United States Department of the Interior

BUREAU OF LAND MANAGEMENT

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IN REPLY REFER TO

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Roger Contor
National Park Service
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Dear Sir:

We are pleased to submit the attached final regional report on water bodies in the Northwest Region of Alaska. The report is designed to facilitate the BLM's endeavors to make navigability determinations in Alaska; to serve as a source document in reviewing the validity of past navigability determinations in the event that the legal standards of navigability change; to assist the BLM's and the State of Alaska's efforts in developing court test cases on navigability criteria; to inform the public on the information and rationales used by BLM in making navigability determinations; and finally, to make known to the public those water bodies already determined by the BLM to be navigable or nonnavigable.

Those familiar with some of BLM's previous reports may note that the one for the Northwest region follows a less elaborate format. Material such as that included in the Upper Yukon Regional Report and the draft Kuskokwim Regional Report is useful in navigability litigation, as well as for land management programs and controversies stemming from RS 2477. However, the primary reason for the regional reports is prompt and proper conveyance of land to the State and Native corporations. The format of the Northwest Regional Report better serves that purpose.

Many of the water bodies described are located on lands selected by or conveyed to NANA and Bering Straits Native Corporation and various village corporations under the Alaska Native Claims Settlement Act, and the State of Alaska under the Alaska Statehood Act. The BLM has made navigability determinations in this region on a township-by-township basis as the need arose in the land conveyance programs. On October 5, 1984, the BLM issued determinations of navigability for nine water bodies based on a draft of two of the chapters in this final report. The completion of the report permits the BLM to make additional navigability determinations.

In the next thirty days BLM will utilize the data contained in the final report, primarily that in the Appendix, to issue a second navigability memorandum for the Northwest Region. The Appendix summarizes the great majority of the Native allotment, Homesite, Headquarter site, and Trade and Manufacturing site records relevant to potentially navigable water bodies in the region. Examination of other such files and interviews with people knowledgeable about the region may result in a third set of determinations.

Sincerely yours,

Robert W. Arndorfer
Deputy State Director for
Conveyance Management

Enclosure:
Alaska's Northwest Region: A History

Identical letter to:

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ALASKA'S
NORTHWEST REGION:
A History

By

James H. Ducker

Bureau of Land Management
Anchorage, Alaska

1985

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EDITOR'S INTRODUCTION

The U.S. Bureau of Land Management (BLM) is currently transferring title to about 145 million acres of land to the State of Alaska and Alaska Native corporations in compliance with the Alaska Statehood Act of 1958 and the Alaska Native Claims Settlement Act of 1971, respectively. A serious impediment to the conveyance of land title is the unknown acreage and location of nontidal navigable waters in Alaska.

By authority of the Statehood Act of 1958 and the Submerged Lands Act of 1953, the State of Alaska owns the beds of tidal waters and nontidal navigable waters unreserved as of the date of Statehood. Submerged land acreage of navigable waters unreserved as of the date of Statehood may not be charged against the State's entitlement under the Statehood Act. On the other hand, lands underlying nonnavigable waters as well as those submerged lands in a reserved status in 1959, remain in trust for the riparian owner or in the public domain.

During the 1960s, the BLM made determinations of navigability for water bodies on lands to be conveyed to the State. However, after the passage of the Alaska Native Claims Settlement Act and the subsequent promulgation of regulations requiring, among other things, the BLM to make navigability determinations for waterways on lands to be conveyed to the Native corporations and to account for the submerged land acreage, the State quickly asserted its claim to potentially navigable waters on ANCSA-selected lands by two methods. First, the State provided the BLM with its definition of navigable waterways and a set of maps known as Water Delineation Maps illustrating waterways on ANCSA-selected lands that the State considered to be navigable. Second, the State routinely notified Native corporations in the instance of a proposed conveyance that the BLM may be attempting to convey lands underlying navigable waters owned by the State since 1959. Well aware of the differences between the BLM and State definitions of navigability, and the State's position that these differences must one day be resolved by the courts, many corporations excluded in their selection applications most waterways identified by the State as navigable. Consequently, whenever the BLM made a determination of navigability contrary to the State's claim and charged the submerged land acreage to the corporation's land entitlement, the corporation was forced to appeal to the Alaska Native Claims Appeal Board for a ruling on the question whether the submerged lands were in fact Federal lands or State lands in 1959.

In the late 1970s, as the BLM prepared to resume land conveyances to the State and to accelerate conveyances to the Native corporations, the BLM and the State agreed that there was a need for more information about the physical character and history of waterways as routes of travel and transportation. This information would satisfy BLM's need to make timely determinations of navigability; and it would facilitate the BLM's and the State's need to develop test cases of navigability for the courts. Thus, in 1977, the BLM let a major contract to the University of Alaska to research pertinent information from the literature about Alaska waterways. Completing the project in early 1979, the contractor provided BLM with a great deal of valuable information about Alaskan water bodies, information that was and is used to support determinations of navigability in the land conveyance programs. However, the contractor provided insufficient information about many minor waterways, some of them located on lands to be conveyed to the State or the Native corporations. The need for additional documentary research and possibly field investigations was apparent.

In 1979, representatives of the BLM and the State of Alaska met several times to discuss and decide upon methods by which: 1) the BLM could make timely determinations of navigability in connection with the land conveyance programs; 2) the BLM and the State could reach agreement on what waterways were clearly navigable and nonnavigable under BLM and State criteria; and 3) the BLM and the State could identify water bodies that best reflect differences in the BLM's and the State's criteria of navigability for the purpose of litigation. The decisions that were made then are still valid today, although some have been modified as necessary to take into account unexpected developments.

The BLM and the State decided to simultaneously follow a two-pronged approach to the problem by making determinations for nontidal water bodies on a township-by-township basis as well as on a regional or subregional basis. This entailed the formation of three independent but interacting teams: one in the BLM State Office to make navigability recommendations in connection with the State and ANCSA land conveyance programs; the others in the BLM State Office and State Department of Natural Resources to prepare factual reports on waterways in a region or subregion. These highly detailed reports, based upon the best information available, are useful to the BLM in making recommendations for waterways on land to be conveyed to the Native corporations and the State. Once the final draft of the report has the approval of the State and other parties as a technically adequate document, the BLM will have the means to make reliable and consistent determinations for entire waterways. This in turn will give the State the opportunity to identify waterways that best illustrate differences in BLM and State criteria of navigability for development of test cases. As these differences are settled by the courts, the BLM and State criteria will eventually be the same. Whatever decisions are reached by the courts, the BLM will have a source document on which to rely in reviewing the validity of previous determinations in light of the court's decisions.

Alaska's Northwest Region is the third such report to be issued in final form by the BLM. James H. Ducker researched and wrote this history, benefiting considerably from the assistance of other members of the Navigability Section in compiling the Appendix. The report summarizes geographic knowledge about the region and its water bodies; traces the general history of its Native people, exploration, mining, hunting, fishing, and trapping activities, and communities; describes in detail the development of water transportation in the region; chronicles the process by which the BLM reached a determination of navigability for water bodies on lands selected and/or conveyed to the State or Native corporations, and summarizes relevant information contained in hundreds of land records. The BLM has already relied upon some of the information gathered by Dr. Ducker in making navigability determinations for water bodies on land to be conveyed.

C. Michael Brown
Chief, Navigability Section

INTRODUCTION

The Alaska Northwest has answered man's material needs in the context of both subsistence and market economies. Eskimo people took from its seas, streams, lakes, and land everything required to feed their families, build their homes, and clothe themselves against the Arctic cold. In the mid nineteenth century, whalers and traders came to the area to share in its natural wealth of whale and fur. By the turn of the century, gold lured a much larger Western population to the region. Since that time, the Northwest has continued to answer men's basic physical needs and has helped to enhance the lives of the region's residents.

Since 1959, the Alaska Statehood Act, the Alaska Native Claims Settlement Act (ANCSA), and the Alaska National Interest Lands Conservation Act (ANILCA), have dramatically altered the ownership of this land. Under its entitlement included in the Statehood Act, Alaska has selected large tracts of Federal-held land in the DeLong Mountains; the upper Ambler valley; the upper portions of the Kiwalik, Kugruk, and Koyuk drainages, and in the highlands of the western portion of the Seward Peninsula. Native selections are concentrated around the twenty-nine villages in the region. The villages, most of which are on the coast, range from Point Hope in the north to Stebbins and St. Michael in the south. The ANILCA has preserved fourteen million acres in National preserves, parks, and wildlife refuges. Most of the Noatak drainage is in the Noatak National Preserve which encompasses six and one-half million acres. The Kobuk Valley National Park is to its south; the Gates of the Arctic National Park and Preserve, which includes the extreme headwaters of the Noatak and Kobuk is on its eastern border; and the Cape Krusenstern National Monument, divided by thirty miles of Native- and State-selected land, is to the west. The more than two-million-acre Selawik National Refuge, encompassing the majority of the Selawik drainage, abuts the Kobuk Valley National Park. A slightly larger tract comprises the Bering Land Bridge National Preserve in the central and northwestern portions of the Seward Peninsula. Chamisso, St. Lawrence, Besboro, and Stuart islands as well as other coastal areas are in the Alaska Maritime National Wildlife Range. Finally, the Federal government has granted Wild and Scenic River status to portions of the Noatak, Kobuk, Salmon, Selawik, and Unalakleet rivers.

The history of the Northwest region is designed to furnish a body of information, broad enough in scope yet comprehensive enough in detail, to enable the Bureau of Land Management to make determinations of navigability with confidence. It draws on extensive, yet by no means exhaustive, research. The great majority of the relevant publications of the U.S. Geological Survey as well as some of the unpublished records have been examined. The various Nome newspapers of the gold rush era yielded some otherwise unavailable information. Manuscripts at the University of Alaska, Anchorage archives along with copies of many documents in Washington, D.C. and Seattle made by the Arctic Environmental Information and Data Center under contract to BLM, have contributed information to the report. The author has researched a variety of published work: accounts of early explorers, book- and article-length reminiscences, and numerous government reports. State and Native land selection files added valuable information. The Appendix to this report summarizes data culled from hundreds of Native Allotment, Headquarter Site, Homesite, and Trade and Manufacturing site files maintained by BLM.

The drafting of this report has been a collaborative process. The author wishes to thank C. Michael Brown for his uniformly useful suggestions of sources to examine and for his characteristically careful scrutiny of the manuscript. The Appendix was a product of all the members of the Navigability Section. Dot Tideman worked countless hours extracting the pertinent data. Later in the project Catherine Bayer, Sherman F. Berg, and Susan Eaton assisted Tideman. Finally, the word-processing staff in BLM's Alaska State Office once again proved its skill and patience in deciphering the authors' scrawl, correcting punctuation, and producing a finished product under short time constraints.

CHAPTER ONE

THE NORTHWEST ALASKA REGION

Alaska's Northwest Region contains 67,000 square miles, that is roughly twenty-two hundred townships or 42.9 million acres. It comprises over 11 percent of the State. From Cape Lisburne in the north to about a score of miles south of St. Michael, the region faces westward toward the frigid ocean. The Seward Peninsula, which juts westward toward Siberia, divides Kotzebue Sound of the Chukchi Sea from Norton Sound of the Bering Sea. The DeLong Mountains, part of the Brooks Range, cut the region off from the Arctic Slope to the north. On the east a series of mountains and hills up to eight thousand feet high in the north to less than a thousand feet in the south separate the area from the Koyukuk drainage. Farther south the Nulato Hills divide Northwest Alaska from the Yukon and hem it in on both the east and south against Norton Sound.

Excluding St. Lawrence Island and a handful of other islands, the Northwest falls into three subdivisions--the area which drains into Kotzebue Sound north and east of Kotzebue, the Seward Peninsula, and the eastern littoral of Norton Sound. The DeLong Mountains form the northern limit of the first of these subregions. The Kukpuk, Kivalina, Wulik, and most of the northern tributaries of the Noatak River head in the shadow of high, rugged mountains in the central Brooks Range. The 2,500- to 3,000-feet Baird Mountains parallel the DeLong, dividing the Noatak and Kobuk. The Purcell Mountains and the Lockwood, Zane, Selawik, and northernmost Nulato hills encircle the Kobuk and Selawik rivers on the south.

The Noatak, Kobuk, and Selawik rivers, the three main streams of the northernmost subregion, converge toward Hotham Inlet and Selawik Lake after passing through lake-dotted lowlands. These lowlands are separated by the modest-size Igichuk Hills and Waring Mountains. The Noatak has some lowland marshes near the center of its drainage below the Aniuk River. More closely related to those of the Kobuk and Selawik, are the flats surrounding the village of Noatak. The Igichuk Hills cut this mass of thaw lakes off from the river's delta. The Kobuk's delta is far larger, having more than a dozen significant mouths; some of its channels meander for more than forty miles across lowlands as the river leaves behind its last upland area near Kiana. Except for its headwater area, all of the Selawik flows sluggishly through low, thaw-lake-dotted terrain to Selawik Lake. Although termed a lake, Selawik Lake is at sea level.

The Seward Peninsula juts westward from the center of the Northwest region. The Continental Divide runs along its spine to Cape Prince of Wales following a line of mountains rarely exceeding two thousand feet. Large lava beds in its center testify to the peninsula's volcanic past. Relatively short and parallel streams flow north from points along the divide to the sea. Those in the east tumble from uplands across a narrow coastal lowland. However, those on the northwest corner of the peninsula meander across a more extensive lake-dotted flat; most empty into lagoons formed by narrow barrier reefs. The Kuzitrin and Koyuk rivers capture the waters draining the southern flank of the divide. They are the largest rivers on the peninsula and the only ones besides the Fish River on the peninsula's southern half with extensive flats at their mouths. The Kuzitrin and Koyuk also drain the northern sides of the Kigluaik,

Bendeleben, and Darby mountains. Most of the rivers flowing south into Norton Sound have their origins on the south side of these mountains and course through restricted valleys.

