claim, as it is called, together with the lower part of Miller Gulch, has yielded much more gold than all the other claims together. The gravels of Slate Creek above Miller Gulch are of lower grade than those below, and fewer men have been employed there, yet their contribution to the gold production of the creek is important.

There was less mining on Miller Gulch in 1910 than in previous years. This was not due to the exhaustion of gold-bearing gravels. Work was partly suspended in order to avoid covering unworked gravels in Slate Creek with tailings and will be resumed another year. The water supply of Miller Gulch available for mining operations is small, so that it has been the custom of the two principal claim owners to use it in alternate years. In this way all the bed of the gulch has been worked out, but there still remain bench gravels that will be exploited as soon as the ground below can be used for dumping.

The most important gold-producing creek in this district, after Slate Creek and Miller Gulch, is Ruby Creek which lies just east of Slate Creek across a low, flat divide.

Work on Chisana River was in the nature of assessment work and prospecting. Considerable ground is held there by different persons awaiting the time when the introduction of hydraulic machinery or other economical mining methods shall make mining more profitable. At present the cost of labor and supplies prevents development of much of the gold-bearing gravels. Wages are $10 a day without board, and freight costs from 20 to 25 cents a pound.

During the winter of 1909-10 and the summer of 1910 Goldstream Valley presented a lively scene of mining operations from a point near the head of Pedro and Gilmore Creeks to "No. 17 below". Open-cut methods were used extensively in the upper portion of the valley, where the depth of the ground permits working in this manner. Two large open-cut plants, one on "No. 9 below" Pedro and the other on "No. 5 below" Goldstream, operated bottomless scrapers successfully. It is reported that the cost of working the ground was less than 30 cents a square foot, which is low for the Fairbanks district. Several other smaller plants operating on Pedro Creek also proved the economy of the open-cut method of mining. The usual practice of drifting and hoisting was employed exclusively on lower Goldstream and Engineer Creeks. Probably 90 percent of the production of the Goldstream Valley was secured in this manner. In size the plants ranged from a hand windlass worked by two men to a 60-horsepower steam plant employing 40 men. Some difficulty was experienced on Engineer Creek with thawed ground and underground water, but the most serious drawback of the season in this basin resulted from the scarcity of water for sluicing. Several of the mines working on low-grade gravel were compelled to shut down entirely on this account, and a number of others were not able to work a full force during the low-water period.

Successful prospecting on the second tier of benches on the left side of Goldstream, opposite "No. 8 below", early in the spring led to the development of a good pay streak extending over three claims opposite "Nos. 7, 8 and 9 below" later in the season. Considerable prospecting was done during the summer and is still being done to trace the pay gravel farther up and down stream. Bedrock on the second tier and creek claims is at about the same elevation, but the pay streak above the former seems to be a uniformly higher grade than in the creek bed. The depth of ground, however, is somewhat greater on the bench claims, as the average depth of hole is between 100 and 110 feet. It is estimated that 500 men were employed in placer mining on 52 claims on Goldstream, Engineer, Pedro, and Gilmore creeks during the winter season and probably about 20 percent more were working during the summer months.

A great decrease in mining operations was shown on Dome Creek, which has held a very prominent position among the producing creeks in past years. This is due chiefly to the exhaustion of the richest claims; but the fact that several of the claims are tied up in court proceedings is also an important factor. There were six or several plants being operated between "No. 7 above" and "No. 7 below", of which only two on "Nos. 5 and 6 below" were working on a scale comparable to past operations. The extreme drought also added to the difficulties on this creek. It is said that there was scarcely enough water to supply a boiler on "No. 6 below" during the low-water period, where in former seasons there was very seldom less than a sluice head available. Further prospecting this year between "No. 7 below" and "No. 14 below" has failed to locate the "lost" pay streak in this part of the creek.

On lower Dome Creek, in the Chatanika Flats, the successful operation of a plant on the Niggerhead group and prospecting on the lower end of the group has defined a body of pay gravel at a depth of 180 feet which carries good values. Prospecting is also being done on the Recorder Association claim, which is just above the Niggerhead group and extends up Chatanika River, on the assumption that the pay comes from the river tather than from Dome Creek. Mining was being carried on at the mouth of Vault Creek on

> the Alabama Association claim, and about four miles below this point, near the mouth of Sargent Creek, gravel was being taken out from a 150-foot face which is 230 feet below the surface of the ground.
>
> The values are found on a false bedrock consisting of an impervious clay which is 89 feet above the real bedrock. It is thought by some of the miners that the developing and prospecting that have been done along the Chatanika Flats indicate a continuous pay streak from the mouth of Cleary down to Our Creek. (Brooks 1911:124-126)

Mining and prospecting follows nearly the same pattern during the next few years covered by Brooks' yearly mineral resouce reports. It is not necessary to reiterate every yearly report, as these already stated more than clearly show that waterbody use in the Yukon Basin region was continuous and involved nearly all waterbodies in this region. However, one of the region's most productive years was in 1912, and it is worth showing the extent of waterbody use in this year. From the 1912 report the following extensive account follows regarding claims on creeks in the Yukon Basin region:

> The Nizina gold placer district includes Dan, Chitna, and Young Creeks. Most of the gold produced in this district in former years and also the larger part of the production in 1912 has come from Chititu Creek, though some was contributed by Dan Creek or its tributaries and some by Young Creek. The total production for 1912 is larger than for several previous years in spite of the unusual discouragements brought about by unfavorable weather.
>
> The floods were felt most severely on Dan Creek, where a recently constructed and expensive hydraulic plant was destroyed by the September floods and a large part of the labor of two years was lost. The lower part of Dan Creek lies in a narrow valley where the water has little chance to spread and consequently is particularly liable to do injury in times of unusual flood. The miners on Copper Creek, in the upper part of the Dan Creek basin, escaped with less injury, for less water was concentrated there and the valley is relatively wider.
>
> In the Chititu Creek basin three hydraulic plants were in operation in 1912. One was on the main stream and the other two were on Rex Creek, the northern branch of Chititu Creek. The plant installed on Chititu Creek several years ago not far above its mouth, and in 1912 a new and large plant was built on Chititu Creek. The third plant in operation is near the head of Rex Creek. These three

plants suffered less injury from the September storms than the one on Dan Creek but did not wholly escape. Unfortunately the high water came just before one of the lines of sluice boxes was to be cleaned up and buried everything, including the gold, under a mass of gravel, necessitating much extra work for its recovery. Better weather in the later part of September and early part of October, however, made it possible to work much later than has been customary, and the damage and loss of time had less effect on the season's gold production than they would have had in previous years.

Dome Creek -- From claim "No. 7 above" to "No. 6 below" on Dome Creek ten to twelve outfits employing about a hundred men were mining most of the summer of 1912. No data is at hand to show the amount of winter work accomplished, but it was probably less than that done in the summer. The production from that part of the creek for 1912 was probably equal to or greater than that of 1911.

In the Chatanika Flats near Olness, near the mouth of Dome Creek, about 250 men were employed at six or seven plants. The Niggerhead Association, which comprises the most important group of claims in that locality, had three large plants in operation and was perhaps the scene of the most extensive mining in the Fairbanks district in 1912. Considerable work was done on the Recorder Association Claim and on the Shakespeare Claim. On the Christmas Association Claim good pay was reported at a depth of 177 feet.

Cleary Creek -- The fact that Cleary Creek continues to be one of the most productive creeks in the camp is due almost entirely to the extensive deposits of auriferous gravels that have been found near its mouth of the Chatanika Flats.

Nine to twelve outfits, employing a total of twenty-five to fifty men, were at work in 1912 from claim "No. 10 above" to claim "No. 10 below". A large number of these men were either rewashing the tailings from the old dumps or were hoisting the pillars and unworked portions that had been left in the mines during the more prosperous days of the camp.

Below claim "No. 10 below" about fifteen outfits were at work, employing perhaps 70 men in the winter and 275 in the summer. Much of the ground has been of rather low grade and very little of it has earned a profit unless worked under the most careful management. Early in the winter of 1912 a new line of pay gravel was found on the right bank of Cleary Creek opposite claim "No. 16 below" and was located by prospecting shafts for a considerable distance up and down the valley. Several plants of large capacity were hurriedly installed. The ground however, did not prove as rich or as widely extended as at first expected and several of the plants were unable to pay expenses, only three or four plants being worked continuously throughout the summer. The gold is said to be coarse and different in appearance from any previously found on the creek.

On Wolf Creek, a tributary of Cleary Creek, two men were mining in the winter and eight to ten in the summer. Very good returns are reported to have been obtained. On Chatham Creek, another tributary of Cleary, no placer mining was done in 1912.

Vault Creek -- In the summer of 1912 several large outfits were mining on Vault Creek, employing a maximum of about a hundred men. The principal group of claims was the Alabama. Other groups of importance were the Isabella, Oregon, Homestead, and Hard Luck.

On Treasure Creek, a tributary of Vault, four or five small outfits were working; and on Wildcat Creek a small tributary of Treasure, two small plants were working.

Little Eldorado Creek -- Little Eldorado Creek has never satisfied the expectation of its earlier prospectors and promoters. In 1912 mining was being done at three or four different points, and considerable prospecting was in progress, the men employed varying from thirty in winter to sixty in summer. The principal claim was "No. 6 above". Bedrock lies at a depth of about 85 feet. It is said that sufficient pay gravel has been located to furnish work for one plant for several years.

Washington Creek -- Two men used a dump gate to do ground-sluicing at the mouth of Washington Creek and had a fairly profitable season. Three men were prospecting on the upper portion of the creek during the early part of the summer. No placers of importance were reported.

Alder Creek -- Four men worked on Alder Creek for practically the whole season. The gold is coarse, and during the summer a number of nuggets valued at from $3 to $8 and one of $25 were found. Some of the gold is rough and other specimens are well worn. The deposits seem to be rather irregularly distributed.

Goldstream Creek -- Although the production from Goldstream for 1912 will probably not equal that for 1911 it will put the creek near the head of the list. The left-limit bench claim of "No. 9 below", owned by the M. B. Mining Co., has proved to be one of the richest claims in the camp. No mining was done below claim "No. 21 below", but prospecting has shown a considerable body of gravel farther down the valley with an average value of about 50 cents per square foot, not enough to pay for working at present costs. Two plants are now working on claim "No. 1 below", which is and has been for several seasons one of the largest producers on the creek. Steam scrapers were used on claim "No. 6 below", the lowest claim on the creek that was worked by open cut. Steam scrapers were also used on "Nos. 4 and 5 below". The outlook for several more prosperous seasons on the creek is particularly good, as many of the operators have sufficient pay gravel in sight to last one or more seasons and prospecting is continually revealing new deposits.

The number of outfits mining on the creek varied greatly during the year, ranging from about fifteen with 150 men in the winter to perhaps thirty with 250 men in the summer.

On First Chance Creek, a small stream entering Goldstream from 12 to 15 feet, and have been mined chiefly by open-cut methods. During the winter of 1911-12 about fifteen men were drifting on four claims. Summer mining was carried on more extensively, probably 75 to 125 men being employed in the open cuts. Several outfits were using bottomless scrapers. Other plants were using steam hoists, the dirt being conveyed to the buckets in wheelbarrows. A few men were working with a windlass. On Twin Creek fifteen to twenty men were employed in operating a Bagley bottomless scraper.

Gilmore Creek -- On Gilmore Creek four or five claims were mined by 12 to 15 men. The prevailing method of handling the gravel in the summer was by conveying it in wheelbarrows to a bucket which was raised by a steam hoist to the sluice boxes.

Engineer Creek -- In 1911 Engineer Creek was one of the busiest creeks in the district, several outfits on it operating on a very large scale. The year 1912, however, has seen a rapid decrease and the consensus of opinion of those personally familiar with the conditions is that the pay streak is about worked out. During the winter of 1911-12 two parties were at work on the Owl Association and one each on

> Discovery claim "No. 1 above", and the Wild Good Association Claim. About thirty-five men were employed. The summer of 1912 was still less encouraging. One small outfit was mining on Discovery, which was the most promising claim; one party of four or five men was mining on the upper end of the Owl Association; and several men were resluicing tailings on the Wild Good Association Claim. Scrapers were used to raise the gravel to the sluice boxes cuts most of the summer. Some mining was also done on Alder Creek, another small tributary of Fairbanks.
>
> A steam scraper was used on claim "No. 1 above" most of the summer. A self-dump hoisting plant was used in an open cut on claim "No. 3 above", the gravel being conveyed to the bucket by wheelbarrows. About twenty men were employed. Options have been obtained on several claims below those controlled by the Alaska Exploration Co., and it's reumored that an attempt will be made to organize a company and install a dredge on the property.
>
> Fish Creek and tributaries -- Fish Creek has failed to come up to expectations of large bodies of low-grade ground, but comparatively little of it has been found rich enough to pay for working by the methods employed. Five to ten outfits employing thirty to forty men were mining on the creek during the year.
>
> On Pearl and Last Chance Creeks, tributaries of Fish Creek, some open-cut mining was done during the summer months.
>
> Smallwood Creek -- Several claims were mined on Smallwood Creek, where a deposit richer than ordinary is said to have been found during the year. (Brooks 1913:204-209)

Between 1915 and 1940 mining and prospecting was in a declining period, especially with two world wars in that period. The last significant U.S.G.S. report regarding mineral resources in Alaska prior to statehood was written in 1939 by Philip S. Smith. Smith's primary focus was on the mineral industry and the following clearly shows once again the extent of waterbody use in the Yukon Basin region:

> The indefinite tract of country adjacent to Fairbanks, here called the Fairbanks district, has long been, and still is the main placer district in Alaska....
>
> The greatest amount of gold from the district was produced by the Fairbanks Exploration Department with its six dredges on Goldstream, Pedro, Cleary, and Ester Creeks, and its scattered small hydraulic

plants. Considerable placer gold was also recovered by several smaller companies using hydraulic, open-cut, and drift mining methods. Placer gold recovered by the smaller operators, using other methods than dredging, came principally from Goldstream and its tributaries, Gilmore, First Chance, Nugget, Eldorado, and Happy Creeks; from Chatanika River and its side streams or their tributaries, Dome, Cleary, Wolf, Kokomo, Faith, and Sourdough Creeks; from Chena River and its side streams or their tributaries, Fairbanks, Pearl, Fish, and Palmer Creeks; and from Caribou Creek, a tributary of Salcha River. There were also smaller camps in the valleys of a number of the other streams, whose production, though individually only a few hundred or a few thousand dollars, in the aggregate swelled considerably the total production for the district.

The extensive mining project being carried on by the Fairbanks Exploration Department, embracing large tracts of Goldstream, Cleary, and Ester Creeks, continued to be the outstanding placer mining enterprise not only in the Fairbanks district but throughout the Territory. The placer work of this company in 1938 is divisible into several more or less separate enterprises that are closely knit together in their broader aspects. Three of these enterprises embrace the dredge mining in progress by three dredges on Goldstream and Pedro Creeks, two dredges on Cleary Creek and Chatanika River, and one dredge in the headwater of Ester Creek. The work on Goldstream and Cleary Creeks was essentially a continuation of the dredging that had been in progress on these streams for several years. Two modern dredges were engaged in this work on Goldstream, one on Pedro, which was new and built during the early part of the year, and two in the Cleary Creek area.

In emphasizing the preparatory work that is in progress by the Fairbanks Exploration Department in the Cripple, Eldorado, and Fairbanks Creek areas it should not be overlooked that a similar type of preparatory work, though by no means on as gigantic a scale, is also in progress in the so-called producing areas on Goldstream and Cleary and upper Ester Creeks. It takes the company at least three years to prepare a tract for dredging, as the surface vegetation must be taken off, the overburden thawed and disposed of, and the frost in the gold-bearing gravel thoroughly removed before it can be excavated. All these processes are going on simultaneously in different parts of these so-called producing areas, as an integral part of the dredging project, and therefore they have not been counted separately in listing the major undertakings of the year by this company. Among the outfits that have reported directly to the Geological Survey regarding their season's work the principal ones were working on streams tributary to the Middle Fork, including Slate Creek and its tributary, Myrtle Creek; Wiseman Creek and its tributaries Archibald and Nolan Creeks and Linda and Gold Creeks, as well as on several of the tributaries of the Bettles River, especially Wakeup Creek and Jim Pup. Two reports were also received regarding mining on Spring and Lake Creeks, tributaries of the Wild River, some 40 miles west of Wiseman, and a number of reports came from other small producers at points as remote as the Alatna River. Most of these camps are mining by simple hydraulic or hand methods, but reports indicate that a modern dragline plant will be installed on Myrtle Creek in 1939. (Smith 1939:43-44)

Heritage Resource Survey (Yukon Basin)

Historic roadhouses and old mining camps characterize the heritage resource survey in the Yukon Basin region. Numbering 14, the sites are testimony to the extent of populations that lived, prospected, mined, hunted, and fished the major tributaries and the Yukon River itself throughout the gold rushes and in the later years prior to and after statehood. Although these roadhouses served as major rest points for the interior traveler there is little documentation that tells us which boarders came from up or down river. However, taking into account the significant number of people in this region from 1880-1920, and the indisputable fact that the Yukon River was a major highway of commerce, it can be assumed that its tributaries were utilized. That is certainly evident when one reads past USGS reports and their contents discussing mining and prospecting.

Second to the roadhouses sites are the prehistoric sites in the Yukon Basin region. Numbering 9, these sites are basically lookout sites situated on riverbanks or on knolls and small rises overlooking rivers and streams. These give ample evidence that the occupants were able to utilize the waterbody. Of course this is not factual use, but susceptibility to use is too important to overlook as a source of possible waterbody use.

HERITAGE RESOURCE INVENTORY

Name of Site: Minto Roadhouse

Location:
Latitude: N 63 35' 15"
Longitude: W 149 11' 00"
Map Series: Fairbanks

Description: On the east bank of the Tanana River, 44 miles west of Fairbanks.

Significance: On a river that supported significant waterbody travel (routes).

Source(s): (Smith 1974:59)

HERITAGE RESOURCE INVENTORY

Name of Site: Gilmore Mining Camp

Location:
Latitude: N 64 59' 28"
Longitude: W 147 32' 15"
Map Series: Fairbanks

Description: A mining camp named for Tom Gilmore.

Significance:

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: Alder Creek Camp

Location:
Latitude: N 65 04' 45"
Longitude: W 147 11' 45"
Map Series: Livengood

Description: A mining camp on the left bank of Fairbanks Creek, west of the mouth of Walnut Creek, and 21 miles NE of Fairbanks.

Significance: An important camp in the middle of a rich and historic mining district.

Source(s): (AHRS 1971)

HERITAGE RESOURCE INVENTORY

Name of Site: Fairbanks Creek Camp

Location:
Latitude: N 65 03'
Longitude: W 147 09'
Map Series: Livengood

Description: Located west of Fairbanks Creek, 11 miles SE of Chatanika.