The Nulato Hills confine the eastern littoral of Norton Sound to a strip rarely exceeding forty miles in width. North of Beeson Slough (T. 14 S., R. 12 W., Kateel River Meridian) there are lake-dotted coastal flats, particularly near Cape Denbigh and the mouth of Inglutalik River. South of Beeson Slough, the hills approach close to the sea. Despite the confined area of this subregion, the northeast to southwest trend of the Nulato Hills directs its major rivers--the Inglutalik, Ungalik, Shaktoolik, and Unalakleet--on lengthy, angular courses to Norton Sound. 1/

Long, severe winters, cool summers on the coast, moderately warm summers inland, and little precipitation characterize the weather of Northwest Alaska. In the Norton Sound area winter temperatures regularly hit the sub-zero range; summer temperatures rarely exceed the sixties. North of Kotzebue the mercury frequently plummets to the minus-twenty-degree range on long, sunless winter days. Along the coast in this area, summer temperatures normally remain within twenty-five degrees of the freezing mark. Far inland temperatures regularly climb into the sixties and have hit ninety degrees. Precipitation is limited by a number of factors. The Bering and Chukchi seas and the North Pacific provide most of the region's moisture content, but these water bodies are frozen over much of the year. Cold air can hold little moisture. Only in August does a storm track trace a south to north path, bringing relatively warm air into the region. Consequently, the average annual precipitation is less than twenty inches; the driest area is the north side of the Seward Peninsula where the average is less than ten inches. 2/

Vegetation in most of the region is limited to grasses, ferns, and mosses. These predominate in the wet tundra near the major river deltas; in the moist tundra, which lie west of the Noatak, on the north half of the Seward Peninsula, and along a twenty-mile-wide strip between Unalakleet and the Yukon delta; and in the alpine tundra away from stream beds in the DeLong, Baird, Kigluaik, Bendeleben, and Darby mountains and the Nulato Hills. Shrubs find a place in the middle sections of the moderate-sized rivers flowing into Kotzebue Sound, on the middle and upper Noatak and its tributaries, and on the southern side of the Seward Peninsula within thirty to fifty miles of Nome. White spruce and balsam poplar dominate in bottom land forests which border nearly the entire course of the Kobuk, the lower portions of the Noatak, Squirrel, and Koyuk, and the upper Selawik. Black spruce is the primary tree of the lowland forests of the upper and middle Kobuk. Finally, birch with scattered spruce, aspen, and balsam poplar compose the upland forests which are most evident on the well-drained south-facing slopes of the Baird, Waring, Bendeleben, and Darby mountains, and in the Unalakleet drainage. 3/

A variety of animals inhabit the Northwest region. Major large mammals are polar and grizzly bears, moose, caribou, musk ox, Dall sheep, reindeer, wolves, wolverines, and foxes. Polar bears are not common very far south of Point Hope. Grizzlies prowl coastlines in spring and river banks in the summer and fall. Moose range throughout the entire region, but congregate in river valleys in fall and winter. In the fall, a large portion of the arctic caribou herd funnels south through mountain passes from the Arctic Slope and travels through the Noatak drainage to winter in the Kobuk, Selawik, Buckland, and upper Inglutalik basins. The Federal government introduced reindeer onto the Seward Peninsula and the east coast of Norton Sound by the turn of the century. In 1977 more than two-thirds of the reindeer in Alaska were on the Seward Peninsula; herds near Shaktoolik, Unalakleet, and Stebbins accounted for much of the remainder. Musk ox, unable to break through heavy snow to forage, browse on wind-swept tundra near Point

Hope, Wales, and Kwik. Dall sheep inhabit the rugged alpine tundra of the Brooks Range. Wolves, wolverines, and red fox are not particular about their prey and can be found throughout the region. There also are smaller mammals, including lynx, porcupines, hares, ground squirrels, voles, and shrews. Eagle, hawks, gyrfalcons, owls, ptarmigan, ravens, and a variety of smaller birds dominate the air, unfortunately not to any marked detriment to the region's mosquitoes. 4/

The region's freshwater fish include all five varieties of Pacific salmon, Arctic char, grayling, whitefish, northern pike, inconnu, and several other species. King and silver salmon rarely go north of Norton Sound. The red salmon which spawn in the Kelly River, a tributary of the Noatak, are probably the most northern population of that species. Chum are the most numerous salmon, entering the majority of the significant streams of the region. 5/

Gold has been far and away the premier mineral extracted from Alaska's Northwest. Nearly all of the gold has come from the Seward Peninsula; particularly rich deposits are in the Nome vicinity. Seward Peninsula mines also have produced tin in the Lost River area, coal along the Kugruk River, as well as modest amounts of copper, lead, silver, antimony, and tungsten. Early in this century miners took gold from Kobuk River tributaries near Kobuk and Kiana. More recently, mineral firms have shown an interest in copper lodes north of Kobuk at Bornite; zinc, lead, and silver ore at the Red Dog mine north of the Noatak; and zinc and lead ores along the Wulik River. Major oil companies have shown an interest in pursuing off-shore drilling in the Kotzebue and Norton sounds--both rated as areas of high oil and gas potential. 6/

The remainder of this chapter is devoted to an examination of river and lake characteristics on an individual water body basis. The water bodies are listed in the geographic order in which they enter the ocean, starting in the north and ending near the south end of the region. Secondary streams are listed after the main river from the uppermost tributary to that nearest the mainstream's mouth. Streams which flow directly into the ocean are in capital letters; tributaries are underlined.

UKINYAK CREEK

For more than five miles Ukinyak Creek flows south, cutting through the Lisburne Hills. It then turns west for its last four miles to reach the Chukchi Sea about ten miles south of Cape Lisburne.

KAPALOAK CREEK

Kapaloak Creek winds around a ridge extending northwest from Mount Buckland and then heads southwest for about five miles. Then it pivots westward along the southern flank of Angayutak Mountain to reach the sea, having fallen about a thousand feet in its eight- to nine-mile course.

AKALOLIK CREEK

Akalolik Creek has its origin on the east side of Mount Buckland. In about two miles it drops four hundred feet. It then turns southwest for nearly four miles and falls another 250 feet. In the creek's next nine miles it flows southward and has a gradient of thirty to forty feet per mile. Akalolik Creek then turns west and drops about 150 feet in a little more than five miles before reaching the Chukchi Sea.

KUKPUK RIVER

The Kukpuk River, the major river of the Lisburne Peninsula, and drains over twenty-two hundred square miles. For the first half of its approximately 160-mile length it flows in a general southwest direction from its source in the DeLong Mountains. It then turns northwest to skirt the southern flank of the Lisburne Hills. The Kukpuk plummets five hundred feet in its first six miles. The river then becomes braided. Its gradient drops dramatically so that in its next twenty miles it falls about seven hundred feet. For about fifty more miles it has intermittent braiding. Near river mile 87 and 250 to 300 feet above seal level, the Kukpuk begins a forty-five mile meandering course in a well-defined channel only occasionally broken by islands or sand or gravel bars. Just south of Angmakrok Mountain the valley broadens and contains a number of small lakes. At this point the river is 120 feet above the sea. The Kukpuk reenters a confined valley which it does not exit until a mile below Ipewik River and at about fifty feet in elevation. It turns more directly westward eight miles below the Ipewik. At river mile 7 the Kukpuk enters wet tundra and its Sulupoagaktak Channel separates from the main river. Both then empty into Marryat Inlet.

Kakpeyak River

Kakpeyak River enters the Kukpuk at river mile 42.3. It is fourteen miles long and flows southwest along the eastern and southern flanks of the South Maktak Hills. In its first mile it plunges well over one hundred feet. The Kakpeyak drops an average of fifty feet per mile for the next five miles; it falls a little over one hundred feet in its last eight miles. Except for scattered braided segments between river miles 4 and 7, the river runs in a single channel. Hills several hundred or more feet above the river's level are on either side of its banks within one and one-half miles.

Ipewik River

Ipewik River is eighty-five miles long and, along with its tributaries including Nilik River, drains over eleven hundred square miles. For most to its first fifty miles, it flows westward. At the confluence of the Nilik it pivots toward the southwest. These directions, however, are only general. Throughout its course the Ipewik flows in a single channel winding its way between ridges several hundred feet above it. There is one marshy segment near Horseshoe Bend in the northwest corner of T. 10 S., R. 52 W., Umiat Meridian.

Nilik River

The Nilik River is over thirty miles long. Its first five miles trend northward before the river swings around to the south. Here it enters a five-mile long, one- to three-mile wide marshy area. Its gradient through this marsh is about ten feet per mile; in the remaining twenty miles the gradient declines to an average of only five feet. Throughout virtually its entire course the river flows in a single channel. The Nilik has three major tributaries, Sakvelak, Tungnak, and Utakturok creeks. Each drains the east slopes of the Lisburne Hills and is about twenty miles long.

OGOTORUK CREEK

Waters on the western slopes of Sigrikpak Ridge gather to form Ogotoruk Creek. This stream drops over four hundred feet on its six-mile, westward course to the confluence of Kiliguak Creek where it turns southward. Ogotoruk is braided and falls a little over one hundred feet more in its remaining five miles to the sea.

SINGOALIK RIVER

Singoalik River, approximately twenty miles long, drains hills several hundred to a thousand feet high northwest of Kisemaraktuk Mountain. It trends southwest and passes through a marshy area in its lowest two miles before striking the coast near Cape Seppings.

ASIKPAK RIVER

The Asikpak River, nearly twenty miles long, roughly parallels the Singoalik on the southeast side of Kisemaraktuk Mountain and the Siaktak Hills. It has some marshy areas in its upper part. Its channel splits in two more than a mile before disgorging into Asikpak Lagoon.

KIVALINA RIVER

For fifty to sixty miles the Kivalina flows south, passing through the Kitingirak Gap and then turning southwest near Uyaraksivik Hill to run between Kili and Simik hills to Kivalina Lagoon. It drains 640 square miles. Three unnamed tributaries which converge near the Kivalina's midpoint (T. 30 N., R. 24 W., and T. 31 N., R. 25 W., Kateel River Meridian) account for much of this drainage area. Two of these drain the southern and western slopes of the Wulik Peaks while the other and the Kivalina itself find their source in a ridge over a thousand feet high which separates the Kivalina and Kukpuk valleys. The Kivalina is a single-channel water body until it reaches the second of these major tributaries. It then becomes braided for nearly all the rest of its course. The channels do merge together about four miles above its mouth, but the river soon splits again into three major channels to form a delta several miles broad.

WULIK RIVER

Finding its source in the heart of the DeLong Mountains, the Wulik River descends over twelve hundred feet in its seventy- to eighty-mile course to the sea. Its drainage encompasses 880 square miles. The Wulik has few named tributaries; the longest is Ikalukrok Creek which parallels the upper half of the mainstream. In the upper third of its length the Wulik drains the Wulik Peaks and Punupkahkroak Mountain on its west and a series of mountains, including Sheep Mountain on its east. These steep ranges loom fifteen hundred to two thousand feet above the riverbed. In this mountainous segment the Wulik generally runs in a single channel, but is braided with gravel bars for about eight miles. East of Punupkahkroak Mountain the river abandons its southward course for one to the southwest. South of the mountain the river becomes very braided and remains so all the way to the coast. In its last fifteen miles it passes through the northern portion of a hundred-square-mile area of wet tundra.

IMIKRUK CREEK

Imikruk Creek begins in an unnamed lake nearly four hundred feet above sea level and flows fifteen miles west-northwest and then southwest to Imikruk Lagoon. Most of its length lies within a large wet tundra. In its lowest eight or nine miles it has a particularly low gradient; it falls only one hundred feet in that distance.

OMIKVIOROK RIVER

Omikviorok River heads near Kikmiksot Mountain in the Mulgrave Hills and runs in a westerly direction for over thirty miles to Ipiavik Lagoon. It is a single-channel stream

until it reaches the southern end of a large wet tundra plain where it splits into several channels for its last five miles.

RABBIT CREEK

Twenty-three-mile-long Rabbit Creek drains the Mulgrave Hills in a southwesterly direction. It has an extremely braided segment several miles above its mouth; otherwise it generally runs in a single channel. For most of its course hills, five hundred feet above the valley floor are within a couple of miles of either bank. Only in the lowest few miles do the hills recede, giving way to swamplands.

KILIKMAK CREEK

Kilikmak Creek's head is on the north slope of Tiyaktalik Mountain from whence it traces a west-northwesterly course to the Chukchi Sea south of Kotlik Lagoon. The stream meanders twenty-three miles, almost all of it in a single channel. In its last six miles it is bordered on either side by a narrow boggy strip.

TUKROK RIVER

In his Dictionary of Alaska Place Names Donald Orth describes Tukrok River as a "water passage." 7/ It drains Krusenstern Lagoon into Kotzebue Sound. The river is ten miles long. For its entire course it meanders in swampland; it parallels the coastline for its last four and one-half miles.

Evelukpalik Creek

At a little over eight miles in length, Evelukpalik Creek is the longest stream entering Krusenstern Lagoon. It flows westward through low hills for about four miles and then enters a swamp. Approximately two miles from its mouth, it pivots to the southwest and less than a half mile from its mouth it receives water through an outlet from Tulilik Lake, the largest lake in its drainage.

Situkuyok River

Situkuyok River enters Tukrok River a little over two miles above its mouth. It is somewhat over seventeen miles long. It heads at about 550 feet above sea level and flows south for nine mile, passing between Kaksurok Mountain and Mount Noak. The Situkuyok then meanders through marshy country, first generally westward and then to the south.

NOATAK RIVER

At 440 miles, the Noatak River is the longest water body in Northwest Alaska. It drains 12,600 square miles, making it also the largest basin in the region. The river has its origin in glaciers on the eastern slope of Mount Igikpak not far from the beginning of the Kobuk River, which roughly parallels it to the sea. For its first sixty miles it winds its way through a narrow valley between peaks which rise thousands of feet within a couple of miles of the riverbed. The Noatak is braided and the valley holds a number of small lakes in this uppermost part of its course. Thereafter, the valley broadens and more lakes and marshes appear. This condition continues down to the Nimiuktuk River. Here the Noatak swings southward into its Grand Canyon and then the Noatak Canyon between the outlying hills and mountains of the DeLong and Baird mountains. The river is confined almost exclusively to a single channel as it pierces this barrier.

Once it emerges from the Noatak Canyon, the river becomes fringed with gravel bars and has a couple braids before it reaches the Kelly River. Below the Kelly the Noatak disintegrates into a tangle of channels. Almost simultaneously the river begins to twist around to the south. Braiding becomes more pronounced as the water body nears the village of Noatak; at places the river thus spreads over several miles. The river cuts along the western side of a five-hundred-square-mile flat dotted with hundreds of thaw lakes. In this area the banks rise only five to fifteen feet above the river at normal water stages. 8/ After twisting southward for more than fifty miles through the heavily braided segment below Kelly River, the Noatak begins to run in a relatively confined yet wide channel as it pivots eastward along the northern face of the Igichuk Hills. It strikes through the hills just below Agashashok River. The river turns south, then east, and then south again. It throws off several distributaries after this last turn and discharges its water into the sea across a delta fifteen miles wide.

Aniuk River

Aniuk River heads near lake-dotted Howard Pass. It flows in a generally southwesterly direction for forty-five miles. Its valley is broad, in many places marshy, and its gradient up to the pass is under twenty feet per mile. The Aniuk drains a thousand square miles and enters the Noatak at river mile 303.

Cutler River

The forty-five-mile-long Cutler River and its tributaries, the most important being the fifty-five-mile-long Imelyak River, drain over eleven hundred square miles. The Cutler and the Imelyak flow northwest from their origins in the Baird and Schwatka mountains, respectively. At a point only four miles from the Noatak the Imelyak makes a dramatic turn to its southwest to flow into the Cutler. Both streams meander in a single channel. Below its uppermost ten miles, the Cutler enters lake-dotted, marshy terrain for about ten more miles. It reaches the Noatak at river mile 285.

Anisak River

Although it rises above the two-thousand-feet contour in the DeLong Mountains, the Anisak River runs only a fourth of its sixty miles before it enters a broad valley. This it follows east and then south between the DeLong Mountains and Avingyak Hills on its left and the Iggiruk Mountains on its right to reach the Noatak near river mile 246. Once it emerges from the mountains it is slightly braided and flows through boggy country for most of its remaining course.

Nimiuktuk River

Nimiuktuk River has its sources near Black Mountain. For approximately its first dozen miles the Nimiuktuk tumbles out of the mountains with a gradient of one hundred feet per mile. About twenty-five miles above its mouth the river flattens out, becomes braided, and turns to flow almost directly south. Throughout this lower stretch the Nimiuktuk remains braided and its gradient is under twenty feet per mile. The water body drains 560 square miles.

Kugururok River

The Kugururok River flows sixty miles in a south-southwest direction to reach the Noatak at river mile 130. It and its major tributaries--Trail, Nunaviksak, and Kagvik creeks--drain the DeLong Mountains from Inaccessible Ridge to Black Mountain. The

total basin encompasses nearly 950 square miles. Like the Nimiuktuk, it becomes braided once it leaves its uppermost mountain origins. Between Kagvik and Trail creeks, sand or gravel bars are especially pronounced. Below Trail Creek, the channels merge together to travel the last fifteen to twenty miles to the Noatak.

Kelly River

The Kelly River meanders for forty-five miles in a generally southerly course from a short divide between itself and Kokolik River in the DeLong Mountains to the Noatak at river mile 106, about a dozen miles below the Noatak Canyon. It drains nearly six hundred square miles. The river braids around gravel or sand bars for most of its length. For all but its last eight to twelve miles its gradient exceeds twenty feet per mile.

Eli River

The Eli River has its source south of the Maiyumerak Mountains. For almost half of its nearly one-hundred-mile course it flows westward in a single channel in a narrow valley confined by mountains looming over a thousand feet above its bed. Once it passes the westward end of the mountains the Eli, emerges into a five-hundred-square-mile wet tundra dotted with thaw lakes. The Eli shortly turns south-southwesterly and parallels the Noatak. A number of sloughs east and southeast of the village of Noatak connect the two rivers. The two rivers finally merge a dozen miles directly south of the village.

Agashashok River

The Agashashok River's source is south of the Eli's at the western end of the Baird Mountains. It flows in a southwesterly direction for about fifty miles and drains over four hundred square miles. After its first twenty miles it becomes braided, and subsequently makes its way past many sand or gravel bars to merge with the Noatak at the foot of the Igichuk Hills.

KOBUK RIVER

The Kobuk River rises against the continental divide northeast of Walker Lake. In more than 370 miles on its westerly course to Hotham Inlet, the river drains twelve thousand square miles. The Kobuk's headwaters run down slopes over three thousand feet high. But by the time it reaches river mile 347 at the outlet of Walker Lake, the Kobuk is little more than six hundred feet above sea level.

The Kobuk flows in a wide valley for virtually its entire course. East of Killak River the Kobuk courses its way between the Angayucham Mountains ten miles to the north and the Lockwood Hills, the peaks of which are five miles south of the river. Below the Killak, the Kobuk enters a marshy eight- to ten-mile-wide valley studded with lakes. This stretch continues nearly uninterrupted almost to Kiana. River banks here are of sand, gravel, and silt; few rocks are exposed. 9/ Down to Ambler River the Kobuk meanders sharply and is braided. Below this the river still encounters sand or gravel bars, but generally runs in a confined channel, skirting the southern end of the Kallarichuk Hills eight miles east of Kiana. Southwest of Kiana the river begins to split into a multitude of channels through which it discharges into Hotham Inlet across a delta thirty miles wide.

Reed River

Reed River heads near Angiaak Pass and flows about fifty-five miles south to the Kobuk, draining 375 square miles. It courses its way through a restricted valley; north of Nutuvukti Lake mountains looming several thousand feet above the riverbed crowd to within a few miles on both sides. The Reed River reaches the right bank of the Kobuk at river mile 310.

Selby River

Selby River's source is in Lake Selby, through which it also receives the water of Narvak Lake. The Selby River flows south less than ten miles to reach the Kobuk at river mile 283. The Selby has one named tributary--Angayukachak Creek--which flows southwest to meet the Selby midway in its course.

Pah River

The Pah River has its source in a low divide in the Lockwood Hills; its headwaters are located near a portage to the Hogatza River in the Koyukuk drainage. It is fifty-five miles long and its basin encompasses nearly eight hundred square miles. It flows southwest for about twenty miles and drops over two hundred feet before reaching the Pah River Flats, a ninety-square-mile mass of small lakes. Once it emerges from the flats, the river pivots and heads north to the Kobuk. Through the approximately thirty-five miles from the head of the flats to the Kobuk the Pah drops less than two hundred feet. It reaches the Kobuk at river mile 275.

Killak River

The Killak River rises in Coal Pass and flows south-southwesterly about ten miles to empty into the Kobuk on its right bank at river mile 272. The river falls over eight hundred feet on its way to the mainstream.

Mauneluk River

The Mauneluk River flows fifty to sixty miles south from the Schwatka Mountains to the Kobuk and drains over 550 square miles. Like Reed River it is enclosed in steep mountains, especially for its upper portion north of Avaraat Lake. It is a single-channel stream for virtually its entire length. West of Avaraat Lake it meanders between numerous small landlocked lakes.

Kogoluktuk River

For the first third of its sixty-mile length the Kogoluktuk River, like the Reed and Mauneluk, courses southward in a narrow, steep valley in the Schwatka Mountains. It then reaches the broad Ambler Lowland. The river begins to meander, and the mountains gradually retreat to be replaced by marshland and small lakes. After meandering for twenty-five miles in this lowland, the Kogoluktuk squeezes between Asbestos Mountain and Ferguson Peak to pour the waters of over four hundred square miles into the Kobuk.

Shungnak River

The approximately fifty-mile-long Shungnak River roughly parallels the Kogoluktuk. For about fifteen miles it flows southward in a narrow valley through mountains several thousand feet above the riverbed. It then heads westward through a portion of the Ambler Lowland before reentering a small, narrow valley between Bismark and Shungnak

mountains. In the Shungnak's last ten miles, it winds through marshes to discharge the water of its more than two-hundred-square-mile drainage into the Kobuk.

Ambler River

The Ambler River is approximately seventy miles long and drains over one thousand square miles. It heads near Nakmaktuak Pass, a passage to the Noatak, and flows south in a single channel for nearly thirty miles. The river then braids for fifteen miles. In this braided segment it pivots to the west and swings around Lake Anirak. Near the Kalurivik Creek the river loses its braided character as it meanders westerly and, in its last few mile, southerly to the Kobuk. The Ambler is a single-channel stream meandering through marsh for its lowest twenty-five miles. About ten miles above its mouth it receives the waters of the Redstone River, a river more than forty-five miles long coming from the north.

Redstone River

The Redstone is the Ambler's largest tributary. It rises over one thousand feet above sea level and in its first ten miles it falls to below the four-hundred-foot level as it courses between steep-sloped mountains. It then enters a broader, sometimes marshy valley. As it flows southward the Redstone occasionally is braided and its lowest twenty miles meanders between small lakes, many of them oxbow lakes.

Hunt River

The Hunt River is over forty miles long and drains more than six hundred square miles on its southward course to the Kobuk River, which it meets at river mile 134. It runs between steep mountains in a restricted valley for it upper half; thereafter the Hunt traverses a lowland in a slightly braided channel. In its last five miles it twists among numerous small lakes. In this same area Hunt River meets its largest tributary, Akillik River, which flows forty miles from the northeast. The characteristics of the Akillik are similar to those of the Hunt, except that the Akillik is less braided.

Kaligurichеark River

The Kaligurichеark River runs southward about twenty-five miles to reach the Kobuk at river mile 109. It heads at over one thousand feet above sea level and for more than ten miles it runs in a narrow and steep valley. The rest of its course is in a mile-wide marsh.

Tutuksuk River

For the first dozen of its forty-seven miles, the Tutuksuk flows westward. It then makes a sharp turn to the south, continuing to pass between peaks several thousand feet above the riverbed. At about river mile 20 the Tutuksuk leaves the highlands behind and for its last ten miles it meanders through a marsh lowland. In all, the river drains 350 square miles before entering the Kobuk through two mouths at river miles 106 and 105.

Salmon River

The Salmon River is much like an enlarged version of the Tutuksuk River, immediately to its east. Like the Tutuksuk it passes through a narrow valley for most of its course, first trending west and then pivoting to the south. Also it emerges from these mountains to pass through the same swampy district the Tutuksuk traverses before

striking the Kobuk's north bank at river mile 103. The Salmon River is sixty-two miles long and drains 660 square miles. Its two main named tributaries are Nikok River at river mile 27 and Kitlik River at river mile 10.

Squirrel River

At ninety-two miles long and with a drainage exceeding sixteen hundred square miles, the Squirrel River is the largest Kobuk tributary. It enters the Kobuk at river mile 63 just above Kiana. The Squirrel and its three largest tributaries--North Fork, Omar River, and an unnamed fork reaching the Squirrel in Sec. 3, T. 21 N., R. 12 W., Kateel River Meridian--head in the Baird Mountains and flow southward in a braided and gravel- or sandbar-riddled channels. At river mile 73 the Squirrel swings abruptly eastward. It remains braided with river bars common. The Squirrel collects the waters of the large unnamed tributary at river mile 59. The North Fork and Omar River yield their water at river miles 54 and 42, respectively. By the time it reaches these tributaries the river is flowing east-southeast. In this stretch it receives the waters of a number of small left-bank tributaries including Klery, Central, and Canyon creeks. The river then dips more dramatically southward and then southwestward just above its mouth. As it twists southward, the Squirrel passes between the Kallarichuk and Kiana hills.

SELAWIK RIVER

The Selawik River has its origins at the north end of the Zane Hills and flows almost due west between the Kiliovilik Range and the Purcell Mountains into the huge lake-studded flats area which lies east of Selawik Lake. For about its first fifty miles, the river meanders in the broad valley between the two ranges of highlands. This valley contains a scattering of small lakes near the river. Then near Ingruksukruk Creek the Selawik enters the immense lowland tundra. Here the river's course becomes even more tortuous, though it maintains its westerly direction until the confluence of Tagagawik River near river mile 80. Draining over sixteen hundred square miles in its more than one-hundred-mile northward course, the Tagagawik is the Selawik's largest tributary. It heads in the northern Nulato Hills. For the first half of its course it runs between low hills. In its lower half it winds its way between scores of small lakes in the huge lowland tundra. The Selawik then swings northward to the mouth of the Kugarak River, the second largest Selawik tributary. The Kugarak River rises on the southeast flank of the Waring Mountains and almost immediately enters the marshy flats extending east of Selawik Lake. The Kugarak first flows south and then west passing between over a hundred small lakes before reaching the Selawik at river mile 65. After receiving the Kugarak the Selawik resumes its westerly course. It is still very sinuous, and is a half mile or more wide. One distributary system flows off from the main river through Throat River; others diverge below the community of Selawik.

MANGOAK RIVER

Mangoak River rises in the Selawik Hills and flows twenty-six miles northward in a meandering single channel before turning northwest for six miles to Selawik Lake. It drains over two hundred square miles.

KAUK RIVER

The Kauk River as well as many of its southerly tributaries have their origins in the Selawik Hills. The river flows over thirty-two miles west-northwesterly along the foot of these hills and then through a marshy area to drain its 215 square mile basin into Eschscholtz Bay.

BUCKLAND RIVER

The Buckland River drains over twenty-eight hundred square miles between the Selawik Hills on the north and the northern Nulato Hills to the south. Most of this broad basin displays a relief of low hills gradually rising four to six hundred feet above the bed of the river and its major tributaries--Fish River and North, Middle, South, and West forks. The Buckland forms at the confluence of its North and South forks and then meanders in a west- northwesterly direction for about a hundred miles. It then swings toward the north and broadens markedly in its last twenty miles to Eschscholtz Bay.

The Middle Fork, which enters the South Fork, and the North Fork and Fish River parallel each other, flowing southwesterly, generally in a single channel. The South Fork heads against the Continental Divide opposite the head of the Inglutalik River and flows north and then northwest. The West Fork drains the west end of Talik Ridge. Both the South and West forks and the main river, especially from its head to Fish River, meander in one- to three-mile-wide valleys dotted with small lakes and ponds. Fish River and West Fork converge on the Buckland at river miles 60 and 51, respectively.

KIWALIK RIVER

The Kiwalik River flows for nearly sixty miles in a north-northwesterly direction from the base of Granite Mountain to Kiwalik Lagoon. It becomes increasingly sinuous as it travels to the sea. For the lower three-fourths of its course it is bordered by bog with numerous small lakes. In this stretch the river falls two hundred feet. The Kiwalik drains over eight hundred square miles. None of its tributaries are very long. The largest right-bank tributaries are Quartz and Hunter creeks; Canoe, Glacier, Bonanza, Eldorado, and Candle creeks are among those contributing to the Kiwalik's flow from the west.

KUGRUK RIVER

Imuruk Lake at 1021 feet in elevation is the source of the sixty-mile-long Kugruk River. The lake encompasses twenty-seven square miles. The river drains nine hundred square miles as it first flows about twenty miles northeast, then an equal distance northward, then ten miles to the west, and finally another ten miles to Kugruk Lagoon. Low-lying hills rising four hundred to a thousand feet above the riverbed characterize the basin. The most important tributaries are Holtz and Chicago creeks and Burnt River.