Significance: Local name of a former gold mining camp; derived from Fairbanks Creek in whose valley gold was discovered in 1902.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: Dome Camp

Location:
Latitude: N 65 17'
Longitude: W 148 09'
Map Series: Livengood

Description: Located on the left bank of Dome Creek about 14 miles north of Fairbanks. Consists of several buildings, much mining equipment, and a ruin of an old dredge.

Significance: Important historical component of the general gold rush character of the region.

Source(s): (AHRS 1972)

HERITAGE RESOURCE INVENTORY

Name of Site: West Fork

Location:
Latitude: N 65 27'
Longitude: W 148 39'
Map Series: Livengood

Description: Abandoned.

Significance: "Being at the head of navigation for small boats on the Tolovana Rivers, was established in 1915 as a small supply point for the Livengood Camp. In 1916 it contained a sawmill, roadhouse, and some warehouses."

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: Vault

Location:
Latitude: N 65 02' 00"
Longitude: W 147 42' 00"
Map Series: Livengood

Description: None

Significance: A former mining camp. A Post Office operated there between 1908 and 1909.

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: Stevens

Location:
Latitude: N 65 58' 54"
Longitude: W 147 42' 00"
Map Series: Livengood

Description: Several buildings. Constructed in 1909.

Significance: Settlement reported in 1909 by USGS.

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: Kalland's Roadhouse

Location:
Latitude: N 65 11'
Longitude: W 153 04' 30"
Map Series: Fairbanks

Description: On the north bank of the Yukon River, at the mouth of Illinois Creek. Known as the "Hub Roadhouse".

Significance: On a river that supported significant waterbody travel (routes).

Source(s): (Smith 1974:59)

HERITAGE RESOURCE INVENTORY

Name of Site: McCormick's Roadhouse

Location:
Latitude: N 65 25'
Longitude: W 150 33'
Map Series: Fairbanks

Description: On the north bank of the Yukon River, on the right bank of Roadhouse Creek.

Significance: On a river that support significant waterbody travel (routes).

Source(s): (Smith 1974:59)

HERITAGE RESOURCE INVENTORY

Name of Site: Woodchopper Roadhouse

Location:
Latitude: N 65 21' 30"
Longitude: W 143 18' 00"
Map Series: Fairbanks

Description: On the left bank of the Yukon River, 1 mile east of the mouth of Woodchopper Creek.

Significance: A mining camp was established here about 1910; the roadhouse was a two-story structure.

Source(s): (Smith 1974:59)

HERITAGE RESOURCE INVENTORY

Name of Site: Arctic City Roadhouse

Location:
Latitude: N 66 27'
Longitude: W 153 00'
Map Series: Bettles

Description: On the Koyukuk River, opposite the mouth of the Kanuti River.

Significance: Site of the terminus of a mail trail from Tanana (1900).

Source(s): (Smith 1974:61)

HERITAGE RESOURCE INVENTORY

Name of Site: Coldfoot Roadhouse

Location:
Latitude: N 67 15' 30"
Longitude: W 150 11' 00"
Map Series: Wiseman

Description: At the mouth of Slate Creek on the east bank of the Middle Fork Koyukuk, 11 miles south of Wiseman.

Significance: Site of a prosperous town between 1899-1910.

Source(s): (Smith 1974:61)

HERITAGE RESOURCE INVENTORY

Name of Site: S4-42

Location: T 31 N, R 31 N, Section 1 (Fairbanks Meridian)
Latitude: N 67 30' 50"
Longitude: W 149 50' 48"
Map Series: Chandalar

Description: On the north side of Gold Creek near its confluence with the Middle Fork Koyukuk River.

Significance: The site contains a 30 x 30 meter log structure with an associated dump.

Source(s): (Gal 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Hess Creek Site

Location:
- Latitude: N 65 40'
- Longitude: W 149 5'
- Map Series: Livengood

Description: A subsurface site, probably of the Denali Complex early Athapaskan phase lasting from about 10,000 to 2,000 B.P.

Significance: Important as a workshop and game lookout site.

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: Rosebud Knob Site

Location:
Latitude: N 65 29' 50"
Longitude: W 148 40' 00"
Map Series: Livengood

Description: A subsurface site.

Significance: Indeterminate.

Source(s): (AHRS 1974)

HERITAGE RESOURCE INVENTORY

Name of Site: Tolovana I

Location:
Latitude: N 65 28' 45"
Longitude: W 148 40' 45"
Map Series: Livengood

Description: A site with approximately 50 square meters of artifact area with about 30 square meters done.

Significance: A typical Livengood quarry site.

Source(s): (AHRS 1978)

HERITAGE RESOURCE INVENTORY

Name of Site: Wilbur Creek

Location: T 7 N, R 4 W, Section 30 (Fairbanks Meridian)
Latitude: N 65 23' 50"
Longitude: W 148 27' 30"
Map Series: Livengood

Description: Three obsidian flakes found in 1969. The site from which these came was totally destroyed by a tractor.

Significance: Not determinable.

Source(s): (AHRS 1978)

HERITAGE RESOURCE INVENTORY

Name of Site: Lost Creek Shelter

Location: T 8 N, R 6 W, Section 16 (Fairbanks Meridian)
Latitude: N 65 31' 40"
Longitude: W 148 46' 45"
Map Series: Livengood

Description: A small lookout station possibly associated with a campsite on the valley floor nearly (not found); 15x15 meters. Flakes were only recovered from test pits.

Significance: Indeterminate

Source(s): (Gal 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Erickson's Razor

Location: T 9 N, R 7 W, Section 14 (Fairbanks Meridian)
Latitude: N 65 35' 30"
Longitude: W 148 56' 10"
Map Series: Livengood

Description: An insignificant lookout site with few flakes or dia-nostic artifacts; 40x40 meters.

Significance: Insignificant.

Source(s): (Gal 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Lost Creek Overlook

Location: T 8 N, R 6 W, Section 15 (Fairbanks Meridian)
Latitude: N 65 10' 15"
Longitude: W 148 45' 35"
Map Series: Livengood

Description: A small lookout quarry campsite on a northern exposure overlooking Lost Creek. Though buried, the site is essentially a surface site.

Significance: The site is supposed to be of the Tuktu tradition due to the finding of a single tabular core and one micro-blade.

Source(s): (Gal 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Nassuk's Knoll

Location: T 10 N, R 7 W, Section 19 (Fairbanks Meridian)
Latitude: N 65 41' 10"
Longitude: W 149 04' 25"
Map Series: Livengood

Description: A 20x20 meter on a light rise on the north side of Hess Creek within sight of a valley. One possible hearth uncovered.

Significance: Tuktu and Denali complexes suggested because of microblades, scrapers, Donnelly Burin, and a side-notched point found.

Source(s): (Gal 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: K-16

Location:
Latitude: N 67 31' 00"
Longitude: W 149 40' 00"
Map Series: Livengood

Description: A site at which a few chert flakes have been found below a mossy lichen cover in an area 2' by 3'.

Significance: A lookout site, northernmost site located south of the Brooks Range divide.

Source(s): (AHRS 1974)

Contemporary Waterbody Use 1950-1981

There really is no lack of information lending itself to factual use of waterbodies in the Yukon Basin region. This is to be expected due to the region's importance during the great gold rushes of the late nineteenth and early twentieth centuries.

A number of articles from the Alaska Sportsman provide insights to use of waterbodies in this region. Cleo Evans floated the Yukon river in the 1950's and during part of the journey he had to make choices: "As an alternative to the mud flats, we set adrift on one of the Yukon's tributaries, the Chena. The Chena is just as quiet and soothing as her name. Peace, rest, serenity--all that we had expected. It had to end, I guess. We neared the mouth of the Chena, which empties into the Tanana, another tributary. It was then that Walter and I glimpsed the Tanana, a swelling, frothing, violent side stream of the Yukon" (Evans 1956:30). The two men then set out trying to "outfox" the Tanana, and they managed to do so:

> The Tanana roared past us. Moody, tempestuous, sultry, she taunted us. Could we take the dare? By morning, the water didn't look so evil after all. The Tanana was in flood stage. Ice was melting high in the mountains and water gushed down the sides to join the river. As long as we respected this condition, Walter and I rationalized that we could do it. We buffeted the...rapids; the current dragged the Mosquito first one way, then another, I tried to encourage Walter.... Unlike River Fingers [infamous rapids on the Yukon River] the Tanana was wide, as wide as two or three miles in places. The Tanana was deceiving, and she tampered with our boating skill every time mid-stream islands clipped the safe channel to a mere few feet. I broke into a cold sweat each time I looked upstream to see driftwood merge as a whole tree, roots and all. As we went along, pitting our sixteen-footer against the timeless Tanana, fierce determination helped us maneuever. (Evans 1956:30)

In another article from the Alaska Sportsman, a story is told about a man's journey down the Tanana River from Fairbanks:

> The knowledge that I was leaving civilization behind filled me with exhilaration as the canoe passed through the shadow of the Chena Bridge.... Fifteen miles from Fairbanks the slough emerged into the swift-flowing Tanana River. My canoe was drawn toward the center, where the turbulent current was flowing at six or seven knots....
>
> The first night I drifted down a side channel and camped on a gravel bar along the shore. The sky was clear, with no sign of rain, but it was very windy.

With the canoe turned up on its side and staked down for a wind break, my air mattress and sleeping bag certainly felt good that first night. This kind of exercise was going to be new for a while.

The next morning a gray fox swam across the channel while I was sorting the variety of canned goods and other food supplies in the boxes. In the sorting process I discovered that my canned ham and three cans of bacon were still lying on the counter in the Piggly Wiggly store. I could picture the smirk on the manager's face as he sliced my ham and thought how he was getting even with that guy who alomst caused his hair to turn gray. One thing for sure, I was not about to paddle thirty miles back upriver for all the pork in Alaska.

Now the sun just disappeared for three or four hours during the night, and it didn't get dark at all. This morning I caught myself looking at my watch about every hour, then realized how foolish it was. Better to put the watch away, and travel, eat, and sleep according to the way I felt.

This, I thought, was an example of the way a person living in the white man's civilization becomes a slave to his watch. He must live by a pattern of habits, rather than by intelligence guided by his wishes and physical requirements.

The weight of the canoe was distributed better today, with a little more in the stern that in the bow. I didn't have to do much as it glided smoothly along except dip the paddle into the water once in a while to steer away from a sweeper-a tree leaning across the water from shore. I had left the air mattress inflated and lain it across the supplies in the center, then lashed a tarp over the full length of the canoe to my feet. If it should capsize, the mattress would help keep it afloat and the tarp would keep things from falling out.

In going over some very fast riffles the stern touches a rock. Then, as the canoe drifted into some boiling, turbulent water, I heard a hissing sound I was to hear often on the Tanaña. At first I thought a hole had been punched in one of the canoe air tanks, and as water leaked in the bottom, air was leaking out the top. But the hissing soon stopped and the bottom of the canoe was still dry, so I kept on going.

As the canoe passed through the new fast water, the same hissing sound was repeated. Evidently it was the silt in the muddy, swirling water hitting the aluminum bottom of the canoe.

Some think of the Yukon and Tanana Rivers as beautiful, clear streams winding down through a wilderness of virgin timber. This is not entirely true. Both rivers are so muddy and silt-laden in the summer that they would make the lower part of the Mississippi look like drinking water.

Coming out of the channel into the main part of the river, I saw a high rock cliff ahead, and protruding from the cliff was a perfect profile of a human face. Just then a large black raven came swooping down off the cliff and squawking excitedly, sailed over my head, then back up to a tree along the shore. Then it sat on the bounding limb, scolding me for being there.

Obviously it had a nest nearby, but where? As I rounded the face of the cliff, the lips of the profile bacame a mass of sticks with five almost full-grown ravens standing up in it. The nose was a protruding rock which served as an umbrella for the...mother's nest. There was just enough brush on top of the cliff to give the profile a crew cut.

It was time to put my camera to use so I climbed about forty feet and reached a narrow ledge beside the nest. The harmless fledglings looked as if they needed some affection, so I reached out to pet one. Its beak clamped down on my finger so hard I flinched and nearly fell off the ledge. When I looked down at the jagged rocks on the shore below, my knees started to quiver....

The high mud banks in some places along the Tanana are honeycombed with holes made by bank swallows....

The following morning the sun was high in the sky when I stepped into the canoe and started to back away from shore. Just then a small green canoe with an Indian in it came around the bend. He paddled up beside me and greeted me with a friendly "Hello".

He said he was on his way to Minto.... At his knees in his canoe were several large northern pike and a .30-.30 rifle.

"How do you like my canoe?" I asked proudly. "It's thirteen feet long and weighs just fifty pounds."

"That's much too heavy for rafting," he replied. "Mine fourteen feet long and weighs twenty-five pounds, and I make it myself."

> Quickly I asked him his name, and at the same time made up my mind never to brag to another Indian about my canoe. He said his name was Peter John.... (Edwards 1957:9-12)

A very interesting story is written about bear hunting on the Tolovana River by D. A. Bochert:

> I have camped out many times since early August of last year, but I have not slept soundly. Not since a nightmare of fur, feathers and fear on the banks of the Tolovana River.
>
> The Tolovana River runs into the Tanana River from the north, and flows along the western edge of an area called Minto Flats, a paradise for ducks, geese, fish, moose and bear. On this particular trip, it was fish we were after. Wayne Majors, Jerry Novosad and I left Fairbanks on a rainy Saturday morning. I had heard that the Shee fish were biting and the Northerns (pike) were hitting well, so we were anxious to try our luck.
>
> The area is accessible only by boat or float plane. We were in two riverboats typical to the rivers of Interior Alaska. The majority of the inland rivers are characterized by extremely silt-laden waters and shallow meandering beds, and the riverboats are designed accordingly. They are long, usually twenty-four but often over thirty feet; have wide flat bottoms; and are powered by outboard motors or "kickers". These boats are made of wood--plywood, spruce, or anything else that happens to be available. There also are some aluminum boats on the market of essentially the same design, which are quite popular. Riverboats are usually equipped with a lifting mechanism for raising the motor when the going gets rough. This type of boat can easily carry 2,000 pounds and the speed, of course, depends on the size of the motor.
>
> Our trip took us a short distance down the Chena River and roughly a hundred miles down the Tanana. After passing the town of Nenana on the Alaska Railroad and the village of Minto, we left the Tanana River proper and entered Swanneck Slough. Still going downstream, we eventually met the Tolovana approximately twenty-five miles above its main junction with the Tanana. This route is much shorter than entering the Tolovana at its mouth.
>
> When running a riverboat, one stands or sits at the stern, usually elevated on a box or stool or, in some instances, an ordinary kitchen chair, with one hand

on the tiller and the other hand on the left handle. Most often the wind and rain are in your face or the glare of water in your eyes. It seems that no matter how the river winds, you are always heading into it.

After a few hours of gripping the throttle and watching the water for signs of changing currents, shallow riffles, submerged stumps or logs, and studying possible short cuts to determine if passage is possible, all these far enough in advance to prevent embarrassing groundings or worse, a person tires even in most favorable conditions.

After a late start and time lost tinkering with a sick outboard motor, we turned upstream into the Tolovana River in late afternoon. The waters of the Tolovana, in comparison to the gray, abrasive qualities of the Tanana, can be considered clear. They are free from silt and colored only by vegetation. The rain, which had decreased in intensity on the way, had stopped completely, and we were even favored with a little sunshine. There was plenty of time to get in some evening fishing after we set up our camp.

I was the only one familiar with the country, and selected our campsite at a spot I had used on an earlier trip. It had a high dry bank and some sheltering spruce. Since the country was flooded, these spots were at a premium. We unloaded our gear and set up a tarp fly as a shelter against the rain. Without stopping to cook a meal, we went on upstream to the confluence of the Tolovana and Tatalina Rivers to get those big ones for which we had come so far.

We fished for approximately three hours. The fishing, although not up to reports, was good enough, and the fish fought well. We caught only pike as the Shee fish were not biting, undoubtedly due to the high water. I returned to camp ahead of the others, cleaned the fish and gathered some wood for a fire. Jerry and Wayne came in just as darkness fell. We fixed a quick bite to eat and crawled into sleeping bags. We were dog tired, and I for one was deeply asleep almost immediately.

The next thing I knew, I heard a scream, and I recall a faint musk smell. Perry was yelling "Git! Get him!" I found myself on my feet, still fully zipped in my sleeping bag and just on the edge of consciousness. I stood there in the faint light of dawn, trying to figure out what was taking place before me.

> What I saw was Jerry trying to pull a torn sleeping bag away from a black bear, who showed no interest in leaving the scene in the near future. Our guns were hanging on a nearby spruce tree.... (Bochert 1964:14)

Bochert has presented some very accurate information regarding the techniques of river running on the Tanana and Tolovana Rivers. In a history of the town of Chatanika, Robert Redding says, "What little is recorded of Chatanika's beginnings might as well be recounted right away. Alas for the facts! Nowhere can I find the place mentioned in books of the region except indirectly, such as: '...and then we went to Chatanika,' or 'The gold fields of Goldstream, Cleary and Chatanika streams,' or '...up as far as the Chatanika and then back again,' and so forth" (Redding 1965:8). Jim Rearden writes about fishing in the Tanana region, "...drive north from Big Delta towards Fairbanks a ways, and get one of the local fishermen to take you to the Richardson Clearwater.... And then there is Shaw Creek, the Salcha, the upper Chena--all on the highway and all with grayling" (Rearden 1969:23).

An extensive account of travel on the Yukon River is written by David Dapkus of the Bureau of Outdoor Recreation follows (members of the party were: Bill Gabriel, BLM, State Office; Terry O'Sullivan, Wendy Pruex, and Pete Motoya, BLM, Fairbanks District; Ron Crenshaw, Division of Parks, Anchorage; and David Dapkus:

> Field Inspection of the Yukon River
> June 5-12, 1978
>
> A field inspection of the Yukon River (Rampart section) was conducted June 5 through 12, 1978, by an interagency team as part of a HCRS study of the river area. The Rampart section is generally that part of the Yukon from the Trans-Alaska Oil Pipeline bridge to the confluence of the Tanana River.
>
> This section of the river is located on lands that have a variety of ownership claims. The overriding one is a Federal power site withdrawal. Village and regional Native corporations have selected some lands under the Native Claims Settlement Act around Tanana and Rampart.
>
> Two 13 foot Avon Adventurer rafts were used for the inspection.
>
> <u>June 5</u>
>
> Left home in early a.m., and picked up the field gear at the office before driving out to Anchorage International Airport (flight time at 8:50 a.m.). Bill Gabriel, Ron Crenshaw, and myself flew to Fairbanks arriving at 9:45 a.m. We were driven, via BLM van, to the District Office where we met the remaining crew. We were later driven, by BLM, to the

old winter crossing of the Yukon River which is one mile upstream from the bridge. This crossing was used during the TAPS construction prior to the bridge. By 4:00 p.m., we were floating down to the Ray River which flows south into the Yukon four miles below from the bridge. The Yukon River, in the vicinity of the bridge, was several hundred yards wide, had a 2 mile per hour current, was darkish brown in color, and full of debris. The debris consisted of small logs, limbs, and 55 gallon oil drums. The river was very low with the high water line being very pronounced about six feet above us. The Ray River is one of the larger tributaries...of the Yukon. It was also very slow, and dark brown in color. We camped on a decent sized gravel bar at the mouth of the Ray River. Easily seen across the river from camp was Pump Station Number 8, which is lighted 24 hours a day.