INMACHUK RIVER

The Inmachuk River flows thirty-three miles in a northeasterly direction from a set of fourteen-hundred-foot hills which divide its headwaters from those of Goodhope River. After tumbling out of these hills in its first seven miles, the Inmachuk drops only two hundred more feet in the rest of its path to Kotzebue Sound. The river's total drainage is over three hundred square miles. Pinnell River, the Inmachuk's major tributary, accounts for much of this area. It heads in a pond north of Imuruk Lake and flows eighteen miles northerly in a single channel. The Pinnell River also receives water from Imuruk Lake through the Fairhaven Ditch.

CRIPPLE RIVER

Cripple River is twenty-five miles long and flows northwest and then north to discharge into Goodhope Bay one to two miles east of the mouth of Goodhope River. It is a

single-channel stream which in its lower half is fringed by a narrow marsh. None of its tributaries, which include Mystery, Polar Bear, Hoodlum, and Pot creeks, are more than seven miles long.

GOODHOPE RIVER

The Goodhope River flows northwest and then gradually swings around to northeast a little more than halfway through its seventy-mile course to Goodhope Bay in Kotzebue Sound. In this distance it drains over 450 square miles and falls a thousand feet. Its gradient is especially low, only four feet per mile, in its last fifty miles. It heads against the Continental Divide opposite the headwaters of the Noxapaga River. Its most important tributaries include Bilge, Cottonwood, Esperanta, Placer, and Humboldt creeks.

PISH RIVER

Pish River has its source on a ridge separating it from the Serpentine Hot Springs. It flows northeasterly for forty-three miles. It falls about eight hundred feet in it first ten miles and two hundred feet in the rest of its course. The Pish is a single-channel stream. In its lowest thirty-three miles it passes through a swampland. It has no named tributaries.

NUGNUGALUKTUK RIVER

The Nugnugaluktuk River is about thirty miles long and drains over 450 square miles. Its headwater tributaries lead from a series of lakes one to two miles in diameter southwest of Devil Mountain. From there the river meanders eastward through wet and moist tundra for over thirty miles to Goodhope Bay. In this distance it falls barely one hundred feet. The Nugnugaluktuk has three relatively large tributaries--an unnamed twenty-two-mile-long one flowing northeast from a low divide to reach the main river at river mile 10, Lane River which runs north-northeasterly for twenty miles to river mile 4, and an unnamed thirteen-mile-long tributary which flows southeasterly to about the half-mile river mile. All three tributaries meander for all or virtually all of their courses within the same wet and moist tundra which surrounds the main river.

ESPENBERG RIVER

Espenberg River is twenty-seven miles long and drains about sixty square miles of wet and moist tundra northeast of Devil Mountain. Its headwater tributaries empty lakes a half mile in diameter. It flows northward to the Chukchi Sea. The river's gradient is very gentle--only two and one-half feet per mile for its lowest twenty miles.

KITLUK RIVER

Kitluk River heads in the more northerly of the two Devil Mountain Lakes. This lake is three miles by two miles in size and eighty-three feet above sea level. The Kitluk follows a generally northward course to the ocean for eighteen miles through low tundra. Its gradient is not steep; it drops fifty feet in its lowest eleven and one-half miles and twenty-five feet in the last five miles.

KALIK RIVER

The headwaters of Kalik River drain two round lakes each with a diameter of a half mile. It flows northward to the ocean eleven miles roughly parallel and midway between Kitluk and Singeakpuk rivers. Its gradient is steeper than that of the Kitluk, falling one hundred feet in its lowest ten miles and fifty feet in its lowest six and one-half miles.

SINGEAKPUK RIVER

White Fish Lake, a lake with a mile-and-one-half diameter and only forty feet above sea level, empties into Singeakpuk River. The river then trends northward for fourteen miles in a sinuous course through wet tundra to the Shishmaref Inlet.

SERPENTINE RIVER

Schlitz and Hot Springs creeks merge to form Serpentine River which then meanders wildly northwest fifty miles to Shishmaref Inlet. The river drains over seven hundred square miles of the lake-dotted wet and moist tundra of northwest Seward Peninsula. The average gradient for the entire river is three feet per mile. Its most important tributaries are its North and South forks which converge upon the mainstream near river mile 14.

ARCTIC RIVER

Arctic River is over thirty-five miles long, rising south of Ear Mountain and flowing northeast for about twenty-five miles before beginning a more northerly course. It is confined to a single channel surrounded by slopes which climb gradually to six hundred feet or more above the river level for its uppermost fifteen miles. Below that, it courses through low lake-dotted tundra to Shishmaref Inlet. The river has a low gradient. It drops less than one hundred feet in the twenty-five miles closest to its mouth. The Arctic's largest tributaries are Kreuger, Fox, and Mission creeks.

KUGRUPAGA RIVER

The Kugrupaga River flows northwest to Kugrupaga Inlet, draining over 160 square miles in its forty-three-mile course. The upper two-thirds of its length is amid low hill country; few of the hills along it rise more than a few hundred feet above the riverbed. The lowest portion of the river passes through coastal wet tundra. The gradient averages only three feet per mile for its lowest thirty miles.

NULUK RIVER

The Nuluk River has its source at the juncture of its North and South forks and trends in a braided channel northwest for thirty-five miles to the north end of Ikpek Lagoon. Its basin encompasses 280 square miles. At the confluence of its two forks the Nuluk is nearly four hundred feet above sea level. In less than eight miles it drops to 250 feet above sea level. The river's gradient is much less near its mouth where it passes through wet tundra; in the last sixteen miles before its mouth it falls only fifty feet.

PINGUK RIVER

The Pinguk River is very similar to the Nuluk. It too is braided, trends in a northwest direction, and passes through wet tundra in its last miles before entering Ikpek Lagoon. The Pinguk is thirty-six miles long and drains 170 square miles. Its major tributary, York Creek, accounts for much of this drainage area.

MINT RIVER

The Mint River follows a northwesterly course for twenty-three miles from the York Mountains to Lopp Lagoon, draining 160 square miles. It is braided and has numerous

sand or gravel bars. Mint River has an average gradient under ten feet per mile for its lowest eleven miles. Above that the gradient is considerably steeper; the Mint falls three hundred feet between river miles 21 and 11. The river has two important tributaries; Grouse Creek enters on the left and Yankee River on the right.

LOST RIVER

Lost River tumbles southward nine miles through a narrow valley in the York Mountains. It has a steep gradient, falling over five hundred feet in all and one hundred feet in its lowest three miles.

DON RIVER

The Don River flows in a generally southerly direction for about twenty miles to the west end of Brevig Lagoon. In that distance it drops four hundred feet. It falls only one hundred feet in its lowest twelve miles. The Don has a single channel for the upper half of its course. Below that it is intermittently braided with some sand or gravel bars.

CALIFORNIA RIVER

The California River makes its way to the east end of Brevig Lagoon by following a nearly direct southerly route. For most of its fifteen-mile course it is confined to a single channel. In its lowest four and one-half miles, a distance in which it falls one hundred feet, it is heavily braided.

AGIAPUK RIVER

The Agiapuk River is about sixty-five miles long. The stream is braided and frequently marked by river bars, particularly above Flat Creek. From a divide separating it from the head of the Pinguk River, the Agiapuk flows eastward for a little over half its length, then it abruptly swings south. American River, its major tributary, flows from the north and accounts for much of the Agiapuk's eleven hundred-square-mile basin. American River enters the Agiapuk at its midpoint in the midst of a boggy, lake-dotted flats area. In its last miles the Agiapuk splits into a number of twisting channels which form a delta across the midsection of the northern shore of the Imuruk Basin.

KAVIRUK RIVER

Johnston and Coco creeks merge to form Kaviruk River. The river then trends southwestward for more than twenty miles passing along the west side of a bog area to reach Mary's Lake. Mary's Lake, in turn, connects by sloughs to Imuruk Basin.

KUZITRIN RIVER

The Kuzitrin River issues from Kuzitrin Lake in the heart of the Seward Peninsula and flows west and then southwest for 125 miles to Imuruk Basin. In the twenty miles along the base of the Bendeleben Mountains it traverses to its North Fork, the Kuzitrin falls well over a thousand feet. Below the North Fork the river meanders a great deal amid a large mass of wet tundra and small lakes for virtually the entirety of its remaining distance. The exception is the confined stretch of the river at Bunker Hill. In this distance the gradient is very mild. In its lowest seventy-five miles, down from a point a little above the Noxapaga River, the Kuzitrin falls only one hundred feet. In all, the waters of twenty-six hundred square miles of the Seward Peninsula reach the ocean via the Kuzitrin.

Noxapaga River

Noxapaga River has its origins on the north side of the large lava bed in the center of the Seward Peninsula. It makes its way westward past the lava bed and pivots south and flows through wet tundra to meet the Kuzitrin at river mile 71. The Noxapaga is about sixty miles long and has a basin encompassing nearly five hundred square miles.

Kougarok River

Macklin and Washington creeks converge midway between Midnight and Kougarok mountains to form the Kougarok River. The Kougarok then flows southward for over fifty miles to the Kuzitrin at river mile 47, draining over five hundred square miles. Down to river mile 20 the water body courses its way in a single channel through a constricted valley amid hills which rise six hundred to a thousand feet above the river bed within a mile or two of either bank. In the last twenty miles the Kougarok becomes more sinuous, is occasionally braided, and passes along the western edge of the wet tundra area just above Bunker Hill to converge with the Kuzitrin.

Pilgrim River

The Pilgrim River issues from the east end of Salmon Lake. It flows east for five miles, northeast for ten miles, north-northwest for ten more miles, and finally meanders westward for thirty-five miles to empty into the Kuzitrin River about seven and one-half miles above the Kuzitrin's mouth. In its last forty-five miles the Pilgrim passes through a slough and lake-dotted flat. It exhibits some braiding for virtually its entire length. The Pilgrim drains nearly five hundred square miles.

COBBLESTONE RIVER

Draining several small lakes in the Kigluaik Mountains, Cobblestone River is about twenty miles long and flows in a northerly direction. It cuts through a northern ridge of the Kigluaik Mountains and falls over five hundred feet before reaching Imuruk Basin. The Cobblestone's gradient is relatively steep. It drops nearly one hundred feet in its lowest four miles.

BLUESTONE RIVER

Gold Run and the Right Fork join to form Bluestone River which subsequently flows northwest fourteen miles to the Tuksuk Channel, the outlet of Imuruk Basin. Its course lies in a narrow valley with hills rising hundreds of feet on either side of the river. In its lowest ten miles the river drops fifty feet. It falls almost 150 feet in the upper four miles.

TISUK RIVER

Tisuk River rises on the western slopes of the Kigluaik Mountains and trends northwest and then southwest for a total of twenty miles to reach the Bering Sea. It is slightly braided for much of its length.

FEATHER RIVER

The Feather River is about seventeen miles long and flows almost directly west to the Bering Sea. It has a braided channel and a rather steep gradient, averaging about thirty feet per mile for its lowest three miles and nearly fifty feet for its lowest ten miles.

SINUK RIVER

Sinuk River has its origin at an elevation of 1,350 feet in several small lakes at the northwest base of Tigaraha Mountain. It follows a southwesterly, generally single-channel, course to empty into the Bering Sea near Sledge Island. The river's basin encompasses over three hundred square miles and drains much of the southern slope of the Kigluaik Mountains. Near its source the gradient is high. The Sinuk tumbles nearly a thousand feet in its first ten miles. However, the river flattens out farther downstream, dropping only 250 feet in its lowest twenty-five miles. Its major tributary is Stewart River, which flows westward for fourteen miles to meet the Sinuk at river mile 28. The Sinuk also receives the water of Glacial Lake, a three-and-one-half-mile-long water body, through an unnamed outlet which meets the Sinuk at river mile 33.

CRIPPLE CREEK

Cripple Creek is twenty-six miles long and flows southwesterly and then south-southeasterly to enter Norton Sound eleven miles west of Nome. It generally follows a single channel between hills rising several hundred to over a thousand feet within three miles of the river. Cripple Creek drops 250 feet in its lowest seventeen miles and only fifty feet in its lowest seven miles. A number of ditches dating from the early years of this century collect water from some of its tributaries and redistribute them within the basin.

PENNY RIVER

Penny River trends southward for fourteen miles to reach Norton Sound nine miles west of Nome. Its valley for all but its last four or five miles is restricted within steep mountains rising from both its banks. The river falls fifty feet in its lowest four miles through a moist tundra strip; above river mile 4 the gradient rises rapidly. Its basin encompasses thirty-four square miles.

SNAKE RIVER

Gold Bottom Creek and the North Fork Snake River converge to form Snake River which then trends southerly and then easterly to discharge into Norton Sound at Nome. It winds through a broad valley and has a mild gradient, dropping less than two hundred feet on its twenty-eight-mile course to the sea. Mining dredges have worked on the river and its lower tributaries. Earlier in this century, miners used ditches to add Nome River water to some of the lower tributaries for mining purposes. The Corps of Engineers also has undertaken dredging operations at the mouth of the river to provide a small boat harbor. 10/

NOME RIVER

Buffalo, Deep Canyon, and Dickens creeks converge to form Nome River, which then winds its way south nearly forty miles to Norton Sound. Hills rise hundreds of feet above the river within one mile of its banks in its upper stretches; the valley gradually broadens downstream. The river drains over 160 square miles. The gradient averages a little over three feet per mile for the lowest fifteen miles. In the next highest six miles the gradient averages eight feet; in the following six miles it exceeds fifteen feet per mile. Thereafter, the gradient continues to rise; the USGS in 1908 described it as "torrential" in its uppermost five or six miles. 11/ A great deal of mining including dredging, has occurred on this river and its tributaries and some of its water has been diverted by ditches to the lower Snake River.

FLAMBEAU RIVER

Flambeau River flows south-southeasterly for over twenty-five miles from amid mountains over a thousand feet high to Safety Sound east of Nome. Its gradient is steep in its upper half falling about two hundred feet from river mile 25 to river mile 17. However, it falls only fifty feet in its lowest seventeen miles and twenty-five feet in its lowest ten miles. Eldorado River, the Flambeau's major tributary, parallels the main stream for most of its length, discharging into the Flambeau about four miles above its mouth. The basin's total drainage is about 250 square miles.

BONANZA RIVER

For the upper half of its thirty-mile length Bonanza River trends southward through steep mountains over a thousand feet high; thereafter the river winds its way southeast across a marshy flat to Norton Sound. The river falls one hundred feet fifteen miles across this flat. Above that, the gradient increases rapidly. Bonanza River drains about 125 square miles.

SOLOMON RIVER

Solomon River follows a generally southward course for twenty miles to reach Norton Sound. In its upper ten miles it is confined to a narrow valley between mountains about a thousand feet high. Below that the hills drop to several hundred feet high and in its last two miles the river splits into several channels which meander across a lake-dotted flat to the sea. A considerable amount of dredging has altered the course of Solomon River and the tributaries of Shovel and Big Hurrah creeks. East Fork is the Solomon's other major tributary. It is eight miles long and falls over six miles in that distance. Miners have built ditches to tap water from its upper four miles. The entire basin encompasses about 130 square miles.

FISH RIVER

The waters from the south side of the Bendeleben Mountains and the west side of the Darby Mountains find their way to Golovnin Lagoon through the Fish River. The river rises in the Bendeleben Mountains at an elevation of over fifteen hundred feet. In fifteen miles it drops to only two hundred feet above sea level; a height from which it falls gradually in its remaining seventy-seven miles to Golovnin Lagoon. Near the two-hundred-foot level the Fish enters the 150-square-mile McCarthys Marsh, where the waters of numerous creeks and lakes add to the Fish's volume. The river meanders severely within this lake-dotted flat, though it maintains a general southerly route. At river mile 50 the stream leaves the marsh behind and passes for nearly twenty miles between slopes which gradually climb to the fifteen hundred feet range. From a short distance above its major tributary, Niukluk River, to a couple miles below Fox River, the Fish River traverses another swampy area. It then passes between low-lying hills before turning to the southeast into its delta and splitting into about a half-dozen channels. The Fish River basin encompasses twenty-two hundred square miles.

Boston Creek

Forty-mile-long Boston Creek has its origin in the Bendeleben Mountains west of the headwaters of the Fish River and flows southeasterly to the main stream. It is moderately braided in its upper half as it courses between mountains exceeding two thousand feet high. The lower half of the creek meanders through McCarthys Marsh. In Boston Creek's lowest twenty-one miles, it has an average gradient well under ten feet per mile.

Pargon River

Pargon River is thirty-seven miles long and follows a southeasterly course to the Fish River. It becomes increasingly braided in its highest nine miles before it emerges from the Bendeleben Mountains into McCarthys Marsh. The river drains the western and southern part of this flat before reaching the Fish River. In all, the Pargon's basin encompasses nearly 150 square miles.

Rathlatulik River

Rathlatulik River rises between Mount Kachauik and Mount Arathlatuluk at the southern end of the Darby Mountains. It flows northwesterly thirty miles to strike the Fish River just below Pargon River. The upper half of its length is in the mountains; the remainder meanders through McCarthys Marsh. Its drainage includes about seventy-five square miles.

Niukluk River

For nearly twenty miles, the Niukluk flows southwest from its sources east of Mount Bendeleben in a channel which in places is braided. Then, at the confluence of Libby River, it pivots to the southeast, a course which it holds for its remaining thirty-eight miles to the Fish River. It strikes the Fish near river mile 27. Except for a rather restricted area between Goldbottom Creek and Melsing Creek, the Niukluk is in a marshy valley on its southeasterly course, a valley which broadens to several miles wide near the river's mouth. Below Libby River, the Niukluk drops about 225 feet. The Niukluk's largest tributary is Casadepaga River which flows northeast thirty miles to reach the Niukluk at river mile 29.

Steamboat Slough

Although termed a slough, this water body is a fourteen-mile- long, left-bank tributary of the Fish. It meanders through a broad lake-studded valley to a confluence with the mainstream at river mile 21. Steamboat Slough falls less than fifty feet in its lowest eight and one-half miles and about twenty-five feet in the last five miles.

Klokerblok River

The Klokerblok River rises in a series of hills which also drain to the headwaters of the East Fork Solomon River. The Klokerblok trends in a generally easterly direction for thirty-nine miles to enter a distributary in the Fish River delta. After meandering between four-hundred- to six-hundred-feet-high hills for fifteen miles, the river winds its way through a marsh area one to two miles wide. Nine-mile-long Skookum River, which also drains the hills east of the East Fork Solomon River, is the Klokerblok's longest tributary and reaches the mainstream at river mile 27.

YUONGLIK RIVER

Heading at about one hundred feet above sea level, the Yuonglik River flows southward in a sinuous course for twelve miles to empty into the northern end of Golovnin Lagoon. Throughout it is a single-channel stream and its gradient is rather gentle; the river falls fifty feet in its lowest nine miles. It runs between hills several hundred feet high in its upper half. The Yuonglik then becomes more tortuous and enters a lake-filled marshland which gradually broadens as the river approaches the sea.

KACHAUIK CREEK

Kachauik Creek runs south for eight miles and then shifts slightly to the southwest for its remaining eight miles to Golovnin Lagoon. At river mile 10.5 Kachauik receives Eagle Creek, it largest tributary. Eagle Creek and Kachauik Creek above Eagle Creek both flow between hills up to one thousand feet high. In its lower half the Kachauik becomes braided with sand or gravel bars. The creek falls fifty feet in its lowest seven miles and twenty-five feet in its lowest four miles.

KWINIUK RIVER

Kwiniuk River is fifty miles long and flows northeast for thirty-three miles along the southern flank of the Darby Mountains before turning to the southeast to enter Norton Bay. It has a gentle gradient in its lowest seventeen miles, falling only fifty feet in that distance. Kwiniuk River drains over two hundred square miles. Nearly all of the river is in the former Norton Bay Native Reservation, currently held by the Elim Native Corporation.

TUBUTULIK RIVER

Tubutulik River is over seventy miles long and drains four hundred square miles on its generally south-southeasterly course to Kwiniuk Inlet of Norton Bay. Near river mile 68 it begins a thirteen-mile course through a marshy, lake-dotted flat called Death Valley, in which the river falls from 575 to 475 feet above sea level. Mountains rising to above a thousand feet then restrict the river to a narrow valley down to about river mile 20. There, at an elevation of little over fifty feet above sea level, the Tubutulik flows out onto wet tundra across which it tortuously makes it way to the coast. For approximately these same twenty miles the river passes through Elim Native Corporation lands, formerly the Norton Bay Native Reservation. A few miles from the ocean the river splits into two mouths.

KWIK RIVER

Kwik River takes a south-southeasterly route for thirty miles from a low divide with the Koyuk River to Norton Bay. Its basin encompasses two hundred square miles. Near river mile 25 it begins to leave the low hills of its origin behind and enter a wet tundra area dotted with lakes. The gradient in these lowest twenty-five miles averages only a foot per mile. For its last twenty-four miles the Kwik passes through the former Norton Bay Native Reservation, which Elim Natives have taken in lieu of other rights under ANCSA.

KOYUK RIVER

The Koyuk River begins at a pond a short distance north of Kuzitrin Lake and flows over 150 miles to Koyuk Inlet of Norton Bay. It travels in a generally eastern direction for 125 miles. At the confluence of its East Fork (river mile 25.5), the Koyuk swings south, entering a wet tundra region near river mile 16, and broadening to a half mile wide. The river has an extremely shallow gradient. In its lowest fifty-five miles it drops only twenty-five feet and it reaches fifty feet above sea level over one hundred miles upriver from Norton Bay. The Koyuk drains nearly two thousand square miles. Its largest tributaries are Peace River, which has its mouth at river mile 53.5, and the East Fork, both left-bank streams. Other sizeable tributaries are Knowles, Big Bar, First Chance, Copper, Salmon, Willow, Kenwood, and Dime creeks.

INGLUTALIK RIVER

The Inglutalik River flows southwest over one hundred miles to the head of Norton Bay draining a thousand square miles. It has its origins on the northwest fork of Traverse Peak and passes between the moderate-sloped Nulato Hills, which exceed fifteen hundred feet in elevation, down to Nigikmigoon Creek at river mile 50. Below that point hills, rarely above four hundred feet, separate the Koyuk River and the right back of Inglutalik River. Thousand-foot-high hills continue on the left bank, but at a greater distance as the Inglutalik approaches the sea. For its lowest sixteen and one-half miles, the river passes through wet tundra.

The Inglutalik has a low gradient. In its lowest sixteen and one-half miles, the Inglutaik falls only twenty-five feet. The gradient remains low. The river level reaches fifty feet at river mile 32 and one hundred feet about ten miles farther upstream. Then in a space of a half mile the Inglutalik climbs to 125 feet. Then the river again flattens out; it does not ascend to 150 feet for another ten miles, to 250 feet until river mile 63, to 500 feet until about rive mile 83, and to 1,000 feet until above river mile 100.

UNGALIK RIVER

Roughly paralleling the Inglutalik, the Ungalik flows for nearly one hundred miles to Norton Sound beginning at the south side of Traverse Peak. It drains nearly seven hundred square miles. For its uppermost twenty to thirty miles, the Ungalik meanders between mountains which reach more than two thousand feet. Thereafter, the peaks tend to be lower, but slopes rising to over a thousand feet persist within a couple of miles on one side or the other of the river to the Ungalik's lowest few miles where it meanders across a low tundra to the sea. Above river mile 25, the stream is confined to a single channel. Below that point, the Ungalik is slightly braided.

The Ungalik is steeper than the Inglutalik. It falls 100 feet in its lowest twenty-nine miles. The river passes the 500-foot gradient at river mile 53 and the 1,000-foot gradient at river mile 81.

SINEAK RIVER

Sineak River's headwaters originate in a number of small lakes thirty feet above sea level. The stream then meanders southward for eight miles through a vast lowland tundra east of the Reindeer Hills.

SHAKTOOLIK RIVER

The one-hundred-mile-long Shaktoolik River begins wending its way northward from its source east of Debauch Mountain, near the headwaters of the Nulato River. It eventually drains 850 square miles into Norton Sound. For its first twenty miles on its northerly course and the next ten miles in a westerly direction it runs in a single channel between hills which rise to two thousand feet. Farther downstream the hills decrease in elevation; those below Kingmetolik Creek generally do not exceed twelve hundred feet. From several miles above Kingmetolik Creek the Shaktoolik begins to exhibit intermittent braiding. Several miles below this creek the river turns southwest. Twenty miles from its mouth in Shaktooik Bay the river leaves the mountains behind and meanders westerly across wet tundra. The Shaktoolik's gradient is moderate for all but its headwaters. Across the coastal tundra the river falls at six to eight feet per mile; the average gradient to river mile 84 is under twelve feet per mile.

TAGOOMENIK RIVER

Tagoomenik River is nearly thirty miles long. It begins amid hills a thousand feet high and runs north-northwesterly for about ten miles before leaving the uplands to meander northwesterly across a strip of wet tundra. For its last three miles it parallels the ocean shore behind a narrow strip of land to enter into southern Shaktoolik Bay. Through the lake-dotted tundra the river falls a little over one hundred feet.

EGAVIK CREEK

Egavik Creek flows southwesterly about thirty-five miles from slopes fifteen hundred to two thousand feet high. Hills continue to rise along both its banks all the way to the coast, though their height declines to about five hundred feet and the valley in which the stream runs gradually broadens. Marshes cover much of the valley's bottom for the lowest twenty miles. In this area the creek is slightly braided, but here as in its upper portion Egavik Creek is normally a single-channel water body. Even in its lowest few miles, the gradient is somewhat in excess of ten feet per mile.

UNALAKLEET RIVER

The waters of over two thousand square miles find their way to the east end of Norton Sound through the Unalakleet River. The river is over one hundred miles long and trends in a roughly southwesterly direction. After running in a valley less than a third of a mile wide for its first ten miles, the Unalakleet enters a broader valley, which is marshy in places above Old Woman River and in all but a few miles below that tributary. It exhibits considerable braiding near Stove Creek and some braiding elsewhere. As it enter the broader valley at river mile 91 it is 600 feet above seal level. Just below Old Woman River at river mile 65, the Unalakleet descends below the 200 foot mark. It reaches 100 feet near river mile 52 and 50 feet at river mile 30.

Old Woman River

Old Woman River extends northward in a confined valley for almost fifty miles between mountains over fifteen hundred feet high. It is a single-channel stream and drains about three hundred square miles. The river falls three hundred feet in its lowest twenty-five miles and fifty feet in its lowest eight miles.

North Fork Unalakleet River

For nearly forty miles the North Fork winds it way southwest between mountains over two thousand feet high near its source to about a thousand feet high just before the river enters the marshy valley of the Unalakleet. The fork's lowest four miles are within this valley. Except in a small number of places most prevalent in its lower course, the fork flows in a single channel.

Chiroskey River

The Chiroskey River drains over three hundred square miles in its north-northeasterly course to join the Unalakleet River at river mile 24. The river is over fifty miles long and makes its way between hills a couple thousand feet high until it reaches the marshy Unalakleet valley, across which it flows for about ten miles. In this ten miles the river falls about one hundred feet.

South River

South River parallels Chiroskey River, flowing to the northeast for about forty miles. It enters the Unalakleet about five and one-half river miles from the sea.

North River

The North River parallels the North Fork Unalakleet River. It heads near the Shaktoolik River and flows through the one- to two-thousand-foot-high Nulato Hills. It empties into the Unalakleet at river mile 5.

GOLSOVIA RIVER

Golsovia River originates in mountains over two thousand feet high. It flows northward fifty miles, on the way receiving tributaries which emanate from many small scattered ponds six hundred to fifteen hundred feet above sea level. Many of these ponds reach the river via creeks which tumble down a gorge in which the river runs below a point about 850 feet above sea level. The river's gradient is steep; even in its lowest two miles it falls nearly fifty feet.

KLIKITARIK RIVER

Klikitarik River flows fourteen miles in a northerly direction to Klikitarik Bay of Norton Sound. It drains small lakes similar and to the west of those which empty into Golsovia River. The Klikitarik is a very steep river, falling twenty-five feet within a half mile of the coast and five hundred feet in its lowest six miles.

NUNAVULNUK RIVER

The Nunavulnuk River is about thirty miles long and courses its way northwest to St. Michael Canal. After its first seven or eight miles and about 350 feet above sea level the river enters an area of scattered small lakes. In the following nineteen miles it falls over 325 feet. For its lowest three miles the Nunavulnuk winds amid innumerable small lakes and drops less than twenty-five feet.