The day was cloudy with no rain. We took a short walk up the Ray River and spooked a flock of 50 Canadian geese. We also observed numerous bank swallow.

June 6

Tuesday was cloudy with some rain off and on all day. The river remained several hundred yards wide, more than 6 feet in depth, dark brown in color and covered with debris. The current was generally 3 mph, but was often 4 mph and reached a high of 7 to 8 mph. We had an enjoyable float of about thirty miles to Hess Creek. This part of the river offered all Class I water on the International Whitewater Scale.

The Rampart section of the Yukon is a canyon-like area from the Ray River down to within about 5 miles of the village of Tanana. The views from the river are impressive. Vertical rock bluffs rise near the river from low river terraces.

Between bluffs these terraces are covered with thick stands of white spruce and paper birch. Low mountains form the backdrop. Pump Station Number 8 can be seen from the river day and night up to a distance of 4 miles downstream. We also saw more than six log cabins along this stretch of the river; several were new or were being improved upon.

We saw few animals or birds along the river on the first full day of floating. Birds seen were about 50 geese, uncounted bank swallows (which had made their mud nests on the vertical rock cliffs), and several unidentified raptors. Just below the Ray River we saw a raptor nest with young birds in it. The swiftness of the river did not allow enough time to identify the species.

We found a nice camp spot on a willow covered sandbar. Since the river was low, this site and similar campsites may be water covered in normal years. Level and adequate sized campsites are not common on the river.

June 7

A warm morning sun greeted us and remained for the entire trip. By 9:00 a.m., the sun intensified enough to sunburn even the thickest bureaucratic hide.

The character of the Yukon remained the same as it had been the previous day, except that it rose one foot overnight. Tributary creeks were fairly plentiful, but all were small and appeared as brown as the Yukon. We found very small clear creeks that were perhaps three feet wide and six inches deep, however, these probably dry up later in the summer. We camped on a large gravel bar which formed the upstream end of Minook Island after having traveled about 22 miles.

The scenery was almost unchanged from the previous day. Small snow patches appeared on the hillsides in shaded areas. The vegetation became more dense and varied, with quaking aspen and balsam poplar joining with paper birch to add light colors to the dark colored white spruce. Cabins, many with fishwheels appeared every few miles along the river. These cabins and fishwheels are interesting and complement the scene.

A black bear, with a fine luxurious coat, was seen about two miles above Minook Island. We also saw gulls, various species of ducks, and Canadian geese along the river as well as numerous arctic ground squirrels.

June 8

The river's character did not change except for an increase in debris; the debris consisted of logs up to 40 feet long and one foot in diameter, 55 gallon oil drums, and assorted smaller pieces of wood. It would be hazardous running the river in a canoe or a kayak, a raft or riverboat are better suited. Moose Creek was the first large clearwater tributary since the Ray River. We passed many large and heavily vegetated islands that are common to the Yukon. We floated to the village of Rampart which has a population of about 50. The people there told us that if we went upstream, from 20 to 100 yards, on any tributary we would find clear water. The creek mouth, they said, were influenced by the Yukon. Fishing for grayling would also be very good. We stopped at most creeks thereafter and found the water and the fishing grand. Rampart has an airstrip, the mail plane having arrived while we were there. Several beautiful old log cabins and one new log cabin were among the homes of the village. Many villages, including Rampart, were connected to the outside world last year by telephone satellite. The transmitter looked very out of place in the village.

We made camp at Moose Creek after having traveled 17 miles. Campsites continued to be difficult to locate and far apart. Ron Crenshaw was the fisherman of the trip, proving it by catching large grayling in Moose Creek. We saw more Canadian geese and a rare sight in Alaska, a frog. We also observed moose, bear, and wolf tracks at camp, but saw no animals.

June 9

Another cloudless blue sky greeted us this morning. We packed quickly to escape the heat by floating on the cooler river. The river remained much the same as it had been, covered with debris. There is an area just below Bear Creek marked on the USGS map as "The Rapids". We floated to the area by mid-afternoon and found "The Rapids" to be a low rock shelf stretching across the river with a giant 1/4 mile wide whirlpool behind the shelf. No problem with the whirlpool, particularly for the raft, but it may cause problems for a canoeist at different water levels. The Rapids were easily sneeked, at existing water levels, on the right bank. Riverboats run this section quite regularly from Tanana to Rampart and beyond. The last ten miles before camp had large desk size boulders lining the bank and an occasional boulder in the river. We camped at Windy Creek, a freshwater creek, having traveled about 21 miles. Campsites on a level ground continued to be scarce.

The scenery improved daily. Large rock outcroppings rise from the river's edge to join steep sided 2,000 foot high ridges which line the river. The continued heavy vegetation adds contrast to the scenery. Cabins, fishwheels, and evidence of past and present mining can be seen along the river.

We saw another extremely healthy looking black bear about three miles above our Windy Creek camp. We also saw sea bulls, Canadian geese, song birds, and a beaver (swimming in Canyon Creek). The Fish and Wildlife Service has informed us that peregrine falcons nest along the river. We did not identify any peregrines, however, they are easily hidden in the high rock areas above the river. Grayling fishing was excellent in Bear and Canyon Creeks.

June 10

The river remained as on previous days -- very easy floating with a steady 3 mph current. We floated about 12 miles to camp on Sixteen Mile Island. Campsites became fewer and more difficult to find. The occasional large island in the river offered the only good campsites on level gravel or sandbars. A few bug infested campsites were found among the black spruce and tundra. These sites could be reached by climbing a short steep rock bank.

Continued to observe Canadian geese, sea gulls, and ravens. We did not observe any large mammals or raptors. Grayling fishing in tributary streams remained good.

June 11

The last day on the Yukon was sunny, but windy. The upstream wind was strong enough to stop the raft dead in a 3 mph current. A sea anchor, consisting of an old wash tub on the end of a rope and sunk about ten feet, combatted the effect of the wind. It easily towed both rafts the last 14 miles into the village of Tanana. The river widened close to Tanana. The land became more open and rolling with ridges in the distant background for the last 5 miles before Tanana. A particularly interesting rock outcropping rising directly out of the Yukon was a 30 foot high rock that looked like a monkey.

Continued to see Canadian geese, sea gulls, and ravens, but no large mammals or raptors. We floated into Tanana at 5:00 p.m. This village of about 450 people has several churches in it, including one I presumed to be Russian Orthodox, and two log churches. A lady directed us to the airstrip, where we contacted the BLM fire crew. They helped haul our gear up to their fire station which is adjacent to the airstrip.

It was the end of a four day town celebration. We were just in time to enjoy Native dances at the town hall. The dancing was very good. We also inspected the old church, previously mentioned, and its cemetery. The church was in bad need of repair, it probably has historic value that HCRS should look into. The cemetery was kept up very well.

June 12

Hot and sunny again. Took a commercial flight (small airplane) out at 10:15 a.m., to Fairbanks. Caught a plane to Anchorage at 11:30 a.m., and arrived Anchorage at approximately 12:30 p.m.

General

We floated the 128 mile long Rampart section (between the Trans-Alaska pipeline bridge and the village of Tanana) in six easy days. The only hazards are debris in the river and the whirlpool at "The Rapids" marked on the USGS map. It is an easy float with all Class I Whitewater and a steady 3-5 mph current. Campsites are far apart and must be searched for in earnest. The pleasing scenery is different from many other rivers in Alaska. The historic aspects of the Ramparts area is tied with gold mining. Some gold mining is still taking place along the river.

Access is easy using the haul road to the TAPS bridge on the Yukon River (put-in) and taking the commercial flight (take-out) from Tanana to Fairbanks. The commercial flight is short and inexpensive (about $25 per person). One could also be picked up by riverboat and taken up the Tanana to Fairbanks. This part of the Tanana River is used heavily by riverboats. (Dapkus 1978:1-6)

Steve Cook, a graduate student in land resources at the University of Alaska, spent the summer and fall of 1979 studying the recreational use of Birch Creek, one of the major gold-bearing streams of the early gold rushes. He addresses the use of the stream in relation to minerals use and river floating:

Our feet are being sucked by mud nearly a foot deep, our boat is floating in water the color -- and nearly the consistency -- of melted caramels. It almost makes us sick. But after planning this trip for several months and braving 94 miles of the Steese Highway northeast from Fairbanks, we are going to grit our teeth and go anyway.

Most float trips down Birch Creek begin here at the confluence of Upper Birch Creek and the North Fork, and we are sadly reminded by the North Fork how the entire stream appeared when we last floated it seven years ago. It flows crystal clear in its rocky bed to where we are standing and is engulfed at this confluence by Birch Creek and its muddle water emanating from the placer mine activity near Eagle Summit.

Optimistically we push off, assuring each other that the stream surely will clear up before we reach Harrington Fork eight miles downstream. Almost immediately our rubber raft sings the rock song as it glides up onto a rock hidden by the muddy water. Out we jump, my boots disappearing into the mud, my companion nearly disappearing entirely as he jumps out into a five-foot hole. Depth of the muddy water is impossible to determine. "It may be a long trip," he said ruefully.

With the same scene repeating itself on at least a thousand hidden rocks, it takes us more than six hours to float eight miles to Harrington Fork. We travel directly away from the Steese Highway into wilderness with plenty of wildlife signs: grizzly and black bear, caribou, moose, wolf and a myriad of smaller animal tracks all appear in the mud along the stream.

The stream.... My eyes keep returning from the beauty of the countryside to the stream.

The clear water from Harrington Fork is quickly overcome by the melted caramel and we continue on downstream, not so confident now that the water will clear up. It does not. One by one the clear tributaries empty in -- Great Unknown, Clums Fork, and many smaller creeks -- and one by one they are overwhelmed by the silt load. Birch Creek gets bigger but not visibly much clearer.

On our third day out we are eagerly anticipating the upcoming rapids, for Birch Creek has only three sets to offer. The roar gets louder as we come nearer: and I realize, as I begin to set up my approach, that running the rapids will not be much fun this time. It is difficult to pick your way through a rock garden when the boulders are hiding in a brown soup.

With the raft we make it through without severe problems. However, the tales told by groups with canoes were not always so good. Canoes do not possess the margin of safety a raft does and several have gotten into trouble in these rapids.

As we approach Harrison Creek, 75 miles below where we put in, the stream finally begins to clear up enough to see the bottom, providing the bottom is less than a foot below the surface. It is also just above Harrison Creek where we are nearly decapitated by a cable stretched across the river. On the bank are ramshackle structures made of heavy plastic and a pickup truck that has been driven cross-country for six miles. A miner is working suction dredges in the river. The suction dredges are legal; the pickup truck, established camp and cable are not.

(After our trip I asked the Bureau of Land Management about the camp. BLM told me the camp was a "well-documented trespass" on closed federal land; but BLM officials said no action would be taken.)

We reached Harrison Creek with its contingent of thrown-together houses, vehicles, garbage and mud. For the remainder of our trip to the Steese Highway bridge at river mile 150, the stream never recovers from the Harrison Creek mud. Even the large, beautiful South Fork is quickly conquered by the Harrison Creek mud. It is amazing how much mud a few placer miners can produce. Farther down, at river mile 135, Crooked Creek flows in with its placer mining discharge, but it does not make an appreciable difference visually.

Birch Creek passes through 150 miles of beautiful, ever-changing scenery. It flows through broad valleys, with typical black spruce forests; through narrow canyons with falcon and raven nests on cliffs; across the broad, flat lowlands with many beaver and waterfowl. Wildlife is often visible, birds are abundant, and the fishing is good in the feeder streams. But I find it impossible to keep my eyes from returning to the stream. The muddy stream.

On the way home to Fairbanks we cross Sourdough and Faith Creeks, both feeder streams of the Chatanika River. Both are flowing thick with placer mine mud and causing the Chatanika to be too muddy for good fishing. And I've heard rumors of a resurgence of mining at Van Curlers Bar on the East Fork of the Chena and at Caribou in the Salcha River headwaters. I wonder what clearwater streams will be left in the Interior.

Is placer mining the only valid use of a stream on which mining occurs? Should recreational use be considered? The answers aren't simple, and Birch Creek has become the scene of a classic conflict between placer miners and recreational users.

Inclusion of Birch Creek in the final system of federal Wild and Scenic Rivers seems almost a foregone conclusion. It has been on every recommended list of Alaska rivers since the U. S. Bureau of Outdoor Recreation studied it and wrote the environmental impact settlement on the potential wild river classification in the early '70's. The Birch Creek drainage, however, has seen periods of active placer mining since the early 1890's and will probably see increases now that the price of gold is spiraling upwards.

It seems ironic that one of the most accessible long float trips in Alaska is on a river with considerable mining activity. But Dr. Ernie Wolff of the Mineral Industries Research Laboratory, University of Alaska, points out that if the mining interests had not initiated construction of the access road there probably would be no conflict -- because there would be no road. (This situation also holds true for the Fortymile country, where placer miners and recreationists are meeting head to head.)

Birch Creek begins about 70 miles northeast of Fairbanks with headwaters draining a large area including both Twelvemile Summit and Mastodon Dome. There has been intermitten placer mining activity on many of its feeder streams including Eagle, Harrison, Great Unknown, Deadwood, Miller and Mastodon creeks. In 1979 there was sufficient placer mining on three streams -- Upper Birch Creek above the North Fork, Harrison Creek and Crooked Creek (which drains Deadwood, Miller, and Mastodon Creeks) -- to cause heavy siltation of the entire stream from near its headwaters all the way to the Steese Highway bridge near Circle, a distance of more than 150 miles.

By definition, placer mining is the extraction of a mineral from stream-deposited materials, usually sand and gravel. In Interior Alaska, the mineral-bearing gravel is often covered by frozen silt and organic matter of varying depths, sometimes more than a hundred feet thick. This material, which miners call muck, has historically been thawed and washed away downstream. The removal of this muck, with its fine soil texture of silts and clays, often affects an area infinitely larger than the actual mine site.

In 1979, on Upper Birch Creek southwest of Eagle Summit, there were two and sometimes three miners with heavy equipment working placer claims directly in the streambed. There are many, many more claims in the area, but only these two or three were being worked seriously during the summer of 1979. To the casual observer there were no attempts by any of these miners to settle out any of the suspended solids from their water discharges. The resulting wastewater discharges rendered Birch Creek so turbid that catching fish was impossible and canoe travel was unpleasant and difficult, sometimes even dangerous.

The upper portion of the stream (especially above Harrington Fork) can be marginal floating anyway because of low water and a narrow channel. But when submerged rocks and logs are hidden by muddy water, hazardous floating conditions can occur. Lower down, the river often flows over broad, shallow riffles that would be navigable with clear water but are not when the submerged obstacles are hidden.

It is inconceivable to river recreationists that the discharge from a few small placer mining operations is being allowed to muddy 150 miles of a beautiful wild river. The majority of floaters in 1979 felt that placer miners should not be discharging untreated water into Birch Creek. Some floaters were truly incredulous, as shown by their written comments on record under the heading "What do you remember most about your trip?": "Bad feature -- the muddy water from mining --aren't they supposed to have settlement ponds?" And another one, "Dirty water caused by mining operations made travel dangerous as many rocks were virtually invisible. Believe miners should be made to use settling ponds to help reduce silting conditions".

But the comment that saddened me the most was one by a couple who had floated the stream in the early '70s when it was clear and had come back expecting the same. They wrote: "The Mud -- We came expecting a clear stream -- A Wild and Scenic River -- Only to find a Stream of Mud -- Miners' Mud -- and we're sorry. We shall miss the pleasures this stream had to offer." They drove away back toward Fairbanks without even putting their canoe in the water.

Since Birch Creek has a long history of mining activity, don't the miners have "grandfather" rights to continued mining in the same manner as before? It appears that the answer is <u>no</u>. Public Law 92-500, the Federal Water Pollution Control Act Amendments of 1972, has set the standards by which to judge placer mining discharge. The intent is not only to stop new pollution but also to reduce existing pollution.

Is placer mine discharge into a stream pollution? To the average observer the answer is an unequivocal <u>yes</u>. But it is not easy to prove. Studies that clearly show placer mining discharge to have a detrimental effect on inhabitants of streams are virtually nonexistent.

Al Townsend, habitat biologist for the Alaska Department of Fish & Game, reported seeing big grayling in the outfall pool below a large sluice box during temporary suspension of sluicing activities. The miners' point is, how can it be so detrimental if the fish are living in the outfall pool? But, according to Townsend, the fact that adult fish are surviving in the water below a placer mine does not mean that there is a healthy, reproducing population. Survival of the fry, eggs and the small organisms that serve as a food source are also essential.

What is the effect of untreated placer mine discharge on fish habitat, egg and fry survival and invertebrate prey species? Definitive studies on the biological consequences must be done. Perhaps there is no negative impact on fish populations. Even if there is, the miners need not be immediately concerned since the ADF&G has only one habitat biologist assigned to cover all mining activities, road construction, oil and gas exploration, and construction (with the exception of the Trans-Alaska pipeline) for Interior Alaska.

Nor does the Bureau of Land Management seem to be in a much better position than its state counterpart when it comes to knowing what is going on in the field. Lack of field personnel makes it nearly impossible for either agency to keep tabs on even the most basic activities on the land each administers.

The proposed wild river withdrawal requires the BLM to manage that withdrawal in such a way that the river corridor is not impaired or degraded. Failure to provide such management may well bring about a management transfer for areas such as the Birch Creek corridor. The most logical federal agency to be recipient of this management change would be the National Park Service.

The National Park Service has not shown compassion for miners, as has been well demonstrated in the Kantishna area in and near Mount McKinley National Park. Even though mining is allowed by law to continue on existing valid claims within the park, the Park Service has made it very difficult for miners to obtain the permits necessary to build access roads to reach their claims.

Few of the resource users in Alaska want strong direct control of the type exercised by the Park Service or other restrictive single-use agencies. An example of such control was unveiled recently by the

U. S. Fish & Wildlife Service for the area it administers as the Yukon Flats Wildlife Refuge. The mining regulations proposed are so restrictive that many miners (and non-miners) feel that no placer mining operation could comply.

Few river recreationists in Alaska would deny the miners the right to exist, so it would be in the interest of both miners and recreationists to press for reasonable multiple-use planning on Birch Creek.

Recreational floaters, for their part, may find it necessary to accept some muddiness on certain streams or parts of streams in placer mining areas. It is very difficult to discharge pure water from a placer mine, but not nearly so difficult to reduce turbidity up to 90%. A stream with a small amount of muddiness is far more acceptable to recreational resource users than the current situation of high standards that are not enforced and thus ignored by nearly everyone.

There are not many clearwater streams in Alaska and only a few of those are readily accessible for either recreation or placer mining. On some sections of Birch Creek and the Fortymile, perhaps the emphasis should be on placer mining, with a lower water quality standard. In other areas such as the Chena, Salcha and Chatanika River basins, the emphasis should be on recreation with a higher water quality standard applied.