KUIAK RIVER

The source of the Kuiak twenty-five-mile-long Kuiak is amid mountains over one thousand feet high, but within a few miles the northward-trending stream plummets to under 500 feet above sea level and begins its way across a lake-dotted flat. The river's gradient continues to decrease. At river mile 23.5 the Kuiak is over 400 feet above sea level. This drops to 250 feet at river mile 21 and to 25 feet at river mile 14. Thereafter the river widens markedly and its large bends twist gracefully between an increasing number of small lakes.

KOGOK RIVER

The Kogok River follows a rough northwest direction for thirty-three miles to enter Norton Sound one mile northeast of Pikmiktalik River. The upper seven miles of the Kogok, as well its three longest tributaries--Nunakogok River, which discharges into the Kogok at river mile 18, and two unnamed streams entering the Kogok at river miles 25 and 7--drain northward through hills eight hundred feet or more high into a large lake-dotted coastal marsh. Once it enters this marsh the Kogok's gradient flattens out.

At river mile 21 the river is 250 feet above sea level. It drops to 200 feet at river mile 10, to 50 feet at river mile 7, and to 25 feet at river mile 5.

PIKMIKTALIK RIVER

The Pikmiktalik River has its origins at a thousand feet above sea level and flows forty-five miles to Norton Sound. In its first eight miles the river falls five hundred feet and twists from a southwesterly course to one heading due north. It continues north and then northeasterly for over fifteen miles in a valley bounded by seven-hundred- to thirteen-hundred-foot hills, before entering a lake-dotted coastal flat. Before leaving the mountains the Pikmiktalik falls to under two hundred feet. Nearer its mouth, the gradient becomes quite shallow; it falls less than twenty-five feet in its lowest eight miles.

NOTES

1. Lidia L. Selkregg, Alaska Regional Profiles: Northwest Region (n.p., n.d.), 3; Clyde Wahrhaftig, Physiographic Divisions of Alaska, U.S. Geological Survey Professional Paper 482 (Washington, D.C.: Government Printing Office, 1965), 20-21, 27-28, 31, plate 1. Except for drainage areas which come from U.S. Army, Corps of Engineers, Alaska District, Harbors and Rivers in Alaska, Survey Report: Northwestern Alaska (n.p., 1957), 31-33, and in a handful of cases otherwise noted, all information on the physical character of Northwest Alaska presented in this chapter comes from U.S. Geological Survey maps based on aerial photography taken in the 1950s. When river miles disagree with those found in Donald J. Orth, Dictionary of Alaska Place Names, U.S. Geological Survey Professional Paper 567 (Washington, D.C.: Government Printing Office, 1967) or the Corps of Engineers, they are derived from the "Storet Maps" in the Navigability Section's files.

2. Selkregg, Alaska Regional Profiles, 8, 16-17, 23.

3. Ibid., 129-37.

4. Ibid., 142-56; Richard O. Stern, Edward L. Arobio, Larry L. Naylor, and Wayne C. Thomas, Eskimos, Reindeer, and Land, Agricultural Experiment Station Bulletin 59 (Fairbanks: University of Alaska, 1980), 101.

5. Selkregg, Alaska Regional Profiles, 169.

6. Ibid., 85-93; Anchorage Daily News, October 24, 1982, p. E-1.

7. Orth, Dictionary of Alaska Place Names, 989.

8. Philip S. Smith, The Noatak-Kobuk Region, Alaska, U.S. Geological Survey Bulletin 536 (Washington, D.C.: Government Printing Office, 1913), 28.

9. Ibid., 21.

10. See Chapter 2 for an overview of mining in this area. See Chapter 3 for a discussion of the Corps of Engineers' work on the Snake River.

11. Arthur J. Collier, Frank L. Hess, Philip S. Smith, and Alfred H. Brooks, The Gold Placers of Parts of Seward Peninsula, Alaska, U.S. Geological Survey Bulletin 328 (Washington, D.C.: Government Printing Office, 1908), 171.

CHAPTER TWO

NORTHWEST ALASKA'S DEVELOPMENT

Alaska's Northwest has hosted a variety of people who sought to sustain and improve their lives by following widely differing economic strategies. Inupiaq and Yupik Eskimos hunted, fished, and trapped for generations before contact with the Russians and white Americans. Russians visited the region in the eighteenth and early nineteenth centuries, as did American Western Union employees in the mid-1860s, without having any marked impact on Native lives. Whaling ships touched the Alaskan coast and missionaries and occasional explorers came to the region in the late nineteenth century. Sheldon Jackson and a group of missionaries he aided as federal Education Agent, sought to alter the Natives' physical, as well as spiritual state, by importing reindeer to the Seward Peninsula in 1892. Some readily adopted reindeer herding as their primary occupation, but most maintained their traditional ways. The first large white influx came in 1898 when hundreds flocked in a false gold stampede to the Kobuk River. Nearly all of them quickly withdrew southward. However, thousands of whites rushed to the Seward Peninsula after the rich finds near Nome in 1898 and 1899. Within a few years these men and women had prospected most of the peninsula and permanently altered its history.

In the early twentieth century whites established a second society in Alaska's Northwest revolving around mining settlements. They replicated western business, governmental, religious, and social institutions in Nome and to a lesser extent in smaller communities. These outposts depended on their links to Seattle and San Francisco. Natives partook in a small measure in this second society, taking jobs, conducting trade, and finding entertainments. Many built homes near the schools the Bureau of Education built between 1907 and 1910, forming permanent, if in many cases seasonal, villages. However, most continued to rely upon a varying mixture of reindeer herding, hunting, fishing, trapping, and berry picking.

Most changes in the past three-quarters of a century have been a continuation of trends apparent by the 1910s. Natives still depend heavily on subsistence activities and some on the Seward Peninsula operate reindeer herds. They increasingly have taken wage jobs, purchased western goods, and concentrated in settled communities. Gold mining is still important for Seward Peninsula's economy, but so are government work and, on the Norton Sound, fishing. There has been smaller and less persistent mining in the Kobuk drainage. Post - World War II exploration has revealed rich deposits of copper and other minerals which some day may be mined. The post-war period also witnessed increased and still-increasing recreational use of Alaska's Northwest furnishing employment for guides, restauranteurs, lodge-keepers, and pilots.

Archeology, folklore, and the reports of the region's earliest explorers help to describe the prehistoric culture of Northwest Alaska. Human habitation of the region dates to at least 6000 B.C. 1/ Throughout this period the people of the Northwest have subsisted upon the available flora and fauna. 2/ Doubtless, their precise patterns shifted over the centuries as species' populations waxed and waned. In describing the subsistence pattern that prevailed among Natives of eastern Norton Sound prior to and in the earliest years of white contact, William Sheppard noted that all inhabitants did not follow the same seasonal cycle. Also from year to year, depending upon the availability of resources and the changing needs of an individual, family, or local group, people would

vary their pattern. Because eastern Norton Sound and the Seward Peninsula were on the edge of a number of resource areas--the northern frontier of king and red salmon, the western fringe for caribou, and a marginal walrus and bowhead area--variability may have been particularly pronounced. 3/ However, elsewhere in the Northwest, Natives also altered their seasonal rounds to best utilize resources and meet sustenance requirements.

Maintaining Sheppard's caveat, it is still appropriate to divide the Northwest peoples into marine and riverine economies. The former depended substantially on sea mammals for food and clothing, while the latter lived largely or wholly on fish, caribou, small game, and berries. Dorothy Jean Ray's The Eskimos of Bering Strait, 1650-1898 sketched the marine-oriented life of most residents of the western Seward Peninsula. The Natives of Wales and some of the Strait islands hunted bowhead whales beginning in May. More generally the area's inhabitants sought walrus. Seals were their most important resource, indispensable for meat, oil, and skin. Salmon, which ran in July, were the second most important food source. 4/

Ernest Burch described what he called the Kotzebue society. These people who lived near present-day Kotzebue also depended heavily upon the sea. In the fall and again in February and March, they fished through the ice at scattered settlements for sheefish, tomcod, and smelt and some hunters pursued caribou. In February some men hunted seals; by April everyone concentrated along the coast to harvest seals. In late June the emphasis shifted to killing dozens or even hundreds of belugas. Not until late August did the Natives again disperse to their winter villages and renew their subsistence cycle. 5/

Other people pursued sea mammals in the summer just as the Wales and Kotbezue inhabitants, while in addition exploiting in a major way the resources of a riverine environment. For example, both the Koyuk River and the lower Noatak River Natives caught seals and belugas in the spring and summer. But they also took large numbers of salmon and hunted caribou. 6/

The inhabitants of the upper Kobuk River and, to a somewhat lesser extent, the Fish River followed a riverine subsistence pattern. In the fall the Kobuk people hunted caribou, bear, and a variety of smaller game and fished with weirs and hooks through the thin ice. They generally rested and recreated until the spring when they spread out along the river and its tributaries to hunt muskrat and to fish. Most continued to fish through the summer, although a few families traveled down to the Kotzebue area to trade and hunt sea mammals. In late July the men left the women, who continued fishing, in order to hunt caribou. The men rejoined the women in the fish camps in early September.

On the Fish River, some Natives trapped fish in the winter. In spring most moved to the squirrel trapping grounds, although others hunted bearded seals on the coast. After breakup they fished and trapped muskrat and shortly after that began snaring birds. They turned their attention to salmon once the runs started. The Fish River people also collected a variety of plants and berries and in late summer killed caribou in fences and corrals or in Kuzitrin Lake. Early in the fall Natives took young seals, which swam up the lower Fish River, before returning to their winter villages after freeze up. 7/

These fundamental patterns of subsistence living probably prevailed in Northwest Alaska for centuries prior to white men's arrival. Indeed, although this was the first part of Alaska reached by Russian explorers, change came very slowly to the region. For well over a century after the Russian imperial missions of Vitus Bering, who spotted

St. Lawrence Island and Big Diomede Island in 1728, and Mikhail Gvozdev, who sailed near Wales and King Island in 1732, whites did little more than chart the outline of the coast. In 1778 James Cook coursed along the shore and gave names to Norton Sound, King Island, and Cape Prince of Wales. The Russian explorers Otto von Kotzebue, Glieb S. Shishmarev, and Mikhail N. Vasiliev substantially completed white discovery of the Northwest coast by probing Kotzebue Sound between 1816 and 1820. 8/

One of the last British exploration parties, Frederick W. Beechey's of 1826 and 1827, set the stage for more European and American visits to Alaska's Northwest. Beechey's published report of 1831 described the plentitude of whales in the North Pacific. Beginning slowly in the 1830s and early 1840s, commercial whaling in the Bering Strait attracted scores of ships annually by the latter third of the century. In the 1880s Port Clarence became a regular stopping point for ships heading north. In this sheltered inlet whaling captains made repairs, took on water, and awaited tenders which brought coal for the increasing number of steam vessels. From Port Clarence the whalers traveled to Point Hope, which they reached about July 10. Here they took on more fresh water and traded with the Natives, often obtaining their labor for the summer on whaling trips in the area. The Point Hope people obtained flour, crackers, tobacco, molasses, and firearms. They also got liquor when the men of a U.S. Revenue Marine cutter, which patrolled the waters annually beginning in 1880, were not looking. In the 1880s various whaling companies began setting up stations in the vicinity to enable them to conduct whaling from shore; by 1898 there were thirteen such stations between Point Hope and Cape Seppings. Natives from as far away as the Kobuk River came to work in whaling boats sent out from these stations. 9/

The whaling outposts were the primary Euroamerican contact points in the northern part of the region. However, in the south St. Michael served since 1833 as a Russian and, after 1867, and American trading center. St. Michael, though, looked east and south to the lower Yukon, rather than to the Northwest. The geographic accident of inadequate harborage nearer the mouth of the Yukon prompted the Russian traders to place their outpost on an island in Norton Sound. From St. Michael or Unalakleet, explorers and traders regularly crossed the Anvik and Kaltag portages to the Yukon. In the process of regular missions to Nulato, Russian traders became familiar with the Unalakleet drainage. 10/

Europeans first probed the interior of the Seward Peninsula in the 1850s. In 1848 Great Britain initiated a series of search parties for the lost Arctic expedition of Sir John Franklin. Some search ships wintered along the Northwest coast. In March and April of 1850, Lt. Bedford Pim traveled overland from Kotzebue Sound to St. Michael via the Koyuk River investigating rumors of whites on the peninsula. The following winter a detachment from the Plover traveled overland between Port Clarence and St. Michael. In 1854 another small group crossed the peninsula from Port Clarence to Chamisso Island in eastern Kotzebue Sound via the Kuzitrin and Goodhope rivers. 11/

Between 1865 and 1867 Americans explored Northwest Alaska to lay out the route of a proposed Western Union line from the United States to Europe via Siberia. Numerous WU parties traversed the well-known Kaltag portage through the Unalakleet basin. Others traveled along the coast of Norton Sound and through the Fish River and lower Kuzitrin River drainages to Grantley Harbor. In December 1865, six employees sledded north from Unalakleet, passed Shaktoolik and another village called Inglutalik and a short distance up the Koyuk River. R.D. Cotter led another group about twenty-five miles up the Inglutalik in April 1866. 12/

In September 1866, Daniel B. Libby led about forty WU men to Port Clarence. Libby was in charge of construction from that point east to Golovnin Bay via the Kuzitrin, Niukluk, and Fish rivers. He traveled the entire distance twice determining the most favorable route. Despite poor provisioning, his party completed twenty-three miles of the telegraph line near Grantley Harbor in the winter. WU employees erected seven more miles near Golovnin Bay and seventeen near Unalakleet. 13/

In 1867 Western Union abandoned its efforts for the trans-Siberian telegraph after the successful laying of a cable under the Atlantic. That same year the United States purchased Alaska, but it proved no more aggressive in mapping beyond the coastline of the Northwest than had the Tsarist government. Not until 1883 did Naval Lieutenant George M. Stoney enter the Kobuk using a U.S. Revenue Marine boat from the Corwin, then at Kotzebue, and accompanied by a Revenue Marine seaman. Stoney was in the area on a mission to reward Siberian Natives and found himself with time on his hands. Stoney and the Revenue Marine's captain of the Corwin, M. A. Healy, both were enthusiastic about exploring the Kobuk. As a result in 1884 and 1885, the Navy sent Stoney to explore the river while the Revenue Marine dispatched Lieutenant John C. Cantwell. The two services examined the Kobuk as well as the Noatak and Selawik independently collecting a wide range of data, including geologic, hydrologic, ethnographic, and biologic information. Maps which they prepared were not as accurate as those the U.S. Geological Survey would draft. But they did indicate major tributaries and other physical features as well as the location of Native settlements. Along with the Unalakleet drainage, the Kobuk-Noatak area would be the only well-charted interior portion of Northwest Alaska until the turn of the century. 14/

White man's religion came to much of Northwest Alaska by 1890. Through the efforts of missionaries, Natives learned not only of westerners' god, but also received western schooling and an introduction to western ideas and goods. Russian Orthodox Priest Gregory Golovin of Unalaska was the first missionary in the region, arriving at St. Michael in 1842. Doubtless at his instigation, the Russian American Company completed a chapel there by 1845. However, not until 1900 did a Russian Orthodox priest live at the settlement.

In 1883 Reverend P. F. Healy, S.J., brother of the captain of the Corwin, traveled the coast visiting settlements as far north as Point Hope. Later in the decade the Roman Catholic Church had a school at St. Michael, but otherwise the Catholic missionaries did not penetrate the pre-gold-rush Northwest. Swedish missionaries ran a school at Unalakleet beginning at least by 1889. In the next two years the Federal government contracted for schools at Wales, Point Hope, and on St. Lawrence Island, with the Congregationalists, Episcopalians, and Reformed Episcopalians, respectively, as well as with the Swedish missionaries at Unalakleet. Within a few years, missionaries also came to Port Clarence and Cheenik and Friends arrived at Point Hope. 15/

Led by Sheldon Jackson, a Presbyterian minister and the Federal government's Agent for Education in Alaska, reindeer herding became part of missionaries' civilizing plans for Northwest Natives. The reindeer, which Jackson first brought to Port Clarence in 1892, were to provide Natives with food and a practical means of learning and succeeding in a commercial enterprise linked to white society. The Natives could master modern business skills while providing themselves and western markets with meat and transportation. 16/

In the first years of activity the herds remained in the Teller area, first with imported Siberians and later Lapp herders teaching Natives the care of the animals. By 1895

Jackson sent reindeer from Teller to Wales and Golovnin Bay to start new herds at these mission outposts. Natives to this time herded but did not own the reindeer. In the following year Jackson loaned Charley Antisarlook one hundred deer; however, even in 1899 only eleven Natives owned animals. As the government's herds grew to number over two thousand in the late 1890s, Jackson continued to expand operations. In 1897 and 1898 he shifted the headquarters for herding to Eaton, a new station near Unalakleet. In the following decade, reindeer spread to a growing number of missions through the Northwest, including Kivalina, Kotzebue, Deering, Shishmaref, and Gambell.

Coastal whaling, occasional government explorations, and the efforts of missionaries left only a modest imprint on Alaska's Northwest and brought few whites to the region. Change may have come very slowly had not George Carmack and two Indians made the bonanza discovery in the Klondike six hundred miles to the east in September 1896. The news of the find ignited a wildfire of enthusiasm for seeking gold in the north, which was unfocused enough to propel Americans to the Kobuk River and the Seward Peninsula.

There had been some mining in the upper Fish River drainage as early as the 1880s. In 1880 a whaling schooner captained by William P. Gallagher traded sea bisquits with Natives in Golovnin Bay who offered to take him upriver to fish for salmon. The Natives also showed Gallagher silver-bearing ore near their fish camp. Gallagher brought a sample back to San Francisco where it was assayed at thousands of dollars per ton. Investors organized a company and in May 1881 they sailed to Seward Peninsula to exploit what became known as the Omilak mine. By August 11, they began floating the ore down to Golovnin Bay in Native skin boats. In the summer of 1883, twenty men took fifty-five tons out of the mine. Production continued in the eighties but probably did not exceed four hundred tons of silver ore. New financing promised increased activity in the century's last decade, but plans to use a steamer and build a tramway to the coast failed. Little mining took place after the early 1890s until renewed efforts between 1906 and 1910. Again activity petered out. In 1922 there was one last unsuccessful try at mining at Omilak. 17/

It was ironic that silver rather than more valuable and very plentiful gold was the subject of the first mining in Northwest Alaska. It also was ironic that the first stampede to the region focused on the Kobuk River rather than the more accessible and far richer Seward Peninsula. For reasons which are not clear, rumors of gold on the Kobuk followed hot on the heals of the news of the strike on the Klondike. Consequently, prospectors, possibly numbering more than a thousand, steamed and sailed to Kotzebue Sound in 1898. In contrast to the Klondike and later the Nome stampedes, town-builders-- businessmen, professionals, and service-oriented workers--did not accompany the gold-seekers. Therefore, the Kobuk stampeders, many of whom were novice prospectors, had to invest considerable effort to furnish their own needs. They built and piloted their steamboats up the river, poled smaller boats up tributaries and packed beyond the reach of boats, erected their cabins, and, except for what they bought from Natives, brought or hunted for their food. And when the little prospecting they did proved disappointing, they left. 18/

Some were so disgusted, home sick, or broke that they did not take part in the rush to the genuine bonanza at Nome. The gold finds of the Seward Peninsula had their roots in the earlier exploration, religious, and mining activity of the area. The Western Union's Daniel Libby, while traveling along the Niukluk in 1866 or 1867, found strong indications of gold. However, Libby was content to make his living in California until the Klondike

fever rose in the nation. Libby organized a group based in San Francisco, including his brother-in-law Louis Melsing to pursue his thirty-year-old discovery. Libby's group landed at Cheenik on September 18, 1897. There they found that other men also knew there was gold on the Niukluk. John Dexter, who had previously worked on a whaling ship and in the Omilak silver mine, for five years had had a trading post at Cheenik. He may have found gold signs on the Niukluk as early as 1891. In 1895 he grubstaked a prospector who brought gold out of the area. The Libby party made several prospecting forays upriver that fall, but they did not hit pay dirt until they found and named Melsing and Ophir creeks in the spring of 1898. In late April they, along with two missionaries at Cheenik and a doctor associated with the reindeer service, founded a mining district. Shortly thereafter these men established the city of Council. Later in 1898 hundreds of gold-seekers worked the area's streams and although their technology was simple, they may have extracted $100,000 in gold. 19/

There are conflicting claims on who discovered gold just north of present-day Nome. Terrence Cole, who recently completed a study of the controversy, concluded that one of the Cheenik missionaries, Reverend Nels Hultberg, discovered a prospect on Anvil Creek in August 1898. At the time he was with a group including H. L. Blake, one of Libby's original partners, intent on prospecting the Sinuk River. Their boat encountered a storm enroute and sought the shelter of the Snake River. Hultberg had had a falling out with Blake and therefore kept his discovery a secret until he returned to Cheenik. By then he was too ill to return to the Snake River, but he passed on his information to the "three lucky Swedes"--Jafet Lindberg, a former reindeer herder, Eric Lindblom, who abandoned a whaling ship at Port Clarence in the spring of 1898, and John Brynteson, a miner from Michigan. The three became partners at Council in July. After hearing from Hultberg they boated up to Snake River and panned the magnificently rich soils of the river's tributaries of Anvil, Glacier, Rock, and Dry creeks. 20/

The story of what followed is well known. Nome grew out of the tundra as thousands of would-be gold tycoons abandoned the Klondike, Kobuk, and Koyukuk in 1899. The rush might have slowed after all the Snake River and Nome River creeks were staked. However, men then found easy and abundant wealth in Nome's beach sands and the rush to Nome swelled in 1900 to nearly twenty thousand newcomers. That year miners retrieved $3.5 million from the beach and the tributaries of Snake and Nome Rivers. 21/

The Nome discovery directly affected nearly every aspect of the development of the Seward Peninsula in the subsequent years, including its rapid exploration, the growth of communities, and the creation of a transportation network. Word of the area's wealth prompted as many as twenty thousand people to rush to the peninsula in 1900. Only a fraction of these could or chose to work on the Niukluk, Snake, and Nome finds. Many labored on the beaches. But many men wanted to claim their own Eldorado and so raced about the peninsula staking out grounds. Some of these prospectors did more staking than digging in hopes that someone would find gold near one of their claims and thus help them focus on what area to concentrate their mining efforts. 22/ Still, this overflow of prospectors probed virtually all of Seward Peninsula by the end of 1901, resulting in scores of minor gold placer operations and a few areas of major development.

In 1900 the peninsula yielded between four and five million dollars of gold. Snake River and Nome River tributaries and the Nome beach comprised all but about a million dollars of the total. 23/ The peninsula's production swelled to seven million dollars by 1906, but thereafter declined steadily leveling off to the one-to-two-million-dollar range for the 1920s. 24/

Without the introduction of capital and the expensive techniques and technology it afforded, production would have shrunk faster and more dramatically. 25/ The swarms of beach miners took out practically all the gold in Nome's sands by the end of 1900 and the easiest-worked creek and bench placers were largely exhausted within a few years. Lack of water hindered sluicing. Therefore, miners with valuable ground and sufficient capital invested in ditches; ditches cost $1,000 to $2,500 per mile. W. L. Leland and J. M. Davidson built a portion of the Miocene Ditch in 1901, the first on the peninsula. It took water from upper Glacier Creek a few miles down to Snow Gulch. By 1903 the Miocene ditch stretched to bring water from the head of Nome River to the Snake drainage. By 1906 four ditches tapped the waters of Nome River, interlacing the streams of the Snake and Nome drainages. 26/

Their success prompted imitation. In 1902 the Topkok Ditch Company began construction of a twenty-one-mile line bringing water from the Klokerblok River to rich deposits near the mouth of Daniels Creek. 27/ The various placer creeks draining into the Kougarok River produced only small amounts of gold until ditches brought sufficient water to the claims starting in 1903. 28/ In the same year miners excavated ditches for placers in the Bluestone and Solomon drainages and in 1904 in the Cripple River basin. 29/ In the next three summers men labored to run ditches to claims in the American 30/, Casadepaga 36/, Inmachuk 32/, Iron Creek 33/, Kiwalik 34/, Noxapaga 35/, Penny 36/, Serpentine 37/, Sunset Creek 38/, and West Fork Buckland drainages 39/.

The arrival of dredges further signaled capitalists' displacement of the pan-and-rocker operator. Dredges appeared on the Snake River in the summer of 1900, though they apparently failed. The machines began clawing along the Niukluk and Solomon rivers in 1903. 40/ Within five years dredges returned to the Nome and Snake drainages. 41/ By 1911 seven dredges worked the last two basins, eight dug in the Solomon drainage, four mined the tributaries to the Niukluk near Council, and two were in the Casadepaga Valley. 42/ By 1913 there were more dredges in each of these areas and the machines also were taking gold from Candle Creek, Kugruk River, and the Inmachuk River in the northeastern part of the peninsula, from Sunset Creek, and from Budd Creek, a tributary of American River. 43/ The Kugruk River and Sunset Creek operations shut down quickly and the Inmachuk dredge ceased work between 1918 and 1930. The Casadepaga machines were silent for about a decade before reviving in 1925 and a dredge on Dime Creek in the Koyuk basin started in the 1920s. Otherwise the distribution of dredges remained relatively constant through 1932. 44/ Spurred by the government's increase of gold's value in 1932, miners between 1933 and 1938 resumed dredging on Sunset Creek and initiated it on the Bluestone and Ungalik rivers and Dese and Spruce creeks. 45/

Seward Peninsula mines yielded the vast majority, but not all, of the gold extracted from Northwest Alaska. Before dredges came to the Ungalik in 1938, miners worked claims on its tributary, Bonanza Creek. Most of this occurred up through 1909. 46/ Prospectors early in the century located gold on Midas and Lucky Six creeks on the upper Noatak, but no one ever made a concerted effort to mine gold in this remote area. 47/ Small-scale operators mined the Cosmos Hills north of the town of Kobuk steadily until World War II. In 1909 prospectors found a new gold field in the lower, left-bank area of the Squirrel River basin, a tributary of the Kobuk. Annual production in the Kobuk consequently rose from about $5,000 for the years 1904 to 1908 to $20,000 to $35,000 for 1910 to 1919. 48/

Just as gold mining directly brought few changes to that portion of Alaska's Northwest outside of the Seward Peninsula, so other minerals and fossil fuels did little to attract

development in the region. Limited quantities of low-grade coal came from such divergent points as Cape Lisburne 49/, Kobuk River 50/, Kugruk River, and Coal Mine Creek. 51/ Only the deposits on the Kugruk produced coal consistently for market. Despite its low quality, its proximity made Kugruk coal marginally profitable to sell to gold miners on Candle Creek and the Inmachuk River prior to World War I. 52/

A number of other resources attracted attention. During World War I a couple of mines north of Nome produced at least one hundred and fifty tons of stibnite. 53/ Standard Oil found oil in the Kotzebue Sound in the summer of 1900 and in 1906 and 1918 drilling occurred near Cape Nome. 54/ Miners unearthed silver as a by-product of gold extraction, and prospectors also noted lead, copper, bismuth, tungsten, and mercury on the Seward Peninsula. 55/ Tin attracted commercial operations. Between its discovery in 1901 and 1919, placers on Mint River and its tributaries, Grouse and Buck creeks, yielded over one thousand short tons of tin. Much of this came from dredging which began in 1911. 56/ Less productive tin mining occurred in lodes over the divide in the Lost River drainage; in about half a century of mining beginning in 1904 these deposits produced 350 short tons. 57/

While prospectors hurried about the peninsula in search of golden gravels at the turn of the century, U.S. Geological Survey teams of geologists and cartographers made annual summer treks through the same terrain. Frank C. Schrader and Alfred H. Brooks initiated the Survey's activity on the peninsula when they spent several weeks in October 1899 visiting the placers and mapping the country between the Penny and Nome rivers in the heart of the new gold district. 58/ The following year Brooks led an expedition which used canoes to explore the Fish, Niukluk, Casadepaga, Pilgrim, Kuzitrin, and Kougarok drainages, while Walter C. Mendenhall headed another party which paddled up the Fish, Tubutulik, and Koyuk rivers. That same summer E. C. Bernard led a small mapping party on the southwestern part of the peninsula. 59/ The public demanded proper maps to the northern part of the peninsula after early gold prospects showed up in the area. Consequently, Arthur J. Collier and T. G. Gerdine supervised a group on horseback; Collier explained the switch to horseback, stating that the Survey's staff believed that "thus organized and equipped [they] would be able to cover a larger area than any one party of the previous season. . . . This expectation was realized." Collier and Gerdine's men began at Teller and charted the area toward Wales and the northern Kuzitrin drainage. 60/ The USGS mapped the northeastern part of the peninsula in 1903. Philip S. Smith and Henry Eakin led an overland expedition in 1909 from Nulato to Council which completed the Survey's mapping of the Seward Peninsula. 61/