The management and regulatory agencies need comments from miners, fishermen, hunters, floaters and other interested parties to decide which stream use to emphasize in a given area. If concerned citizens do not let it be known how they feel, and if management and regulatory agencies do not respond in good faith, none of us will have a reason to complain when the special-interest groups see to it that the heavy-handed agencies end up with management of even more of Alaska's land and water. (Cook 1980:32-37)

It is more than clear from Cook's article that not only does Birch Creek enjoy wide use, but so do most of the waterbodies in the Fairbanks region. Of course when you get together, the recreationist and the industrialist, you have controversy, but whether or not one group is more correct in their use of a waterbody than another really doesn't matter. The fact that many people use the waterbodies for many purposes stands as an example of the use of waterbodies in general in the Yukon Basin region.

Personal Communication Regarding Waterbody Use

As with those responses received for the Arctic Slope region, the majority of personal communications regarding the Yukon Basin regions are from guides, professional hunters, and pilots. There are a number of responses from river-runners and recreational users as well.

The Army Corps of Engineers has done limited work on rivers in this region, "Outboard and inboard watercraft of various sizes are used to monitor the ongoing studies and maintenance programs on the two rivers [Chena and the Tanana]" (Williams: p.c.). Kurt Lotspeich, of Tanana Air Service, wrote with this reply: "Tanana Air Service has a base of operations in Tanana located at the confluence of the Tanana and Yukon Rivers. Our primary areas are down river from the proposed route [however] we also on occasion land on the Chena River at Fairbanks and the Tanana River.... All summer there is extensive river boat travel on the Yukon and Tanana Rivers in this area both for recreational and commercial fishing as well as subsistence hunting and fishing. These rivers are also used for transportation of goods on Yutana Barge Lines" (Lotspeich: p.c.). Mark Lynch of Tatonduk Flying Service said, "We do not operate float equipped aircraft in the area due to the availability of gravel bars along the rivers. We do run raft float trips between Dawson and Eagle and Circle ever since the National Georgraphic special on T.V. With regards to the Yukon River, running traffic has increased markedly.... We ourselves take between 20 and 30 King Salmon every summer and commercial fishing for Kings [on the rivers] is on the rise" (Lynch: p.c.). From an anonymous source I was told, "I have used the indicated drainages [Yukon, Tolovana, Tatalina, Chatanika, Chena, Salcha, Little Salcha] for floatplane landings, recreational and subsistence as have many of my friends and acquaintances" (Anonymous: p.c.). In an interview, I was told, "I've used the Yukon River for sport fishing and rafting on Yukon Sloughs. I've also used the Tolovana River for sport fishing and the Chatanika. I've used the Chena for rafting as well as sport fishing" (Elliot: p.c.). Another interviewee said, "I hunted and fished the Tolovana, Tatalina, and Little Salcha between 1966 and 1978. I used an aluminum canoe with a small jet unit; I fished throughout the courses of the rivers; and always saw evidence of campers on the rivers and streams" (Hammond: p.c.). Lastly, a man from Juneau in an interview told me, "I have floated the Tolovana River for material I was writing for a journal in 1980. I used a Zodiak raft and had no problems with navigation" (Slavea: p.c.).

Tana River Basin Region: Regional Introduction

Physiography

The Tanana River Basin region is the third of three divisions covering the proposed natural gas pipeline route. The three major areas within the Tanana region are 1) Tanana Lowlands, 2) Copper River Lowland, and 3) the Wrangell Mountain system.

The Tanana Lowlands is a broad depression bordering the Alaska Range on the north. The central and eastern areas are drained by the Tanana River and the southern area is drained by the Nabesna and Tok Rivers. There are many thaw lakes in this area as well as thaw sinks. There are no glaciers.

The Copper River Lowland is in a smooth plain, with a few gently sloping hills. The eastern and southern parts of this lowland are drained by the Copper River and its tributaries, while the western and southern parts are drained by the Susitna River and its tributaries. There are many thaw lakes but no glaciers. The entire area is underlain by minimal permafrost.

The Wrangell Mountain system rises above a low plain on the north above highly glaciated ridges on the south and east. Three-quarters of the drainage for this area is in the Copper River, which surrounds the mountains to the west. The rest drains to the Tanana, Nabesna, and Chisana Rivers. There are a few lakes in this area.

Ecological Resources

The Tanana River Basin region is the only division among the three covered in this report that contains nearly all the major ecosystems in the State of Alaska. About a third of the region is covered with alpine tundra and barren tundra systems, which cover the high mountain areas. The vegetative cover is dynamic because of interaction between climate, topography, discontinuous permafrost and drainage. The bottom-land spruce-poplar forest is commonplace.

Biological Resources

The Tanana River Basin region lies within tributary systems of the Chisana, Salcha, Nabesna, Chena, and Nenana Rivers. Consequently, waterfowl productivity is high. Although primarily a breeding area, the Tanana region does support a large population of ducks and geese in resting and staging areas. Primary bird species are Swans, Mallards, Scaups, Canvas-backs, and Pintails. Mammals are abundant and the population density is high for wolves and black bears. Caribou and moose roam the region as well. There are many small fur-bearing animals.

As with all division in this study, the Tanana River Basin region has a rich fishery resource base. Thus, taking into account the habitable ecology of the region and the abundance of wildlife, there exists a probability that past inhabitants utilized water resources in this region.

Waterbody Name: Million Dollar Creek

Main Drainage: Tanana River

Tributary to: French Creek

Width: 0.5-1.3 m

Depth: 12-34 cm

Description: A narrow stream that flows through muskeg drainage (JFWAT FILES 1981).

Map Reference: Big Delta (B-5)
(1: 63 360)

Waterbody Name: Million Dollar Creek Tributary

Main Drainage: Tanana River

Tributary to: Million Dollar Creek

Width: 1-2 m

Depth: 10-15 cm

Description: A shallow muddy stream with poorly-defined channels (JFWAT FILES 1981).

Map Reference: Big Delta (B-5)
(1: 63 360)

Waterbody Name: Little Salcha River Tributary

Main Drainage: Tanana River

Tributary to: Salcha River

Width: 0.1-5.2 m

Depth: 10-12 cm

Description: A poorly-defined, channeled tundra stream (JFWAT FILES 1981).

Map Reference: Big Delta (C-6)
(1: 63 360)

Waterbody Name: Little Salcha River

Main Drainage: Yukon River

Tributary to: Salcha River

Width: 4-10 m

Depth: 80-100 cm

Description: A large, bog-fed stream characterized by a series of alternating pools and riffles (JFWAT FILES 1981).

Flows SW 17 miles to Tanana River, 44 miles NW of big Dealta; 64°31'45" N, 147°03'00" W; named by prospectors (Orth 1967:587).

Map Reference: Big Delta (C-6)
(1: 63 360)

Waterbody Name: 219 Creek

Main Drainage: Tanana River

Tributary to: Little Salcha River

Width: 0.5-1.5 m

Depth: 10-12 cm

Description: A small, beaded tundra stream (JFWAT FILES 1981).

Map Reference: Big Delta (C-6)
(1: 63 360)

Waterbody Name: Salcha River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 30-60 m

Depth: 1-2 m

Description: Indian name reported in 1898 as "Salchaket," ie "mouth of the Salcha," by Brooks. R.H. Geoghgan in 1904 recorded the Indian name as "Saltshatsheg" (Orth 1967:829)

Map Reference: (1:630 360) Big Delta

Waterbody Name: Redmond Creek

Main Drainage: Tanana River

Tributary to: Salcha River

Width: 2-3 m

Depth: 12-14 cm

Description: A small, meandering tundra stream (JFWAT FILES 1981).

Map Reference: Big Delta (B-6)
(1: 63 360)

Waterbody Name: Small Creek

Main Drainage: Salcha River

Tributary to: McCoy Creek

Width: 0.4-0.6 m

Depth: 10-24 cm

Description: A narrow stream with a high gradient and many waterfalls (JFWAT FILES 1981).

Map Reference: Big Delta (C-6)
(1: 63 360)

Waterbody Name: Gold Run Creek

Main Drainage: Salcha River

Tributary to: McCoy Creek

Width: 0.5-1.1 m

Depth: 12-16 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Big Delta (B-5)
(1: 63 360)

Waterbody Name: South Fork Minton Creek

Main Drainage: Salcha River

Tributary to: McCoy Creek

Width: 0.1-1 m

Depth: 3-18 cm

Description: A narrow, shallow tundra stream (JFWAT FILES 1981).

Map Reference: Big Delta (B-5)
(1: 63 360)

Waterbody Name: Shaw Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 10-15 m

Depth: 12-30 cm

Description: A deep slow-moving stream (JFWAT FILES 1981).

Heads at 64°29' N, 145°05' W; flows SW 40 miles to Tanana River, 11 miles NW of Big Delta. In 1902 Lt. G.S. Gibbs called this stream Thompson Creek, but in 1904 L.M. Prindle, USGS, reported that the miners called it Shaw Creek (Orth 1967:861).

Map Reference: Big Delta (B-5)
(1: 63 360)

Waterbody Name: Tanana River

Main Drainage: Yukon River

Tributary to: Yukon River

Width: 20-50 m

Depth: 50-300 cm

Description: A large braided glacial stream characterized by its deep and wide meandering course.

Map Reference: Big Delta (B-6)
(1: 63 360)

Waterbody Name: Rhoads Creek

Main Drainage: Sawmill Creek

Tributary to: Granite Creek

Width: 0.1-0.5 m

Depth: 2-8 cm

Description: Drains the north face of the Granite Mountains. A small shallow stream, with water only present during spring and high periods of heavy rainfall (JFWAT FILES 1981).

Heads near shovel point horn near Granite Mountain, flows NE 18 miles to Granite Creek; 63°59'30" N, 145°17'40" W, named between 1948 and 1955 by T.L. Pewe, USGS (Orth 1967:804).

Map Reference: Mt. Hayes (D-3)
(1: 63 360)

Waterbody Name: Sawmill Creek

Main Drainage: Tanana River

Tributary to: Clearwater Creek

Width: 10-15 m

Depth: 10-18 cm

Description: A small but very wide and shallow stream (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-3)
(1: 63 360)

Waterbody Name: Gerstle River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 15-20 m

Depth: 25-60 cm

Description: A large braided galcial stream with many channels and riffles and large pools (JFWAT FILES 1981).

Heads at Gerstle Glacier and flows N 40 miles to Tanana River; 64°03'30" N, 145°08'00" W, named in 1885 by Lt. Allen for "Lewis Gerstle", president of the Alaska Commercial Company (Orth 1967:364).

Map Reference: Mt. Hayes (D-2)
(1: 63 360)

Waterbody Name: Little Gerstle River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 8-10 m

Depth: 20-25 cm

Description: A medium-sized stream characterized by its many channels and moderate gradient (JFWAT FILES 1981).

Flows NE 24 miles to Tanana River; 63°47'50" N, 144°46'30" W, local name reported in 1937 by USGS (Orth 1967:583).

Map Reference: Mt. Hayes (D-2)
(1: 63 360)

Waterbody Name: Johnson River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 14-25 m

Depth: 20-25 cm

Description: A large, braided galcial stream with many channels and alternating pools and riffles (JFWAT FILES 1981).

Heads at terminus of Johnson Galcier, flows NE 25 miles to Tanana River; 63°43'20" N, 144°37'05" W, named by Lt. Allen for Peder Johnson, Swedish miner and member of his party (Orth 1967:477).

Map Reference: Mt. Hayes (C-2)
(1: 63 360)

Waterbody Name: Dry Creek

Main Drainage: Tanana River

Tributary to: Johnson Slough

Width: 6-15 m

Depth: 10-20 cm

Description: A very wide run-off plain that drains a muskeg area. Seasonal water depths (JFWAT FILES 1981).

Map Reference: Mt. Hayes (C-2)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Tanana River

Tributary to: Johnson Slough

Width: 0.4-0.8 m

Depth: 13-21 cm

Description: A small stream with a very narrow channel (JFWAT FILES 1981).

Map Reference: Mt. Hayes (C-2)
(1: 63 360)

Waterbody Name: Sears Creek

Main Drainage: Tanana River

Tributary to: Johnson Slough

Width: 3-5 m

Depth: 70-85 cm

Description: A large stream fed by springs and summer run-off. Its waters flow through deep banks.

Map Reference: Mt. Hayes (C-3)
(1: 63 360)

Waterbody Name: Berry Creek

Main Drainage: Tanana River

Tributary to: Yukon River

Width: 3-10 m

Depth: 20-25 cm

Description: The stream originates in glaciers and is fairly deep and wide (JFWAT FILES 1981).

Heads at clacier NE 19 miles to Johnson Slough 7 miles E of junction of Johnson and Tanana Rivers; 63°42'10" N, 144°23'20" W, local name shown on a 1927 manuscript map of the "Endicott and Haley hunting expedition" (Orth 1967:127).

Map Reference: Mt. Hayes (D-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Tanana River

Tributary to: Sam Creek

Width: 1-3 m

Depth: 12-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-3)
(1: 63 360)

Waterbody Name: Sam Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: No channel

Depth: No determination

Description: A small spring-fed tundra stream.

Map Reference: Mt. Hayes (D-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 12-18 cm

Description: A small spring-fed stream (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.6-0.9 m

Depth: 13-23 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-4 m

Depth: 10-16 cm

Description: A small stream that forms two large ponds (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-4)
(1: 63 360)

Waterbody Name: Dot Lake Marsh

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-5 m

Depth: 12-14 cm

Description: A small muskeg drainage area (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-4)
(1: 63 360)

Waterbody Name: Chief Creek

Main Drainage: Tanana River

Tributary to: Bear Creek

Width: 0.9-1.4 m

Depth: 13-17 cm

Description: A small stream with a narrow but well-defined channel with some riffles (JFWAT FILES 1981).

Map Reference: Mt. Hayes (D-4)
(1: 63 360)

Waterbody Name: Bear Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 4-6 m

Depth: 5-20 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (A-2)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.3-0.9 m

Depth: 10-12 cm

Description: A small drainage from a tundra area (JFWAT FILES 1981).

Map Reference: Tanancross (A-2)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.8-1.4 m

Depth: 13-34 cm

Description: A small drainage will well-defined channels and alternating pools and small riffles (JFWAT FILES 1981).

Map Reference: Tanacross (B-5)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1.2-1.4 m

Depth: 12-22 cm

Description: A small muskeg drainage stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-5)
(1: 63 360)

Waterbody Name: Robertson River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 30-55 m

Depth: 85-220 cm

Description: A large, braided stream that has its source in glaciers. Of many channels, this stream is swift-flowing and flows through gravel banks (JFWAT FILES 1981).

Heads at terminus of Robertson Glacier, flows NE 33 miles to Tanana River; 63°30' N, 143°47' W, named in 1885 by Lt. Allen (Orth 1967:808).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1.4-2.5 m

Depth: 14-25 cm

Description: A small stream that flows through a marshland and muskeg area (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Sheep Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-2 m

Depth: 12-12 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 8.3-11 m

Depth: 10-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-5)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1.4-1.8 m

Depth: 12-30 cm

Description: A small tundra stream with many riffles and many small pools (JFWAT FILES 1981).

Map Reference: Tanacross (B-5)
(1: 63 360)

Waterbody Name: Cathedral Rapids Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-40 m

Depth: 9-13 cm

Description: A moderately-sized stream divided into seven channels, with many meanderings and braids (JFWAT FILES 1981).

Flows N 5.5 miles to Tanana River at E end of Cathedral Rapids, 12 miles W of Tanacross; 63°23' N, 143°44' W. Named for the rapids at the stream's mouth (Orth 1967:193).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Cathedral Creek

Width: 1.2-1.5 m

Depth: 10-20 cm

Description: A very small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 10-25 cm

Description: A moderately-sized stream with many pools and small riffles (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Yerrick Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 10-15 m

Depth: 12-25 cm

Description: A small tundra stream (JFWAT FILES 1981).

Heads on Mount Newberger and flows N to Tanana River, 63°24' N, 143°33' W, local named published by USGS in 1951 (Orth 1967:1066).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Moon Lake Tributary

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.9-1.3 m

Depth: 12-18 cm

Description: A swift clearwater stream with a wide course, and flowing in braided channels (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 2-3 m

Depth: 0.5-1.5 m

Description: A small shallow stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-6)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1.2-2.4 m

Depth: 12-16 cm

Description: A small stream with a very steep gradient (JFWAT FILES 1981).

Map Reference: (1: 63 360) Tanacross (B-6)

Waterbody Name: Crystal Slough Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 0.5 m

Description: A deep, slow-moving stream that flows through a muskeg area (JFWAT FILES 1981).

Map Reference: Tanacross (C-6)
(1: 63 360)

Waterbody Name: Tok River

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 25-40 m

Depth: 20-80 cm

Description: A glacial-original stream characterized by its wide and deep waters (JFWAT FILES 1981).

Heads at glacier terminus, flows NE 60 miles to Tanana River; 63°22' N, 142°50' W, Indian name reported in 1885 as "Tokai River" (Orth 1967:973).

Map Reference: Tanacross (B-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-5 m

Depth: 20-25 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.4-3.2 m

Depth: 30-150 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-4)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 10-13 cm

Description: A small, meandering tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (A-3)
(1: 63 360)

Waterbody Name: Bitters Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 2-3 m

Depth: 28-50 cm

Description: A small stream that flows through a marshland and muskeg area (JFWAT FILES 1981).

Map Reference: Tanacross (A-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 0.5-1.5 m

Depth: 10-14 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Tanacross (A-3)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 2-3 m

Depth: 12-23 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-4)
(1: 63 360)

Waterbody Name: Beaver Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 12-14 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-4)
(1: 63 360)

Waterbody Name: Lethe Creek

Main Drainage: Tanana River

Tributary to: Chisana River

Width: 2-3 m

Depth: 3-12 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Nabesna (C-1)
(1: 63 360)

Waterbody Name: Unnamed Creek

Main Drainage: Yukon River

Tributary to: Tanana River

Width: 1-3 m

Depth: 12-13 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Tanacross (B-4)
(1: 63 360)

Russian Exploration

Russian exploration and related activities in the Tanana River Basin region were no more extensive than those which occurred in the Arctic Slope regions. Such is the case because the Yukon region offered many more valuable resources to the trader and prospector.

The most intensive exploration efforts in this region occurred between 1847 and 1849. The man most responsible for those exploratory efforts was a creole named Serebrenikov. He traveled at the behest of the Russian American Company. During the years, he worked for the Russian American Company, he (and three others) only made one significant exploration and that occurred when he was ordered by the Russian Colonial Administration to make a survey of Lake Plavezhoe and the Copper River area.

In Serebrenikov's journal he indicated that "the last place where we made observations was at 62°48'43" north latitude" (P. A. Tikmenev 1978:352), near the confluences of the Copper and Tanana Rivers. Again, there are indications that Serebrenikov traveled further into the Tanana region; however, as is usual in Russian-American history, there is little documentation available (which is translated) which illustrates such activity, and what is available remains highly speculative.

American Exploration and Occupation

Few documented cases of exploration in the Tanana River Basin region exist today. Those that are available are too general in content to quote. Thus, it was not until the 1930's and later that Americans began to explore and become familiar with the Tanana River Basin region.

The first venture into this territory began as a result of a minor gold rush on the Fortymile River. Gold was discovered on bars of the Fortymile at Franklin Creek in 1887. In the same year, prospectors found gold placers in Franklin Gulch, and in the spring of 1888 more discoveries were made on Davis Creek. In the following year further deposits were found on Poker Creek and Walker Fork. These discoveries brought an influx of miners into the Tanana region, and in 1893 mining activities began on Dome Creek, a tributary of the Tanana River. By the mid-1890's, no new gold discoveries had been made; however, the importance of mining in this region, though not extensive, contributed greatly to its opening to the serious traveler important travel routes, both overland and riverine.

There have been many accounts written regarding the building of the Washington-Alaska Military Cable System (known hereafter as WAMCATS) which traversed much of the land covered by the Tanana River Basin region. Designed as a communications system for linking important military posts with civilian centers, WAMCATS' route involved connections between Ft. Gibbon and Kechumstuk and Eagle and Valdez. Lt. Billy Mitchell was the man in charge of the operation, and on August 24, 1902, three years after the starting date of construction, his construction crew met those coming from the north (Copper River Valley). Their meeting "near the present community of Tanacross, provided the first direct telegraphic connection between Ft. Liscum and Ft. Egbert" (U. S. BOR 1974). More important, however, was the establishment of a transportation link between all points. Thus, during the same period of construction, WAMCATS crews had been seeking a route along the Yukon to Ft. Gibbon:

> On January 1, 1903, Lt. Mitchell discovered an alternate route through the Goodpaster River drainage to the Tanana River.... From that point construction started in both directions; one toward existing Ft. Egbert-Ft. Liscum telegraph line at Kechumstuk; while the other started toward construction crews working up-stream on the Tanana River from Ft. Gibbon. By the last of April 1903, the lines were completed from Kechumstuk to Tanana in the vicinity of Quartz Lake. Here, Lt. Mitchell continued on downstream to the Salcha River. (U. S. BOR 1974)

The WAMCATS work in this region comprises the only significant American exploration until the 1930's, more than 25 years. A number of journals from the archives of the University of Alaska, Fairbanks, provides insights into travel in the Tanana River Basin region in the mid-1920's and through the late 1930's; Olaus J. Murie, a biologist, kept accurate records of his work in this region and the following exerpts from two of his journals show the extent of his travels:

Waterbody Name: Ten Mile Creek

Main Drainage: Tanana River

Tributary to: Chisana River

Width: 0.81.3 m

Depth: 8-17 cm

Description: A small tundra stream (JFWAT FILES 1981).

Map Reference: Nabesna (D-2)
(1: 63 360)

Waterbody Name: Silver Creek

Main Drainage: Tanana River

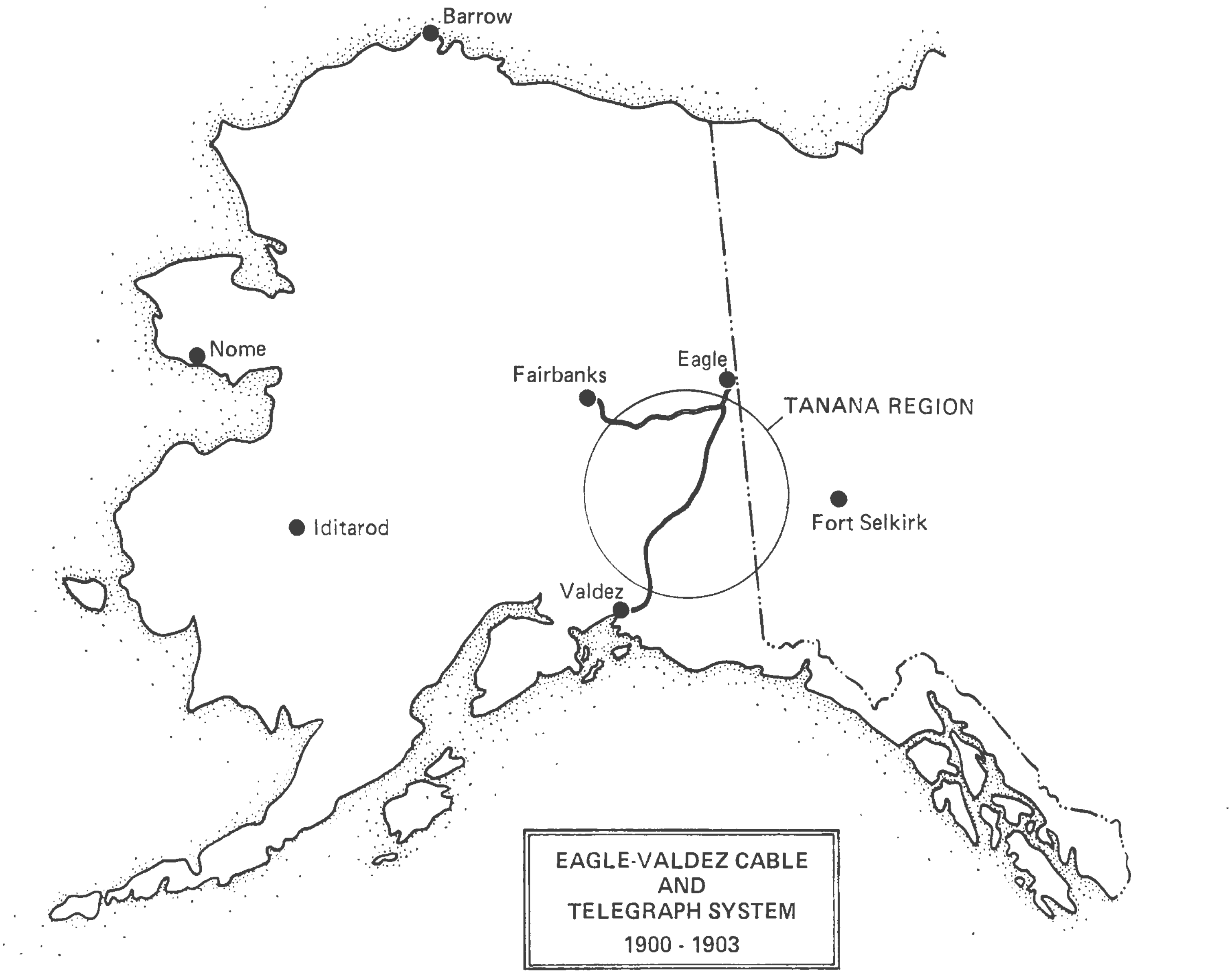
Tributary to: Chisana River

Width: 1.0-2.3 m

Depth: 12-15 cm

Description: A small stream (JFWAT FILES 1981).

Map Reference: Nabesna (D-2)
(1: 63 360)



Barrow
Nome
Fairbanks
Eagle
TANANA REGION
Iditarod
Fort Selkirk
Valdez
EAGLE-VALDEZ CABLE
AND
TELEGRAPH SYSTEM
1900 - 1903

(D[illegible]rling · 1981)

> On the evening of June 16 [1922] I secured the services of J. W. Rust, with his motor boat. We left Fairbanks at 6 p.m., went down Chena slough, into the Tanana River, and up Salcha Slough. About midnight we were up Swift Slough, a tributary, and there I made camp. Mr. Rust returned for Fairbanks with the motor boat leaving a canoe for my use. During the following day I worked up stream, until I reached McDonald Creek. I went some distance up this creek and camped a few days. Then I worked down again and in the evening of June 24 made camp at the mouth of Black Slough.... Later in the evening Mr. Rust arrived with his motor boat by previous arrangement. Next day we made a run up Clear Creek some distance, then turned back and reached Fairbanks in the evening. During this period I worked over territory adjacent to the Sloughs and investigated all the lakes and swamps I could find.

and:

> [regarding the physiography of Salcha Slough] Salcha Slough is one of the many channels of the Tanana River, breaking away from the main stream somewhere below the mouth of Salcha River, floating through the flats with an intricate network of loops and turns and subdivisions to join the Tanana again a few miles below the mouth of Chena Slough. Salcha Slough is like Chena Slough but smaller and flows through a more swampy area. As it has been a favorite duck hunting place the various branches have been rowed by the hunters who are more or less familiar with the lower portion.... As a nest ground for water fowl I found that reports have been much exaggerated. The Slough itself has a considerable current in most places, with high sandy banks, not at all suited for nests of water fowl. (Murie 1922:1-5)

From Murie's other journal his account follows in the same vein:

> The period from April 27 to May 24 was spent at Tanana Crossing and in the neighboring mountains to witness the caribou migration taking place there and to prepare for a trip up the Robertson River. While the caribou were passing through I was encamped at the base of the Alaska Range about eight miles from Tanana Crossing. As it was not necessary [sic] to travel on the river I used the dog team to transport my camp outfit and for going into Tanana Crossing on various errands. May 12 I broke camp and moved into the village. The snow was nearly gone by that time in the flats and the dogs had difficult travel that day. Water was running here and there and it was necessary to wade in many places, the dogs almost swimming at times. Upon arrival at Tanana Crossing the sled was put away for the summer.

> When I first came to Tanana Crossing the missionary, Mr. McConnel, kindly gave me the use of one of the Mission buildings. When the breakup of the river became imminent, I moved across in order to be on the same side as the Alaska Range, and was furnished living quarters by the trader, Mr. Denny, who assisted me in the work considerably.
>
> After breaking camp I remained with the trader preparing for further travel. It became necessary to build a boat and as there was no lumber available two large spruce trees were whipsawed and furnished enough boards for the boat. Mr. T. S. Yeigh was employed as guide and assistant. Being an experienced boatman he took charge of the boat building. May 22 the boat was finished but a two-day gale set in so that we could not leave Tanana Crossing before May 25.
>
> During my stay at Tanana Crossing I was able to observe the migration of birds to some extent, although being around timberline so much of the time, I would naturally miss the arrival of some of the smaller species. Various specimens were collected, as opportunity offered, but particular attention was given to the caribou. (Murie 1921:1)

He continues the journal by writing about the physiography of the Tanana River:

> The Tanana Valley in this vicinity is 7 or 8 miles wide, bounded on the north side by low rounded hills which stretch away into the Yukon-Tanana Upland. On the south side rises the rugged Alaska Range, more or less abruptly from the valley floor. The two sides of the river are thus sharply in contrast. From the highest peak opposite Tanana Crossing I enjoyed a splendid view of the range. As far as I could see south and east the jagged mountains rose in a jumble of irregular peaks of all shapes, with steep cliffs, pinnacles, and other grotesque shapes. The mountains were still largely [sic] snow-covered, May 8, especially on the north slopes, although the southern exposure were bare in many places. Tok River, locally known as the "Tokio", cuts through the range and flows into the Tanana a few miles east of Tanana Crossing. The Tanana winds about through the valley in shoe-shoe curves, now on one side, then on the other side. The current here is not as swift as portions of the lower river nor is the river split up into numerous channels such as in other portions.
>
> One slough leaves the main current about three miles above Tanana Crossing and flows into the river again

> about six miles below the village. This is known as the Little Tanana. About eight miles northwest of Tanana Crossing is Lake Mansfield, the largest body of water in this locality. Fish Creek, a very deep, but narrow brook, is the outlet of the lake into Tanana River. There are numerous small lakes and ponds in the valley, the general character of the bottom land being somewhat swampy. Along the south side of the river, however, a lightly higher portion extends eastward 17 miles and is spoken of as "The Dry Stretch".
>
> Upon arrival at Tanana Crossing April 26 I found that there was considerable open water, although dog teams were still crossing the river. By the first of May the ice was no longer safe and during the following week the ice gradually disappeared. There was no spectacular break-up, but the ice thawed and crumbled and quietly floated away, little by little.
>
> Tanana Crossing is mainly an Indian Village, numbering something over 96 people. At times a portion of the population moves to Lake Mansfield, where they have a number of cabins. In addition to the Indians, there is a missionary and usually from one to four fur traders. (Murie 1921:2-3)

Froelich G. Rainey, an eminent anthropologist, who has done extensive work in Alaska, also kept very accurate records of his work. Three journals, one written in 1939, and the other two with no dates, provide an excellent record of his work and travel in this region, as well as an excellent record of anthropological and archaeological data in this region:

> Tuesday, July 28.
>
> Left Fairbanks 8:30 by train for Nenana with 14-horse Johnson. In P.M., bought groceries -- 30 gals. gas. Fixed boat.
>
> Wednesday, July 29.
>
> Left Nenana 9 A.M. down river with Wright and son Gene. Put in 6 miles below at fish camp to trade boasts with native. On down to Minto -- 30 miles -- traded boasts again to get 35 ft. boat from native at fish camp -- Many fish camps along river -- Natives down from Minto Lake and Nenana 175 to 200 between Tolorana [Tolovana River] and Nenana -- using fishwheel -- doing well.
>
> Ran on down below mouth of Tolovana, stopped at fish camp to find Old Sam from Salchaket. He agreed to go

up Tolovana with us. 1½ days to north fork -- the oldest known site. All natives down on river from Minto.

Natives believe there are 3 or 4 old sites on Tolovana above North Fork and on Lake. Indians came from lake region out to river at Minto to fish from June 5 to Sept. 1. They speak of the inland region as their permanent home.

Below Tolovana most of the Indians are down from the Kantishna -- 100 miles up to old sites.

Good fishing -- catch salmon in clear water. They told us of stone enclosure (not man-made) where there are paintings. Place where Raven named the groups (as at Salchaket).

Three clans on lower river -- "Nattsina" in common with upper. Sam says can marry in own clan -- modern (?).

Thursday, July 30.

Ran on down to mouth of Hot Springs slough passing many fish camps (75 people) past Baker Creek, largest settlement just above Hot Springs.

Broke prop off, crawled up slough with little kicker 6 miles to Hot Springs. Finally found nut off steam pipe that fit prop. Put on old bronze prop.

Woman at mouth of slough gave me mammoth tooth & rib (?) from Tofty.

Friday, July 31.

Broke sheer pin but got iron ones of better size & ran on down to Tanana -- 80 miles stopping at Cross-Chaket -- 60 miles from Tanana.

Cross-Chaket said to be old site but natives say it was established since white contact down from Interior.

Two old sites are also reported on Tanana near Minto. One on Kawchaket and one 10 miles above.

We heard of these after passing them & intended to catch them on the way back.

In Tanana we stayed the night at the Episcopal mission with Rev. Files and wife. Bishop Bently was there, having come down the Yukon. He said he had seen deposit on river bank at Jordan's place below rapids. Near Site Indians had told us of where there was a massacre and where Indians gathered to make pottery.

Obtained borrowed aluminum prop from Birl Anicich. He told of sites recorded on front pages. His uncle told of Hrdlicka's trips. It seems he was down river 2 or 3 times. A week at Tanana.

Saturday, August 1.

Ran up Yukon stopping at fish camp on 16 mile island -- another at 24 miles -- then at ex-chief Mathews place about 26 miles above Tanana. Old Mathew knew of massacre site -- people killed when his mother or grandmother was a baby. Big Kobuk Eskimo.

Mathew had seen pits excavated by Indians for clay near Jordan's place. He said he had been told how Indians all gathered there to dig clay.

Clay mixed with chopped bears hair mounled about basket-like frame and set by fire to bake. Bowls much prized. Wrapped in rabbit skins when packed.

Old Sam at Tolovana said people from there went down to make vessels & traded them as far up Tanana as Big Delta.

Mathew accompanied us to site of massacre -- 2 or 3 miles above his camp. Said human bone had been found there. We found narrow bench against high bank. A few caribou bones & one worked bone point. Large boulders exposed probably indicating site has been worked out. Not room now for fish camp. Clear small stream enters Yukon here. Site on right limit.

Went on up to Arland Jordan's camp about 33 miles above Tanana. Found him working in garden on right limit. In this garden he had plowed out 5 to 10 fire pits. Several pot sherds & one broken but nearly complete bowl -- "like piss-pot". He gave this to some geologists several years ago. He also gave Hrdlicka some sherds & a stone axe found in the garden. The garden is on a high bench near river bank. We dug to find hearth about one foot deep.

3 or 4 sherds appeared in hearth. Some bone refuse.

Waterbody Name: Gardiner Creek

Main Drainage: Tanana River

Tributary to: Chisana River

Width: 1.5-2.6 m

Depth: 20-30 cm

Description: A deep, slow-moving stream that drains a marshland and muskeg area (JFWAT FILES 1981).

Flows S 38 miles to Chisana River, 18 miles SE of Northway Jundtion; 62°49'10" N, 141°31'20" W, named in 1898 by A.H. Brooks (Orth 1967:360).

Map Reference: Nabesna (C-1)
(1: 63 360)

Waterbody Name: Sweetwater Creek

Main Drainage: Tanana River

Tributary to: Chisana River

Width: 1.2-2.5 m

Depth: 12-25 cm

Description: A small, clearwater stream (JFWAT FILES 1981).

Flows W 13 miles to Chisana River; 62°45'42" N, 141°27'55" W, local name reported by USGS in 1955 (Orth 1967:937).

Map Reference: Nabesna (C-1)
(1: 63 360)

Waterbody Name: Desper Creek

Main Drainage: Chisana River

Tributary to: Scottie Creek

Width: 0.8-1.4 m

Depth: 12-24 cm

Description: A small stream (JFWAT FILES 1981).

Flows S and W 20 miles to Scottie Creek 62°40' N, 141°10' W, local name reported in 1955 by USGS (Orth 1967:268).

Map Reference: Nabesna (C-1)
(1: 63 360)

Waterbody Name: Scottie Creek

Main Drainage: Tanana River

Tributary to: Chisana River

Width: 1.2-2.3 m

Depth: 10-12 cm

Description: A small stream (JFWAT FILES 1981).

Heads in Yukon, Canada, flows SW across Alaska-Canada boundary 50 miles to Chisana River; 62°41' N, 141°16' W (Orth 1967:845).

Map Reference: Nabesna (D-2)
(1: 63 360)

Fish storage pits also apppear on bench.

Jordan took us across the river to see deposit exposed by river cutting right in front of his house. Several stratified hearths extending to depth of four feet. Jordan has found long skin flesher (obtained) plain bone point, and end scraper in this cut (last), no pottery. some digging showed no implements. Ash & some bone refuse. This place is a remarkable caribou crossing. Indians said to gather here from all over to fish & kill caribou in summer & fall.

Mathew showed us series of small posts on ridge ¼ mile up from Jordan's house where Indians are said to have dug clay. Then Jordan took us downstream 1½ mile to point where river had cut exposing clay strata lying under 3 to 4 feet of sandy humus. Gray, white, yellow, blue & black clay. Took samples. Gold can be panned out of this clay.

Jordan agrees to send down any tools he may find.

Returned to mission at Tanana 10:30 P.M.

Sunday, August 2.

Started bakc up Tanana after purchase of 40 gal. gas. 16 miles up broke two pins in prop shaft. Lost 3 hours fixing them. Ran on up 50 miles to cross Chaket. Camped.

Monday, August 3.

Ran on up to 10 miles below Hot Springs. Broke prop shaft. Small motor had water pump broken. Waited for Yukon. Picked up 3:30 P.M.

Met Wilson -- teached for 5 yrs. at Kaltag. Got good info. on Ind. Bureau.

Tuesday, August 4.

Arrived Nenana 9 A.M. Called Leahe at Park about visiting site there. He was leaving for Fairbanks.

Took Brill car at 4 P.M. to reach Fairbanks at 6 P.M.

Leahe agrees to take me to game lick -- 3 days on horseback -- in park whenever I wish. Tentative date -- Sept. 1st. (Rainey n.d.: 1-3)

This second excerpt from one of his journals again has no date, but it was likely written in the late 1920's or early 1930's. This journal covers his work in the Nabesna area and work on the Tanana River:

Tuesday, June 9.

Left Fairbanks 1 P.M. Arrived Big Delta 5 P.M. Continued 10 miles to Jarvis Creek to make camp.

Wednesday, June 10.

Returned to Big Delta 8 A.M. and proceeded on foot 7½ miles up Tanana to Tom Yeigh's mink farm arriving 1 P.M. Looked over collection....obtained while he spaded his two garden plots. Flint tools found in are away from house and bone points and trade beads are near house. Then dug into fire pit near garden, then in house site on lake shore. Found nothing.

Thursday, June 11.

Continued digging in house pit. Found only wolf vertebrae. Dug out two fire pits near garden away from house. Also in two house pits on top of hill. Found nothing. In P.M. crossed river to dig two house or storage pits on opposite bank (see notes). Returned to house to dig into three fire pits in garden near house.

Friday, June 12.

Photographed Yeigh's collection and then took boat down river to lower mouth of Goodpastor River. Dug out one house pit lined with poles and birch-bark -- crossed lower mouth to opposite bank to see abandoned cache -- guns, toys, bedding, utensils. Graves near by fenced in. Several pits on bank of Tanana now washing away. Also new graves with crosses. Crossed Tanana to dig out pits ½ mile below Yeigh's on same bank.

In P.M. walked back to Big Delta to find battery run down. Dog Cripes started us on his battery. Fixed flat tire. Drove on 45 miles to Rapid Roadhouse 8:30 P.M.

Saturday, June 13.

Fixed second flat tire then drove to bridge wash out on Miller Creek. Tried fording below but boulders too large in stream bed. Retruned to abandoned road camp and made camp. Two days until bridge is fixed.

Called Bunnell at College from Rapid. He was trying to get me. Wanted to change house site. Jack and I drove in leaving Tim in camp at MIller Creek. Arrived Fairbanks 12 P.M.

Monday, June 22.

Drove to Nabesna mine -- end of road mile 108. Inquired from Witom (Manager) regarding the Nebesna River. Can Be done. Some fast water. No boat -- no lumber long enough to build one. Called DeWitt who offered to sell 15 ft. boat for $30. Returned to Slana bought boat -- recaulked bottom and stayed night there.

Tuesday, June 23.

DeWitt's man with truck took us to Jack Creek (mile 95) where we put in boat and ran downstream lining part time. Bad going. Camped night 3 miles below Nabesna mine.

Wednesday, June 24.

Jack got some more tar at mine and we ran down to Nabesna camping for night just below mouth of Jack Creek -- bad water.

Thursday, June 25.

Ran fast stream in river where it fingers out into many channels -- over side much of time. 10:30 A.M. reached Nabesna Indian village. Only Nabesna John, his wife, son, another young Indian, wife and several children. (Shorty John) Village now moved mile & half from old village. Both built of log cabins. Shorty John took me to old village with Jack & Tim going back for boat. Just old log cabins (4), caches (3) and 6 graves. Nabesna John's wife still using Bndachas. Shorty John came from Chisana to marry find looking young woman whose father lived in old village -- last to be buried there. Good hunting at this place. Caribou - birds, a few grayling in stream in summer -- no other fish. They now shoot rate (15 miles down Nabesna), wolves, foxes. Speak language of Tanana natives differing from Copper people. Nabesna John does not trade with Copper River posts because of old feud with Indians.

Ran on down after lunch some 12 miles. Very bad water -- over side -- very cold, fast.

Friday, June 26.

More bad river, but more water over side, cold fast.

Saturday, June 27.

Ran bad log jams nearly upsetting -- very fast water -- finally reached village on Nabesna 7 miles above Chisana. Only one old prospector (yerich) was there. Traders gone down river. Indian 5 miles away on lake fishing. 8 or 10 fine log houses used by Indians. Permanent winter settlement but many families take children to Tetlin for gov. school. Many there now.

Quiet water -- 7 miles down to Junction of Nabesna & Chisana then 5 miles down Tanana to camp. Rowing. Fine going.

Sunday, June 28.

35 miles down Tanana to mouth of Tetlin -- 1 P.M. Lunch.

Rowed up river 2 or 3 miles to old fish camp to strike trail to Tetlin. Walked 5 miles up river making crossing of slough on raft. Arrived Tetlin 9 P.M. The trader, Ted Lowell, put us up in John Hyducavitch's cabin. Called on Mr. & Mrs. MacMillan who run Ind. Bureau school.

Monday, June 29.

Had breakfast with Lowel and met Jack Singleton, old school teacher here, 40 yrs. in Alaska. Learned much of Indians from him. He has adopted native boy.

Says women play large part -- often control husbands -- now very important in potlatch. Medicine men still strong here. Chiefs not always medicine men. Singleton took me to see chief Peter, chief sinc 1921. He gave me names of 5 Ind. groups here as follows:

I. <u>iaalic^{h}</u> "Straight People" chief's people. Word means cottonwood. Cotton came from sky. Came from Mt. Wrangel from salty water via Copper River.

II. <u>tis'u^{h}</u> "Red Paint People" from Valdez Creek.

III. icel'c^h "Salmon Tail People" from salt water via Copper River.

IV. naltsi^h (This Wolverine People on Copper River) Came from Nenana up Tanana -- Peter calls them "Raven People".

V. Atsa'dene "One People" no one knows where they came from. Other people found them living on island in Tawchin Lake -- across Tanana 12 miles from Tetlin. Cannibals -- to Indians they are like Jews to Christians.

Peter says all killed but one woman. She was bought off by husband and was great grandmother of many men, none living here.

Peter also told story of tailed men who lived in holes in ground here. Bad men, ate people. Finally burned in holes. Peter thinks they lived where depressions -- now are in sand ridge on trail up right limit of Tetlin River.

In P.M. Peter with Singleton & son took us down to the ridge and we dug pits in three depressions. Found nothing but wind blown sand. Probably dunes from old lake bed.

No old house sites in Tetlin. Peter & Singleton think maybe at Las Tetlin or at old village 15 miles inland.

Tuesday, June 30.

Visited school with Chief Peter. Some 20 children learning crafts and ABC's. Peter much interested, feels responsible -- has no children.

Got book called Alaska Natives by H. Dewey Anderson & Walter Crady Eells. Stanford University Press from MacMillan.

Arranged with native, Walter Northway, from Nabesna to take us to Las Tetlin in gas boat. Left about noon. Engine trouble arrived Las Tetlin about 8:30 P.M. About 35 native of which 20 are small children. Fine healthy people going strong. Gathered there to fish whitefish in Tetlin Creek with set dip nets. Log houses, caches, tents -- some from Tanana Crossing, Mentasta, Nabesna.

Stayed with Chief Luke & Wife in large two room log house. Fed us smoked whitefish. Talked with man from Tanana crossing who says natives want more schools -- way of making living when game & furs are gone.

Met Little John, old Indian who was young man when Lt. Allen came in from Suslota Pass. Little John remembers first iron axe. Came from Chilcotin. People paid man to use it. Built log houses. Remembers bone & copper arrowheads. Stick guns -- no stone heads. Says people gathered to fish in summer, lived in bark & log houses -- moss house for single potlatch. Left to spread out hunting in winter when they lived in movable carigou skin tents. He showed us old house sites which he remembers and says most of them washed into creek as it cuts into bank in front of present village. Now there is 6 inch to 18 inch deposit exposed along right limit of creek for some 3 to 400 yds. Much like refuse deposit dug at Salana. Chips, ashes, bones, trade beads. Probably few if any tools as people much interested in old tools and would have found some on bank during years of washing.

Sweat house pits apparently lacking.

Chief Luke found cache down in ground some distance back of village with stone adze head, whetstone, and hammerstone.

Chief Luke still uses bow & arrow to shoot birds and rabbits.

His wife makes fine moose & caribou skin moccasins, open coats. Also woven rabbit skin robes and hooded parkas.

Las Tetlin probably one of largest and most thriving Indian settlements. Incredible number of children. Now smoking whitefish for winter. Soon many move down to Tetlin for school. Then in winter many leave to hunt fur but Chief Luke spends year round there.

Wednesday, July 1.

Spent morning in Las Tetlin talking with chief & others. Promised to write Luke regarding sale of moccasins, etc.

When leaving Tim put on Eskimo dance and several men including Chief Peter, his cousin, Walter Northway, put on potlatch dance drumming on gas tin boiler. Then we left for Tetlin going down Tetlin Creek to Tetlin River, down to Tetlin Lake and back down Tetlin River to Tetlin. Arrived 3:30 P.M. after motor trouble & duck shooting.

Thursday, July 2.

Left Tetlin with Northway who took us down to our boat 2 miles above mouth. Coasted down Tanana till 6:30 P.M.

(Tanana crossing from Silas Henry)

Friday, July 3.

Down Tanan -- at noon shot bear on bank. Arrived Tanana crossing about 9 P.M. Put up in cabin by Tom Denny, Trader for Hyducavitch.

Saturday, July 4.

Most of Indians from Mansfield down for fourth. About 100 here. Chief is Walter Isaacs. A programme of singing and speeches in P.M. directed by Mrs. MacIntosh, the Episcopal missionary. Most old Indians talked admonishing children to do right. Talked with several old Indians (San, Chief Walter, etc.). Learned that oldest site about ½ mile this side of Mansfield at place called fish camp.

Rifle contest in P.M. Tim won $5.

Dance in evening -- like barn dance. All night.

Sunday, July 5.

Spent day doing nothing. Indians do not go back to Mansfield until Monday.

Talked in evening with Silas Henry who was born at Goodpastor and lived later at Chena. He says old site at Chena 4 miles below White town on right bank of Tanana just below hill. Also old site at Salchaket below graves along road toward Fairbanks from the fishing slough.

He is Nalchin and has married 3 Tsesush women. Gave 5 groups -- clans -- mother right -- matrilocal -- all in one settlement.

> Silas took me to see old Sam from Mansfield and translated poorly. Sam says axes carried as war clubs -- has one halved with blunt point -- used as club. Says copper used for awls & knives before iron -- before that, beaver teeth. Has set of tools -- curved knives -- awls.
>
> Old Sam told of origin of 5 groups -- poorly translated but told of growing up in different localities & coming together. Alsa'de'de' at Tanchin Lake met Nalchin from Copper River, etc.
>
> Monday, July 6.
>
> Andrew Titus Isaacs took us across to Mansfield. Stopped at Fish Creek site. Found 7 old house sites and one sweat house on high bank above creek. Refuse heap before beach and fire pit in each 9 x 12, 12 x 15 -- Andrew says two families lived in each -- made of spruce bark & poles. (Rainey n.d.: 1-8)

The final journal dealing with travel on waterbodies in this region covers his activities on the Upper Tanana River from May 23 to June 22, 1939. As with the latter excerpts, his notes provide a good record of the navigation of waterbodies in this region:

> Tuesday, May 23.
>
> Left Fairbanks at 4:30 P.M. with Lerdahl in Wien's Cessna. Arrived Tanacross 7 P.M. Blew out tire landing and very nearly capsized. Found tube shot. Lerdahl radioed for relief plane.
>
> At Tanacross found Frichie & wife at radio station. Fleishman and wife at school. Moses Sam met me with boat and outboard. Most of men hunting rats and not in village. Saw my namesake, Rainey Paul, husky boy nearly three years old.
>
> Many people have died with flue, pneumonia & T.B. Jennie died of T.B. telling her young husband John he must go with her. Once tried to stab him. Four days after her death he died suddenly. People asked for Marshall to examine body. It bloated after 36 hours.
>
> Wednesday, May 24.
>
> Relief plane arrived about noon. Helped change wheel. Relief plane also stuck. Bad tail skid threw it around with wheels in ditch. Both ready to go about 2 P.M.

Moses & 2 then start down river with 30 gal. of gas. $1.50 a gallon at Hessler's post.

Very cold. Clouds.

Run 7 hours, 60 miles to Sam Creek passing mouth of Robertson which is still covered with ice. Mountains white to feet. Many ducks & geese. I miss good shot at sitting geese with Moses Winchester. Also missed a big black bear watching on bank. No fresh meat.

Four cabins & 3 tents at Sam's Camp (3-4 miles above mouth of Sam Creek almost on bank (right) of Tanana). All people down at Healy. Make camp in vacant tent. Supper at 11 P.M.

Thursday, May 25.

Pack all our stuff (70 lbs. apiece) 2½ miles across to Sam's fish camp on the Creek (15 miles above mouth by the creek) three cabins, two tents, on low ridge between Sam Lake and Sam Creek on right limit of creek.

Several house depressions and refuse along bank of creek. But only few inches deep. Picked up Ici-thi & Ici-thut (bone tube) dug many pits. No old settlement. Found out later it was 1 mile downstream at foot of high hill right limit.

Packed back to Tanana. Ran on down past mouth of Johnston (still is) 30 miles to mouth or George Creek.

Very cold. Wind spray.

Pulled up George Creek six miles to George Lake. Fine clear stream. All but one set of riffles & the last ½ mile we could use motor. Most grayling, whitefish & pickerel I ever saw. Like a fish hatchery. I forgot fish hooks.

Frank Luke the only man at this camp. Wife & 4 children. 3 cabins still standing. Frank came up from Salchaket 10 years ago. His wife Sam's daughter.

Camp on left lime 200 yds. below lake. A very big lake.

Old fish camp 100 yds. above present (Frank's) camp on same side.

(Camp A) Two house depressions about 12' x 18' x 3' deep. Middens 12' in diameter in front of each house pit.

300 yds. downstream and on opposite bank, back about 40 yds., an old stream bed is "Camp B". Three house pits. One large one about 12' x 18' with a sweat house room at the back & about 4½ feet deep (deepest pit I've ever seen). Roof boards on floor of pit; two smaller shallow pits. Middens 10' in diameter before each house pit.

Friday, May 26.

Camped on bank of George Creek by Frank's house.

Begin digging midden 1 at Camp A about 9 A.M. Find about 2' of deposit. Ash charcoal, fish scales, bird, moose, caribou, rabbit bones, buried stones, birchbark, trade-beads (rare). Ici-thas (very common) bone points, no flint, iron awls.

One bone point with notched butt Moses says was used with beaver arrow. Detachable -- dragged arrow shaft after strike in water.

Rain about 1 P.M. Pitch big tent borrowed from Frank -- Make a stew.

2 P.M. begin test pits in middens at Camp B. Hit ice at about 1 foot. Many trade beads, a Ici-thut, a moose collar made from caribou scapula.

Camp B must be more recent than A. Both occupied since white contact. Willow tree in housepit at Camp A has 53 rings.

Moses described bark house at Mansfield when he was a boy -- half underground -- pole frame -- spruce bark walls -- pole & moss roof cabled to smoke hole with flat strip in center -- sleeping bench -- fireplace at center -- skin door -- no windows.

Saturday, May 27.

Raining hard. No work. Many pickerel in stream. Indians bail them out & spear them just as ice break in stream in spring as they swarm out of or into (?) lake. Also net whitefish & some grayling in stream.

Frank says there are many old camps about lake but he doesn't know where.

Frank's wife is from Sand (not Sam) Creek & knows of older camp one mile below present fish camp on right limit.

Decide to return to Sand Creek. Frank says we can go through George Lake, portage 30 yds. to Black Lake, cross that & portage 1-1½ miles over hill to Tanana, missing Johnston rapids. Decide to do that.

Sunday, May 28.

Cross lake to find upper end still covered with rotten ice. Work 4 hours breaking way through & carrying boat over to ready Black Lake. Frank following in small boat. Then found we cannot hardly move big boat on first portage -- 1 mile portage up hill impossible. Debate leaving gear & hiking back. Finally decide to return to George Creek.

Wind had blown ice across lake. Not bad going back.

Frank wants some phonograph records & needles. Gave me four rat skins.

Monday, May 29.

Off at 7 A.M. floating 6 miles down George Creek fishing for grayling. No luck. Leave mouth of George Creek 9:30 A.M. Barely can push current going upstream. 5½ hours making the 8 miles to the mouth of Johnston. Warm & sunny but tense business in very fast water. Engine churns water, down not pull. 6-horse Johnson -- 25-foot boat -- change propeller.

Finally reach Sand Creek 10:30 P.M. (30 miles from mouth of George).

Tuesday, May 30.

Packback into old camp 3 miles in from river but 10 miles up from mouth on stream, on hillside on right limit, one mile below present camp, in grove of spruce.

Sunday, June 4.

Follow long ridge for 12 miles to Long Cabin. The trapping cabin of Moses & Silas Solomon. Left foot hurting in the arch, swollen & red. A very long 12 miles. Some water in low places. Found Lisa had shot 4 caribou. Other people camped 3-4 miles off trail.

On the grass plain at LIttle Denison we saw a very tame herd of caribou. Moses shot a young bull. The others kept on grazing until a second shot. Took liver, tenderloin, a part of thigh bone.

Later on side hill saw another herd. Very tame. Reach Long Cabin at 5 P.M. Very tired & sore.

Tuesday, June 6.

Walk 15 miles to Dick's ranch. Come down off ridge onto grassy swampy plain (mosquito flats) -- 11 miles to Mosquito Fork. Many small herds of caribou -- one red fox. Trail ankle deep in water. 4 miles from bridge over Mosquito Fork to Dick's ranch -- lower down stream. Across grassy plain -- thousands of caribou -- curious -- run up to see us within 20 yds. Some pay no attention until we are almost up to them. Could shoot scores with a bow and arrow.

When they run the water sprays like blue smoke. Some tiny calves. Mosquitos buzzing in grass but wind keeps them down. Shot duck but could not get it.

Reach Dick's ranch about 2 P.M. to find grub, stores, find cabin. Used by Silas & Moses as trapping cabin. Dick Mitchell built it and cut hay for travelers on old telegraph trail.

Was married to Andrew's present wife. She wanted to eat & live "old way" old food habits -- with her mother. Moses could not do it. Could not stand her mother around. Divorced friends. He & Silas got white ideas from living around Dick Mitchell. He thinks other men do not care about living with wife's mother, but that's what ended (that friend of Andrew's marriage) only it was <u>his</u> mother.

Thursday, June 8.

Began digging at 6 A.M. Found lots of jasper fragments -- but not many like flakes. One may be a crude blade. Buried bone charcoal, many large stones -- nothing else.

Hill apparently made of loose rocks among which occurs naturally the jasper. Buried refuse all over from 2 to 6 inches deep.

Probably a lookout and a caribou smoking camp. May have worked the jasper -- not sure. Poss. like College site but if so why no buried bones at College site. There is a lake to land a plane on at the foot of this hill.

After 4 test pits decide to move on to Ketchumstock. Leave at 10 A.M. Some rain.

5 miles or less to Ketchumstock -- over hill and across grassy plain again -- same caribou.

Stay at Silas' & Moses' trapping cabin. Moses talked of marriage & family life, conflict of old & new ways. Women want to live with mother -- cook old way. Moses & Silas influenced by Old Dick at Dick's Ranch will not live that way. Moses divorced because of this conflict. Not now married.

Saturday, June 10.

Off in rain for Chicken. Ice on swamp. Sick headache. Down Mosquito Fork following steep bank at edge of valley. Made 12 miles between 4 A.M. and 12 M. Forded Gold Creek.

reached mail cabin 18 miles from Ketchumstock at 3:30 P.M. Worst day yet. To bed at 5:30 P.M.

Sunday, June 11.

Walked 12 miles to Chicken arriving about noon. Rain.

Dick Hawley of Pollach landed about 1:30 -- then off to Steel Creek and back to pick us up at 3:30. Flew back to Tanacross with Moses -- his first flight.

Arrived Fairbanks about 5:30 after refueling at Big Delta.

Tuesday, June 20.

Laying over in Big Delta waiting for spring.

Spring arrived in P.M. replace with help of Hanson. Drove on to Paxton roadhouse.

Wednesday, June 21.

Drove on to Tonsina after stop at Gulkana. Decide not to go up Nabesna Road to look at "Battle Mound" at Lost Lake near Botzulnelas (?).

Site at Tonsina reported by Pete Maas in a recent camp (houses still standing) built by Indians from Tonsina Lake many miles above. None there now. Roadhouse man (Woody) says the Indians tell him that Tonsina Lake is their old permanent house.

Thursday, June 22.

Drove back up the Chitna Road after stop (yesterday!)
at Copper Center. Old John MacCrary showed us an old
fish camp site on right limit of Copper R. where an
old spruce was growing when he arrived 30 yrs.
(Rainey 1939:1-6)

Heritage Resource Survey (Tanana)

Despite the small number of historic sites in this region, those present indicate a high degree of use of waterbodies within the Tanana River Basin region.

The four prehistoric sites are all near major waterbodies and their artifacts indicate a technology associated with riverine use. The most significant site is probably the Gerstle Quarry site. This site, found near Gerstle River, has been found to have a high incidence of multi-components, many thought to be subsistence tools associated with fishing.

The other three sites are historic roadhouses and remains of an old mining camp. All lie within known areas of river usage. The Gardiner Creek Camp was located just 1500 feet from Gardiner Creek, which indicates that the creek was probably used for many mining-related tasks.

HERITAGE RESOURCE INVENTORY

Name of Site:	Gardiner Creek Camp
Location:	T 12 N, R 21 E, Section 3 (Fairbanks Meridian) Latitude: N 62 51' 15" Longitude: W 141 27' 40" Map Series: Nabesna
Description:	Located 1500 feet NW of Gariner Creek. Remains consist of foundations, water well casing, and wood stove pipe.
Significance:	Limited due to nearly complete lack of structural integrity of camp, but good records are in the Alaska Dept. of Highways archives.
Source(s):	(McKay 1979) (AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Forty Mile Roadhouse

Location:

Latitude: N 63 19'
Longitude: W 142 36'
Map Series: Mt. Hayes

Description: At Tetlin Junction, 12 miles east of Tok.

Significance: Within a major transportation route(s).

Source(s): (Smith 1974:67)

HERITAGE RESOURCE INVENTORY

Name of Site: Salchaket Village Site

Location: T. 5 W., R. 4 E., Section 21 (Fairbanks Meridian)
Latitude: N 64 28' 25"
Longitude: W 146 58' 35"
Map Series: Big Delta

Description: A post-contact village site with at least three houses and other associated buildings. The buildings remain in various stages of ruin.

Significance: This site is the only contact period site to the Salcha River Indians with historic import.

Source(s): (Andrews 1976)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Gerstle River Quarry Site

Location:

Latitude: N 63 49' 10"
Longitude: W 144 53' 10"
Map Series: Mt. Hayes

Description: From granite knobs overlooking the Gerstle River floodplain, the site has two culture layers dated at 2170 B.C. and the lower undated but contains microblades.

Significance: The site is a stratified multi-component site.

Source(s): (Rabich and Reger 1978)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site:	Mead Site
Location:	T 7 S, R 8 E, Section 35 (Fairbanks Meridian) Latitude: N 64 16' 17" Longitude: W 146 6' 49" Map Series: Big Delta
Description:	A site with house with a large amount of prehistoric material; flint flakes present in the basement and in the gardens.
Significance:	Although there are other sites in this area, the Mead site is the only one that is at least partially untouched; important in view of the virtually unknown prehistory of the Middle Tanana Valley.
Source(s):	(Yarborough 1975) (AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Cosgrove I

Location: T 10 S, R 12 E, Section 8 (Fairbanks Meridian)
Latitude: N 64 3' 24"
Longitude: W 145 26' 21"
Map Series: Big Delta

Description: A site nearby an unrelated cabin, containing a burned and calcined bone and some charcoal. At this time undisturbed as covered by tall grass.

Significance: In light of the virtually unknown prehistory of the Middle Tanana valley, this site is important in its place in the prehistory of the Clearwater area.

Source(s): (Yarborough 1975)
(AHRS)

HERITAGE RESOURCE INVENTORY

Name of Site: Dickson Site

Location: T 10 S, R 12 E, Section 7 (Fairbanks Meridian)
Latitude: N 64 3' 42"
Longitude: W 145 28' 20"
Map Series: Big Delta

Description: This site has been heavily disturbed due to construction of a house and well. Fluted and side-notched point discovered.

Significance: Although disturbed, the site area is important for the fine artifact which was turned up, which may further aid in determining the temporal status of the site.

Source(s): (Yarborough 1975)
(AHRS)

Contemporary Waterbody Use 1950-1981

The Tanana River Basin region does not enjoy a well-documented history as far as transportation is concerned. Thus, after the brief venture into this region by engineers of the WAMCATS line, little was written about the area until well after statehood.

An interesting article by Harold Harborth illustrates the use of the Nabesna River and its physiography:

> During our tour of duty in Alaska, Lt. Fred Dexter and I took to the bush every chance we had in search of a big bear. It was in early March that we decided there was only one way to get him, and that was to pack into some area where few other people hunted. The area we chose was the headwaters of the Nabesna River on the north slope of the Wrangell Mtns.

and:

> We had three main channels to ford, and numerous smaller ones. The three big channels in the river were pretty rough, as there was some ice floating downstream and the water came just about halfway between our knees and hips. It was so swift that the current just about washed our feet out from under us.... When we got to the river it was easy to see that it had risen from the still-falling rain. We made several of the channels without trouble, then hit the bad one. About halfway across, the water was up to our hip pockets. Then we hit a piece of ice on the bottom of the river. I went down on one knee, but managed to stand up again after I had slipped the skin of the bear off my shoulder. I still had hold of the skin by one hand, but I couldn't bring it up onto the bank with me because the water made it too heavy. (Harborth 1955:22,23,30)

From a draft of a speech given to some unknown parties comes a good description of the importance of the Salcha River and its resources:

> Present use includes fishing, camping, hunting, recreational boating, but by far most of all in terms of manhours, by families who have built and maintained cabin sites along the river for recreational use. These family sites exist from some 2-3 miles below the pipeline crossing to the extreme upper reaches of the river. Some stretches of the river have a modest concentration of such sites. All are accessible only by water during the summer months or snow vehicles and cross-country skis during the winter months. People have invested considerable time and emotion in their development of this river and its land.

and:

> Regardless of the ambiguity of the real and intended intent of this hearing, one is forced to make a choice. The Salcha access route, as either a temporary or permanent road, is totally unacceptable. The additional use created by any road would be intolerable to continued recreation use as it exists and the river would become just another beer-can-filled frequently-urinated-in Alaskan stream with no aesthetic value or recreational potential; limited principally to G.I.'s shooting at beer cans with their .44's and seeing if their husky dogs will fetch a stick. (Anonymous n.d.)

Echoing the latter's feelings about use of the Salcha and associated rivers, a memorandum from the Alaska Department of Fish and Game addresses the impact of pipeline use of a river on salmon populations. "Our major concerns in regard to salmon resources involve the following areas: Tanana River, including the Delta River in the vicinity of Big Delta, Salcha River drainage, and South Fork Koyukuk River. Studies indicate that approximately 20,000 fall chum salmon spawn within a five-mile radius of the proposed pipeline crossing of the main Tanana River. The importance of the Salcha River in read to the spawning and rearing of salmon...has been extensively documented.... The buried pipeline crossing of the main river will intersect a known King Salmon spawning area" (Regnart 1974:1-3). The memorandum ends with a statement about population impacts on salmon in the Tanana River drainage: "Due to the impact of a large human population, we are considering closing the lower Delta River and portions of the main Tanana River to both sport and subsistence fishing" (Regnart 1974:3).

It is evident that such action would have effectively cut-off an often-used resource by populations who live near and around the Tanana and Salcha Rivers. Though this use of the rivers is not well-documented, it is certain that people travel down these rivers for many purposes, primarily for subsistence fishing.

It seems that the most activity involving use of waterbodies in this region is by Fish & Game employees, which makes sense, as they are charged with managing a known and well-used salmon resource area. From a monthly activity report:

> Most of the month of August was spent on the Salcha River. Upon looking at the King fry index of abundance, it appears that catches are going down in all locations, with the possible exception of the mouth of Redmond Creek. Adult chum and king salmon were sampled for age, length, and sex information. Two aerial surveys were conducted during the peak of spawner activity. (Dinneford 1977:1)

In an article titled "Grayling on the Calendar", Edwin Buckingham recounts his use of the Salcha River:

> Come the summer 1965, when the ice goes out of the Yukon River.... We'll be fishing the Richardson Clearwater and the Salcha, two of the most beautiful grayling streams in interior Alaska.... The boys have never had the thrill of a grayling's sudden and dainty snap at a drifting Black Gnat, but I know they'll love it. Their fathers loved it.... Their dads loved these two remote Alaskan streams. Both had planned for the day when they could take their kids to this sylvan spot.

and:

> The yacht was a somewhat battered twenty-two-foot aluminum trade boat in which we all owned an interest along with a five-year-old Evinrude twenty-five that had also seen better days.... I think we'll head up the Salcha first, to that wonderful grayling hole where we all had such a memorable trip that fall just before the grim reaper that joined our club. It was our last trip together, and I think the boys will love it as much as their fathers did. (Buckingham 1959:30-31)

Personal Communication Regarding Waterbody Use

Narly all the interview information and correspondence I received regarding this region dealt with recreational use of the rivers and streams in the Tanana River Basin region. Of 15 responses, only 2 are concerned with guiding, and the rest are about hunting, fishing, and river-running trips.

Lynn Castle, president of the Alaska Professional Hunters Association, write that "The Gerstle and Johnson Rivers in particular in the Tanana region are used extensively, however, the Tanana flats area, and the lowlying areas of most of the other rivers mentioned are not nearly so used as the upper reaches of the rivers in question" (Castle: p.c.). A man from North Pole wrote saying, "I have used the Salcha River for over 20 years. For hunting, fishing, guiding, boating, and for recreation. I have not used a floatplane on the river but have landed on wheels at several sandbars along the rivers course" (Howard: p.c.). William Waugaman, of Fairbanks, related to me his activities in this area: "Been using these rivers [Chatanika, Chena, Salcha, Little Salcha, Tanana] for hunting and fishing trips for the past 41 years" (Waugaman: p.c.). An informative anonymous letter stated, "I have used the indicated drainages [Tanana, Gerstle, Johnson] for floatplane landings, recreational use and subsistence as have many of my friends and acquaintances" (Anonymous: p.c.). I talked with one man who said, "I use the Gerstle River for hunting, and I use the Johnson River for hunting and fishing" (Elliott: p.c.). William Clinton, of douglas, offered the most extensive survey of use of rivers in this region:

> I have floated on the Tanana River along the Alaska Highway for over ten years (1965-1975); in the summer months. Always used a rubber raft [designed for three men] and never had any problems with navigation. A very navigable river in my experience [Tanana]. There are many good put-in places along the river, I had some semi-permanent camps [seasonal] set-up at some of them. I know of 4 people who have landed planes on the Tanana River near Tok with good success.... I've fished on the Johnson River once and that was in 1968. I've used the Gerstle River for hunting and recreation (1967-1974). Used mostly canoes and fiberglass kayaks. In summer 1974 I saw lots of people on the river, close to May and June; mostly in canoes. I always used the river in early and mid-summer. I consider the Gerstle to be navigable and never had any problem with navigation. (Clinton: p.c.)

A professional photographer from West Virginia gave me excellent information in a surprise interview when I was in Juneau at the Alaska Historical Library:

> In 1978 I came to Alaska in order to photograph wildlife and people. I stayed in Tanacross and from there proceeded to traverse the entire area within 30 miles [square] during the summer of 1978. I walked most of the way, but often I also used a canoe; this was loaned to me by a good friend. In my travels, I floated the following streams and rivers: gerstle, Redmond Creek, Yerrick Creek, Johnson, Tanana, and Scottie Creek. (Condon: p.c.)

From a letter from an ex-resident of Alaska came this answer: "The Tanana is navigable. I rafted down the river many times and have done fishing and hunting in this area for many years [12]. I have also fished the Gerstle River by boat" (Feloner: p.c.). Cary McVee, an avid sport fisherman has "used the Johnson and Gerstle Rivers extensively over the last ten years for sport fishing. I have fished those rivers using a river boat with a 15 horse power outboard. I've seen a float-plane land on the Johnson River as well" (McVee: p.c.). Lastly, a letter from a Fairbanks man tells, "I was in Alaska in 1954 just before going out-of-state for awhile and I fished Gardiner, Scottie, and Desper Creeks. I floated all of them with a very small two-man rubber raft. All the creeks were easy to navigate and I had a great time" (Wallace: p.c.).

Conclusion

In a report of this scope it is always hard to arrive at a conclusion that represents the work put into it. However, due to the unique nature of this study, a conclusion is more easily arrived at than with other studies.

There were a number of inherent problems in attempting to write an ethnohistory of all the waterbodies paralleling the proposed natural gas pipeline route. The most obvious is that over 30% of the rivers and streams were either unnamed or were previously unnamed and then given names by pipeline workers or USGS personnel. It is hard to write a good history of a waterbody if there is no ecord of it in sources that are consulted. Secondly, the total number of waterbodies studied was 260. By any account that is a large number, and this was made more than clear to me as I began my study at the beginning of the year. At first, trying to address each waterbody, I came to realize that it could not be done, so in a way this is a regional study, but focused on a corridor with finite limits.

In order to better facilitate my study efforts, I spent a week at the Alaska Historical Library in Juneau. My trip there was well worth the time as I was able to research a number of journals and old magazines with articles about river travel in interior Alaska. The most important sources were probably the newspapers I consulted. Later in the study I went to Fairbanks for two weeks and spent some very productive time at the archives at the University of Alaska. The material I gathered there was invaluable, and much of that material is contained in this report.

In looking at the progresses and fall-backs of this study, I had the most difficult time in trying to gather and write material about the Arctic Slope region. Hopefully, this section can be added to as time goes on. Of course, the Yukon Basin region presented no problems as we know that area was used extensively by prospectors and missionaries in the late nineteenth and early twentieth century. The Tanana River Basin region presented less research material than the Yukon but was more productive in its final form than research for the Arctic region. Thus, this study presents varying degrees of presence of waterbody use.

I expect the evidence to stand on its own. Being that I cannot determine navigability, the facts in the study represent the extent and limitations of navigability as presented to me during the research and writing of this study.

APPENDIX 1

Mineral Resources of the Proposed Route

The proposed pipeline will parallel the Trans-Alaska Pipeline Corridor for about 550 miles until Delta Junction where it will follow the Alaska Highway to the Alaska-Canada border. The pipeline corridor crosses five mineral belts having potential economic value: (1) the north slope of the Brooks Range (oil, gas, oil shale, coal, phosphate); (2) the south slope of the Brooks Range (copper, gold); (3) the Livengood area (gold); (4) the Fairbanks area (gold, lead-silver, antimony); and (5) the Tok Area (gold, lead-silver).

the proposed pipeline crosses no producing lode mines and no metallic lode deposits of national economic importance, either known or inferred. The route crosses or follows many gold placer streams (factual use of waterbodies) but measured placer deposits in these streams are of slight economic value. A possible exception may be one or two deeply buried gold placers in the southeast part of the Livengood area and in the Fairbanks area.

Mineral Resources Zones

Te pipeline route crosses five distinct mineralized zones that have had, or may in the future have, economic significance.

From the start in the Beechy Point Quadrangle through the Sagavanirktok Quadrangle to the middle of the Philip Smith Mountains Quadrangle the route crosses the north coastal plain and the north slope of the Brooks Range. This forms a sedimentary mineral province characterized by oil, gas, oil shale, coal, and phosphate deposits. The southern limit of oil leasing interest occurs in the Philip Smith Mountain Quadrangle.

The second zone is on the south slope of the Brooks Range and roughly includes all of the Wiseman and Chandalar Quadrangles and the northern quarter of the Bettles Quadrangle. This zone is characterized by copper and gold deposits with some lead-silver and antimony. Coal deposits are known but are scarce. The westward extension of this zone includes the Kobuk copper deposits.

The third zone is on an east-west trending belt of gold placer deposits up to 15 miles wide that crosses the center of the Livengood Quadrangle. the placer gold is derived from quartz veins associated with antimony and lead-silver deposits. Cassiterite is a common accessory mineral in the placers to 30 miles west of the pipeline.

the fourth zone is the well-known gold placer and lode zone in the northwest quarter of the Fairbanks Quadrangle and extending into all the adjacent quadrangles. This zone has been a major placer gold producer and the scene of persistent small scale lode gold and lead silver mining. The gold placers include traces of cassiterite and scheelite. the placer gold is derived from quartz vein deposits associated with antimony and lead-silver deposits.

The fifth zone, the Tok area, is crossed by the Tanacross Quadrangle and extends into the Nabesna Quadrangle. This zone is characterized by copper-bearing greenstones and associated copper deposits that have not been well-developed.

The following tables from a Bureau of Mines report illustrates the scope of mineral availability along the proposed gas pipeline routes, and indicates past activity and the possibility for mineral resource development along the route. As much of the mineral activity is connected with gold mining, it is evident that a use of waterbodies within the quadrangles was required to some extent, and the susceptibility to use is implied.

ARCTIC SLOPE REGION

QUADRANGLE: Beechey Point

GEOLOGY: Marine and nonmarine sediments overlain by alluvium and beach deposits.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $2,500,400

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	Most of the land area has proven hydrocarbon production or are areas of high potential.
Coal	No surface exposures known; may occur in areas of oil and gas potential.
Minerals	None.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	The potential for developing additional oil and gas deposits is high.
Coal	Unknown; little exploration to date.
Minerals	None.

(Bottge 1974:28).

QUADRANGLE: Umiat

GEOLOGY: Predominantly marine and nonmarine sandstone and shales; overlain by alluvium, beach and terrace deposits in the northern portions.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	Northern hald has proven production or has high potential; southern half has good potential based on oil seeps or other indications.
Coal	Most of the western two-thirds are underlain by subbituminous coals.
Minerals	None.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	The potential for developing additional oil and gas potential is high.
Coal	The potential for developing the approximately 11,000 million tons of subbituminous coal within the corridor is considered low.
Minerals	None.

(Bottge 1974:161).

QUADRANGLE: Sagavanirktok

GEOLOGY: Predominantly sandstone, graywacke and shales changing to nonmarine rocks towards the north. North half covered by beach and terrace deposits and alluvium. Southeastern quarter consists of limestones and other marine deposits.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	Northwestern quarter has proven production or high potential; remaining areas have good potential based on oil seeps or other indications.
Coal	Subbituminous coals and lignitic coals occur in scattered outcrops over the northern half.
Minerals	Southeastern quarter has low to good potential for gold, lead, copper, zinc. tin, tungsten and flourite deposits.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	The potential is high for development of hydrocarbons, particularly natural gas.
Coal	The potential for developing a large coal deposit is low.
Minerals	The development of small to medium-size copper, lead and zinc deposits in the limestones is considered low.

QUADRANGLE: Sagavanirktok

GEOLOGY: Predominantly sandstone, graywacke and shales changing to nonmarine rocks towards the north. North half covered by beach and terrace deposits and alluvium. Southeastern quarter consists of limestones and other marine deposits.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	Northwestern quarter has proven production or high potential; remaining areas have good potential based on oil seeps or other indications.
Coal	Subbituminous coals and lignitic coals occur in scattered outcrops over the northern half.
Minerals	Southeastern quarter has low to good potential for gold, lead, copper, zinc. tin, tungsten and flourite deposits.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	The potential is high for development of hydrocarbons, particularly natural gas.
Coal	The potential for developing a large coal deposit is low.
Minerals	The development of small to medium-size copper, lead and zinc deposits in the limestones is considered low.

(Bottge 1974:123).

QUADRANGLE: Philip Smith Mountains

GEOLOGY: Predominantly sedimentary rock -- sandstones, shales, limestones and dolomites. An area of metamorphic rock occurs in the southeast corner.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The northwestern quarter is geologically favorable. Surface indications occur in some areas.
Coal	Subbituminous coal occurs along the western border.
Minerals	The northwestern third has low potential. Most of the remaining area has good potential for gold, lead, copper, zinc and tin. The southeastern corner has high potential for copper, lead and zinc.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	The northwestern corner of the quadrangle has good potential for development.
Coal	The potential for development is considered low.
Minerals	The potential for medium-size copper, lead and zinc vein-type deposits in the limestones is high.

(Bottge 1974:120).

QUADRANGLE: Chandalar Lake

GEOLOGY: Marine and nonmarine shales and sandstones with minor areas of limestones and volcanics.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	NOrthern third has good potential based on oil seeps or other indications; the middle third is geologically facorable but no surface indications have been found.
Coal	The northern third is underlain by bituminous and subbituminous coals.
Phosphate	Deposits occur in central and west central area.
Minerals	The southern third ranges from less favorable to favorable for the occurrence of gold, lead, copper, zinc and tin.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	An estimated 7.4 billion tons of coal reserves exist within the corridor. The prospects for its development are considered low.
Minerals	The potential for developing the medium-size, low-grade phosphate deposits is considered low.

(Bottge 1974:28).

QUADRANGLE: **Chandalar**

GEOLOGY: Predominantly limestones and other clastic rocks in the northern quarter. The middle half predominates in metamorphic rocks intruded in the central area by grantic intrusives. The southern quarter has sedimentary rocks metamorphosed in places by granitic intrusives and extrusives.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $985,200 -- placer gold, lode gold, placer silver, lode silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The southwestern corner is part of the Kobuk Cretaceous Province and may have potential.
Coal	No surface exposures known; may occur in the Kobuk Cretaceous Province.
Minerals	The western three quarters have high potential for gold, antimony and tungsten. A belt of copper, lead and zinc occurs in the northern quarter. The eastern quarter has good potential for gold, lead, copper, zinc and tin. Placer gold has been produced from the west central area.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown; little exploration to date.
Minerals	The potential for continued development of small and medium-size placer gold deposits is high. A high probability exists for the development of medium-size, high-grade copper, lead and zinc deposits associated with the metamorphic rocks. These deposits could be similar to the deposit staked by Kennicott at Arctic Camp. A good probability exists for the development of small but high-grade copper, lead and zinc deposits where the limestones have been intruded by granites. The Little Squaw gold mine is currently operating within 12 miles of segment "M" in metamorphic rocks.

(Bottge 1974:45).

QUADRANGLE: Wiseman

GEOLOGY: Predominantly limestones and marine clastic rocks in the northern half, metamorphic rocks in the next southern quarter, and sandstones and shales in the southern quarter.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $7,958,600 -- placer gold, placer silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The Kobuk Cretaceous Province embraces the southern quarter, oil and gas may possibly occur.
Coal	An outcrop of bituminous coal occurs in the southeast.
Minerals	The northern quarter has good potential for gold, lead, zinc and tin. Most of the remaining areas have high potential for gold, antimony and tungsten. A belt favorable for copper, lead and zinc trends through the middle of the quadrangle from southwest to northeast. Much of the central area has been an important placer gold producing area.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown; little exploration to date.
Minerals	The continued development of small, medium and large placer gold deposits is high. The development of high-grade, low-tonnage copper, lead and zinc vein-type deposits is rated good where limestone is intruded by granites. The development of large-size, low-grade copper, lead and zinc deposits and gold deposits associated with the metamorphic rocks is rated fair.

(Bottge 1974:167).

QUADRANGLE: Beaver

GEOLOGY: The northwestern half is underlain by metamorphic rocks with scattered granitic intrusions. The southeastern half has alluvium and glaciofluvial deposits overlaying sedimentary rocks.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: None.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The southeastern half is within the Yukon Flats Basin where oil and gas may occur. The southeastern quarter is geologically favorable for oil and gas but no surface indications are present.
Coal	Small scattered outcrops occur along the east central border.
Minerals	Most of the northwestern half has a high potential for gold, antimony and tungsten. An area in east central portion has good potential for placer gold.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown; little exploration to date.
Minerals	Unknown; little exploration to date.

(Bottge 1974:).

YUKON BASIN REGION

QUADRANGLE: Livengood

GEOLOGY: Predominantly limestones and shales intruded by small ultramafic and granitic intrusives. Southeastern third is predominantly metamorphic rocks.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $44,315,600 -- placer gold, lode gold, placer silver, tungsten, lode silver, lead, copper.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The Yukon Flats Basin touches the area on the north and the Middle Tanana BAsin touches the area on the south so oil and gas may have potential in these areas.
Coal	Subbituminous coal occurs along the western border.
Minerals	Most of the area has good potential for antimony, gold, silver, lead, zinc and mercury. Major past gold placer production has occurred in the central and western section.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown; little exploration to date.
Minerals	A high potential exists for small gold mines in the metamorphic rocks, and for small, medium and large-size gold placer operations nearby in permafrost zones. The limestones and shales have good potential for medium-sized lead and zinc deposits where they are associated with granitic intrusives. The potential for small copper and antimony deposits in metamorphic rocks is fair.

(Bottge 1974:99).

QUADRANGLE: Fairbanks

GEOLOGY: The northern half consists predominantly of metamorphic rocks partially obscured by stream alluvium. The southern half of the area consists of mostly sedimentary rocks partially overlain by alluvium. The southern border lies within a metamorphic rock zone.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $170,653,400 -- placer gold, placer silver, lode gold, tungsten, lode silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	Much of the area lies within the Middle Tanana Basin and may have oil and gas potential.
Coal	Subbituminous coal occurs in several areas in the southern quarter of the area.
Minerals	The northeastern quarter has good potential for antimony, gold, silver, lead, zinc and mercury. The southern half has good potential for uranium. In addition, the southern quarter has high potential for copper, gold, lead and zinc. The northeastern quarter has been an important placer gold producer.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	No known production potential established to date.
Coal	No known production potential.
Minerals	The potential for small, medium and large placer gold deposits is high. The potential for small and medium-size gold deposits in the metamorphic rocks is good as is the potential for small gold-antimony deposits. Small massive sulfide deposits containing gold, silver and copper deposits in metamorphic rocks have good potential for occurring.

(Bottge 1974:70).

TANANA RIVER BASIN REGION

QUADRANGLE: Big Delta

GEOLOGY: Predominantly metamorphic rocks with granitic and mafic to ultramafic intrusives partially covered with glacial and glaciofluvial deposits in the southwestern corner.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $4,429,400 -- placer gold, placer silver, lode gold, lode silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The Middle Tanana Basin occurs in the southwestern quarter so oil and gas have potential there.
Coal	No known surface occurrences; may occur in the Middle Tanana Basin.
Minerals	The northern three quarters have good potential for antimony, gold, silver, lead, zinc and mercury. The southwestern quarter has good potential for uranium. Ultramafic rocks may hold asbestos, nickel and platinum.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown, little exploration to date.
Minerals	The potential for small and medium-size placer gold deposits is high in permafrost zones. Small gold-silver deposits in the metamorphic rocks associationed with intrusives have good potential. The potential for medium-size asbestos and copper-nickel deposits in the metamorphic rocks is fair.

(Bottge 1974:36).

QUADRANGLE:	Mt. Hayes
GEOLOGY:	The northeastern half consists mostly of metamorphic rocks cut by intrusives. The southwestern half has both volcanic and sedimentary rocks. Ultramafic rocks are found near the Denali Fault.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $3,260,000 -- placer gold, placer silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The Middle Tanana Basin includes part of the northeastern quarter, so that may have some potential.
Coal	Several areas of subbituminous coal occur in the northwestern quarter.
Minerals	The southwestern half had high potential for copper and molybdenum. A good potential for uranium exists in the northwestern corner. Placer gold has been produced in the southeastern corner.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	The potential for developing the estimated 76.5 million tons of coal reserves is rated good.
Minerals	The development of small and medium-size placer gold deposits is high. The potential for small copper-nickel vein deposits or small disseminated copper-nickel deposits occurring in the ultra-basic rocks is fair.

(Bottge 1974:105).

QUADRANGLE: Tanacross

GEOLOGY: The northeastern half and southwestern quarter are predominantly metamorphic and volcanic rocks with granitic and small ultramafic intrusives. The remaining area is overlain by alluvium and terrace deposits.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $900 -- placer gold, placer silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The Upper Tanana Basin extends into the southcentral part of the area, hence oil and gas may have some potential.
Coal	No known surface occurrences; may occur in the Upper Tanana Basin.
Minerals	The northeastern quarter has good potential for copper.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown; little exploration to date.
Minerals	The potential for several large, low-grade copper-molybdenum deposits is high.

(Bottge 1974:152).

QUADRANGLE:	Nabesna
GEOLOGY:	Much of the northeastern area is covered by alluvium. The remaining area consists of sedimentary and volcanic rocks with granitic intrusives. Ultramafic rocks occur parallel to the Denali Fault which cuts the quadrangle from northwest to southeast.

MINERALS PRODUCED IN ORDER OF THEIR VALUE, 1880-1971: $3,140,500 -- lode gold, placer gold, lode silver, copper, lead, placer silver.

MINERAL POTENTIAL WITH THE QUADRANGLE:

Oil and gas	The northeastern quarter is within the Upper Tanana Basin and may have potential for oil and gas.
Coal	No known surface occurrences; may occur in the Upper Tanana Basin.
Minerals	A band through the central part of the quadrangle from northwest to southeast has high potential for copper and molybdenum. Placer gold has been produced in the south and central areas.

POTENTIAL FOR DEVELOPMENT WITHIN 50 MILES OF A CORRIDOR FROM 1975-2001:

Oil and gas	Unknown; little exploration to date.
Coal	Unknown, little explration to date.
Minerals	The potential for the development of small and large placer deposits is high. The potential for large, low-grade copper-molybdenum deposits is good.

(Bottge 1974:114).

APPENDIX 2

List of Respondents to Questionnaires/Interviews

Munz Northern Airlines, Inc.
Dick Gallacher
Box 790
Nome, Alaska 99762

Central Airways, Inc.
David Goocey
1842 Merrill Field Drive
Anchorage, Alaska 99501

Harmon R. Helmricks
Walker Le-Colville Village
Via 930 9th Avenue
Fairbanks, Alaska 99701

Alaska Professional Hunters Association, Inc.
Lynn Castle, President
P. O. Box 36
Tanana, Alaska 99777

Tatdonduk Flying Service
Mark J. Lynch
Box #55
Eagle, Alaska 99738

John Elmore
Box 1045
Nome, Alaska 99762

Jack L. Howard
Box 55263
North Pole, Alaska 99705

William L. Waugaman
Box 80589
Fairbanks, Alaska 99701

Gates of the Arctic Outfitters
Dan L. Wetzel
P. O. Box 10224
Fairbanks, Alaska 99701

Charles Gray
311 Slater Street
Fairbanks, Alaska 99701

Wright Alaskan Adventures
Alfred F. Wright
Box 60531
Fairbanks, Alaska 99701

Richard Reakaoff
General Delivery
Wiseman, Alaska 99726

Alaska Range Hunts
Robert Elliot
5920 Airport Way
Fairbanks, Alaska 99701

Robert J. Tarnowski
P. O. Box 6006
Fairbanks, Alaska 99706

William R. Clinton
General Delivery
Douglas, Alaska 99824

John W. Hammond
General Delivery
Douglas, Alaska 99824

Delbert Covery, Jr.
General Delivery
Gustavus, Alaska 99824

Conrad D. Feloner
RR #4
Box 33489
Ferris, North Carolina 28774

William B. Salvea
Pouch M
Juneau, Alaska 99801

Odin Williams Conners
P. O. Box 445-78
Fairbanks, Alaska 99706

Allen Condon
P. O. Box 4567
Raleigh, West Virginia 98236

Brooks Range Arctic Hunts
Eugene M. Witt
Mile 329, Parks Highway
Rt. #1
Nenana, Alaska 99760

Hale McVee
Mile 280, Parks Highway
Rt. #1
Nenana, Alaska 99760

Richard Wallace
P. O. Box 2344-N
Harris, Ohio 43974

Harlan D. Carter
General Delivery
Galena, Alaska 99741

APPENDIX 3

Dear Sir:

The State of Alaska is conducting research on the use of waterbodies along the route of Northwest Alaskan Pipeline Company's natural proposed gas pipeline. Travel, subsistence, hunting, fishing, guiding, and other activities on the rivers, lakes, and streams are being documented, both from written and oral interviews.

I am currently gathering materials documenting the use of waterbodies along the proposed route. As you are a registered guide, I am seeking information regarding your use of waterbodies along the proposed route.* Specifically floatplane landings, guiding activities, personal experience on waterbodies, and knowledge of recent or past activities on those major waterbodies.

To assist you, I am including a listing of major waterbodies and drainages along the proposed route according to region. If you can take the time to jot down on the enclosed sheet your activities on those waterbodies (as indicated above) I would appreciate it. There is no rush for this information, however, I would like your answers within a month.

Thank you for your cooperation in this research effort.

Sincerely,

Dale A. Stirling
Historian

*The wording was slightly different in some letters, as I sent letters to air carriers, miners, and guides.

APPENDIX 3A

MAJOR WATERBODIES ALONG NAPLINES ROUTE

(INCLUDING SEGMENT FOLLOWING ALASKA HIGHWAY)

ARCTIC	Putuligayuk River
	Sagavanirktok River
	Toolik River
	Atigun River
	Galbraith Lake
	Chandalar River
	Dietrich River
	Middlefork Koyukuk River
	Hammond River
	Jim River
	Kanuti River
	Ray River
YUKON	Yukon River
	Tolovana River
	Tatalina River
	Chatanika River
	Chena River
	Salcha River
	Little Salcha River
TANANA	Tanana River
	Gerstle River
	Johnson River

APPENDIX 4

International Whitewater Scale

Class.I	Moving water with a few riffles and small waves. Few or no obstructions.
Class II.	Easy rapids with waves up to three feet, and wide clear channels that are obvious without scouting. Some maneuvering is required.
Class III.	Rapids with high, irregular waves often capable of swamping an open canoe. Narrow passages that often require complex maneuvering. May require scouting from shore.
Class IV.	Long, difficult rapids with constricted passages that often require precise maneuvering in very turbulent waters. Scouting from shore is often necessary and conditions make rescue difficult. Generally not possible for open canoes. Boaters in covered canoes and kayaks should be able to Eskimo roll.
Class V.	Extremely difficult, long, and very violent rapids with highly congested routes which nearly always must be scouted from shore. Rescue conditions are difficult and there is significant hazard to life in event of a mishap. Ability to Eskimo roll is essential for kayaks and canoes.
Class VI.	Difficulties of Class V carried to the extreme of navigability. Nearly impossible and very dangerous. For teams of experts only, after close study and with all precautions taken.

(Heritage Conservation and Recreation Service 1979:5)

APPENDIX 5

Present Waterbody Name and Historic Variation(s)

Present River/Creek Name	Historic Variation(s)
Sagavanirktok R.	Ivishak R. Sagavaniktuuk R. Sakovanuktok R. Sawanukto R. Shagavanuktok R. Sharavanaktok R. Suvanukto R.
Toolik R.	Tudlik R. Tulik R.
Kuparuk R.	Koopowra R.
Dietrich R.	Dietrick R.
Kanuti R.	Kanutena R. Koínooten R. Konootena R. Kornutena R. Kornuti R. Kornutna R. Koznuten R. Old Man C. Old Man R.
Rosa C.	Rosy C.
Hammon R.	Hammond C.
Rosie C.	Rose C. Rosy C.
Jim R.	Jim C.
Two -Bit C.	Two-Bit Gulch
Hess C.	Hess R. Mike Hess C. Whymper C. Shymper R. Yokuchargut C. Yukochakat C. Yukochakat C. Yukutzcharkat C.
Tolovana R.	Nilkoka R. Tolovania R.

Wilber C.	Wilbur C.
Tatalin R.	Tateline R. Tatalena R.
Washington C.	Benikakat R.
Chatanika R.	Chataneka R. Chatinka R. Tolovana R.
Vault C.	Moose C.
Chena R.	Big Chena R. Chena Slough Chenoa R.
Little Salcha R.	Little Salchakett R.
Shaw C.	Debetendig C.
Tok R.	Takai R. Tokai R. Tokio R.

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