Since mineral wealth was lacking in other parts of Alaska's Northwest, the USGS was slower to examine areas outside the Seward Peninsula. The Kobuk had some mining and so was visited first. In 1901 Mendenhall led a survey down the Kobuk in Peterborough canoes; in 1910 Smith and Eakin surveyed the same drainage on horseback. Collier charted a small area near Cape Lisburne while examining coal lands in 1904. In 1911 Smith examined the Noatak by canoe. 62/ In connection with examinations of the petroleum reserve north of the Brooks Range, Smith also examined the Aniuk, Kivalina, and Kukpuk drainages by sled in the mid 1920s. 63/

The prospectors who flocked to the Northwest after 1898 congregated in a number of small settlements and generated the need for services which made for other established white outposts. Roadhouses appeared along the trails to the gold fields. Near the mines, such as those on Big Hurrah and Shovel creeks, enterprising souls set up

stores. 64/ The fourteen-by-thirty-foot willow-pole hotel and store built in late 1900 or in very early 1901 at the mouth of the Noxapaga River was known as the settlement of Spooner. Although it is doubtful if it ever had any year-round inhabitants other than those in the store, it became the headquarters of a mining district and had a post office before disappearing altogether by mid-decade. 65/ There were other settlements, some of which had a number of buildings, which rose in the first years of the century, only to disappear within a year or two. Among these were Bering, near present-day Teller; Noxapaga, at the mouth of Turner Creek on the Noxapaga; Checkers, at the mouth of the Kougarok; and Record, at the confluence of the Pinnell and Inmachuk rivers. 66/

However, other communities rose which contributed more substantially to mining development on the peninsula. These included Solomon and Dickson, entrepots to the Solomon River placers 67/; Deering, Kiwalik, and Candle which supplied operators in the Inmachuk, Kugruk, Kiwalik, and Buckland drainages 68/; and Teller and, after 1906, Shelton to aid miners in the Kougarok and nearby areas 69/. Council, the second most important town of the peninsula was the trading and shipping headquarters for the lucrative Ophir and Melsing creek mines. Supplies reached the town by transferring from ocean vessels to small steamers off Golovin and from steamers to scows at White Mountain, giving some significance to those outposts. 70/ Nome was by far the predominent town of the region. It was as easy to access as any area on the coast and it had the region's richest mines in its backyard. During the rush it acquired an array of facilities and institutions--stores, shops, hotels, restaurants, saloons, churches, courts, social clubs, local government, a school, and a fire department. After the stampede some of the business failed and the courts were less busy dealing with conflicting mining claims and rowdy residents; however, Nome maintained a population in the thousands and continued as the hub of activity for mining in Alaska's Northwest. 71/

The miners traveled between their communities and mines on trails, roads, and in a couple cases, railroads. When Shrader and Brooks of the USGS reached the Nome area in October 1899, they observed that there were "few definite or well-marked trails." However, they stated that the country was open so that "one can without much difficulty proceed in almost any direction." 72/

Schrader and Brooks were speaking primarily of pack-train travel. Pack horses, however, were not the major mode of transport for two reasons. First, the peninsula's grasses only supplied grazing from July through mid-September. Shipping in hay and oats or sending horses south for the winter were expensive. Second, dog sleds provided a much faster mode of travel and transporting light supplies. The U.S. Geological Survey's Fred Moffit observed that prospectors preferred to stake claims in the winter when they could cover more ground in a week than they could in a month in the summer. 73/

The movement of heavy freight or the large supplies of cargo necessary for highly capitalized exploitation of the peninsula's gold, required alternatives to pack train and dog sled travel. Charles D. Lane, whose Wild Goose Mining and Trading Company bought many of the claims on or near Anvil Creek, moved quickly to provide transportation to his mines. By the end of the summer of 1900 the Wild Goose Railroad connected his claims to the coast at Nome. Over the next few years the road expanded modestly, reaching Dexter Creek by 1905. That year Lane sold most of his interest in the line. The new owners spurred construction the following year to the banks of the Kuzitrin River at Shelton. Supplies could thus reach the southern outskirts of the Kougarok mining district from Nome in half a day. However, the line was not profitable and the last engines were pulled off the road in 1910. The road changed hands a number

of times ending up with the Alaska Road Commission in 1922, which maintained the roadbed. Between 1910 and the 1950s dogs, horses, and gas engines propelled various conveyances on the track. While under ARC control, mining companies, common carriers, and private individuals operated these vehicles. Subsequently, the Alaska Road Commission gradually extended a gravel road northward over the old roadbed. 74/

The Wild Goose was not the only attempt at a rail solution to the Seward Peninsula's transportation needs. In the middle of the first decade of the century a seven-mile narrow-gauge railroad connected Council to a mining claim at the confluence of Dutch and Ophir creeks. 75/ The Council City and Solomon River Railroad was a more ambitious project. In 1903 it began extending track north up the Solomon Valley from Dickson, a settlement named after the company's general manager. But the road's life was problematic; the line reached the Casadepaga River in 1906 but ceased operation soon thereafter. 76/ In 1918 the Alaska Road Commission dismantled the track and thereafter used part of the roadbed as a wagon road. 77/

Most mine owners had to rely on roads to supply their operations. In the first years of the century miners built their own roads or, as in the case east of Nome, paid a toll on roads built by others. 78/ However, after 1905 the Alaska Road Commission assumed an increasingly important role in road and trail construction and maintenance. Mine operators and the Nome-Seward Peninsula Chamber of Commerce regularly pleaded with the ARC to extend road service. Commission expenditures immediately infused cash into the local economy. It hired local men who spent their money on the peninsula. After his area's road project was not funded one Candle saloon owner complained that, "if [the ARC] had spent $3,000 I would have got half of it." 79/ More importantly, a good road dramatically cut the cost of supplying mines, giving some operators greater profit and allowing others to develop marginal fields. 80/

When at all practical miners preferred to move heavy cargo in the winter. In the first years of the century horse-drawn sleds could haul supplies from Nome to the nearby creeks for half the summer wagon rate. 81/ The sleds did not require any improved roadbed, though the Road Commission marked some routes; indeed once the snows melted there often was no trace of the paths of winter travel. 82/

Summer travel was more restrictive. During dry weather wagons could maneuver over some stretches of unimproved tundra. As late as 1921 wagons wandered unmarked routes from Haycock in the Koyuk drainage to Bear Creek. But in many areas soggy and overgrown terrain made wagons impractical. 83/ Miners found that some of the best summer wagon routes lay in riverbeds. The USGS's Fred Moffit wrote that bars along Nome River furnished a good route from Dexter Creek to the headwaters. Adolf Knopf, another USGS investigator, noted that the stream beds north and south of the York Mountains served a similar purpose. 84/ And Thomas A. Richard, who traveled up the bed of the Solomon River, wrote that throughout the Seward Peninsula, "the roads for the most part cling to the river beds, where gravel affords fairly good footing as compared to the soggy tundra; in consequence the road is in the river and the river is in the road." 85/

Beaches also served as natural roadways in some areas. The route from Nome to Teller followed along the coast to Tisuk River which it ascended to cross a divide to Teller. Light wagons could also proceed west on the beach opposite Teller to Lost River, fording Don and California rivers on the way. 86/

Miners fashioned roads from the rail lines to their claims. In 1902 when the Wild Goose Railroad ended at Anvil Creek, roads extended from the terminus and other points on the track to mines. 87/ When the railroad reached the confluence of Iron Creek and the Pilgrim River, Iron Creek miners promptly constructed a road to it. Consequently, their freight rates plummeted from ten cents a pound, the charge via wagon from Nome, to two cents using a combination of rail and road. 88/

Most roads, though, connected with the coast or with an important river. The earliest and the heaviest-used thoroughfares connected Nome and the neighboring fields. In 1900 pack trains and dog sleds reached as far as the Kougarok district by trail from Nome, normally by way of the Nome River. In summer miners would ascend the Kuzitrin in a boat to Checkers, at the mouth of the Kougarok, and then take pack trails to the mines. 89/ Within a few years miners ascended the river to Lanes Landing, later called Shelton, which was the head of scow navigation. From there they could follow relatively high ground northward in wagons to the Quartz Creek mines and then along the Kougarok's banks to Taylor Creek. 90/ The Kougarok Mining Company initiated another route to the upper Kougarok in 1905. The company lightered considerable supplies for ditching operations to a warehouse on Kaviruk River, known as Davidsons Landing. From there a wagon and sled road extended along Kaviruk River and Henry Creek to strike the Kougarok just below Taylor Creek. In 1916 the ARC assumed responsibility for this route. 91/

One of the Alaska Road Commission's highest priorities was the location of an overland route between Nome and Council via the Solomon Valley. There already was a makeshift wagon road with grades exceeding 20 percent. In 1905 and 1906, though, the ARC marked and constructed a new route with a 10 percent maximum grade from the Council City and Solomon Railroad station at East Fork. When the railroad ceased operation, the Road Commission expended more funds to improve the road segment in the Solomon Valley up to East Fork. 92/

Roads from the coast or a river also penetrated to smaller mining districts. In the first years of the century a wagon road connected the Bluestone placers with Teller. 93/ Wagons followed a road south from Candle to Candle Creek. With greater difficulty wagons could also cross the tundra from Candle to the Bear Creek mines. Supplies striking the coast at Deering could travel by wagon up to mines along the Inmachuk. 94/ When miners began to extract gold near Haycock in the Koyuk drainage, they cleared such a crude road from Dime Landing that the cost of winter sledding was a quarter of that required for summer transport. 95/

There was little road-building outside the Seward Peninsula. Exceptions were those to the mining areas north of the Kobuk River. Miners cleared trails from the river at Shungnak to their claims early in the century; they had the help of a U.S. Commissioner who compelled prisoners to build a trail to the diggings on Dahl Creek. 96/ The operators in the Klery Creek area of the Squirrel River drainage pulled wagons across a swamp. The ARC corduroyed part of this in 1912. However, it fell into disrepair quickly and subsequent miners and the ARC struggled periodically into the 1930s to maintain a useable summer road to the Klery Creek placers. 97/

The gold discoveries which spurred the development of a white society in Alaska's Northwest also were at the root of a radically altered way of life for the region's Natives. Some Yupik and Inupiat found jobs at the mines; a few eventually got their own placers. The increased number of whites brought the Natives into closer contact with

western ideas and products which they adopted with varying degrees of enthusiasm and benefit. In order to help direct and facilitate Natives' accommodation to the gold-rushers' culture, well-meaning whites promoted a proliferation of government schools.

According to A. B. Kinne of the Bureau of Education, Natives had difficulty getting jobs at Council in 1910 because of the "opposition and prejudice of the whites." Nevertheless, there were some exceptions at Council 98/ as well as elsewhere. Even a Native at Shaktoolik engaged in mining in 1918 according to a teacher's report 99/; he probably worked on the Ungalik, the Seward Peninsula, or along the Yukon because the Shaktoolik was not a mining area. Some Koyuk River Natives engaged in seasonal mining. 100/ Many of the Natives at Deering worked at the mines up the Inmachuk. Clarence Andrews, who taught at the village, reported that, "some of the best [hydraulic] nozzle men were Eskimos." 101/ Natives were most closely involved in mining in the Kobuk drainage. Brooks of the USGS observed in 1908 that Eskimos in the valley were "very largely employed, and are said to make very good workmen." 102/ Shungnak Natives were among those who rushed to the Squirrel River placers in 1910. 103/ In that year one Native in the village cleared $1,400 from his own claim. 104/ Seven years later there were three Shungnak Native-owned mining companies operating much like those of neighboring white firms. 105/

Whites also hired Natives for non-mining jobs. Winter freighting and wood-cutting were common occupations which drew Natives to the white settlements. 106/ Others served as pilots on boats working out of Kotzebue, or provided a variety of services for the Bureau of Education, including cutting lumber and building schoolhouses, as that agency expanded into numerous villages between 1907 and 1910. Villagers learned to make western goods, including boats, which some sold to whites. 107/ White traders hired Natives as clerks at some outposts, while other Natives maintained their own stores. 108/

The Eskimos also partook in the western economy through fur trapping. The market in the first three decades of this century motivated Natives to expend greater effort in gathering furs. Prices rose so that a white fox skin brought $1 in 1900, $10 in 1910, and over $50 in 1929. Natives eagerly sought furs which could yield them annual incomes into the thousands of dollars. 109/ The teacher at Shungnak in 1919 noted that many villagers left the community earlier than usual after breakup so they could kill a maximum number of muskrat which were bringing very good prices. 110/

The government's education and reindeer herding initiatives had a far-reaching impact on Native life. In 1905 Special Agent Frank C. Churchill reported to the Secretary of the Interior on his mission to examine the Bureau of Education's schools and reindeer in Alaska. As a result, the Bureau increased the number of schools in the district, placed reindeer herds near these schools under the supervision of the government teacher, and dramatically accelerated the distribution of the animals among the Native population.

Between 1907 and 1910 the Bureau of Education instituted schools in scores of Alaskan Native villages and took over teaching responsibility from mission schools. When the agency decided on a school site, it often determined the location of a village. Natives, especially those living on the region's rivers, led peripatetic lives. However, Native families quickly congregated around the schools to afford their children an education. Eli M. Myers, who built the log schoolhouse at Shungnak in October 1907, reported that thirty to forty families quickly converged on the area and built cabins. 111/ Similarly, Noatak owed its origins to a Bureau school placed at the site in 1908 112/, as was the

case with Noorvik, where the government put a school in 1915. 113/ The schoolhouses placed on the Buckland and Shaktoolik rivers prompted Natives to build a cluster of cabins around them. These settlements took the name of the respective rivers. Both schools were originally located inappropriately, and the Natives consequently moved the schoolrooms and established new villages of the same names. 114/

In 1907 the government also began the rapid expansion of reindeer herding when it placed herds at Council, Egavik, Golsovia, Marys Igloo, Shaktoolik, Shungnak, and the mouth of the Sinuk River. Within eight years the animals reproduced sufficiently to permit two dozen additional herds in the region. At the same time Native ownership swelled from 6,400 in 1907 to 20,000 in 1911, to 46,700 in 1915. Some owners marketed the meat locally and the Bureau of Education tried, albeit not very successfully, to sell it as well as the hides and antlers to stores in the States. 115/

In its efforts to disseminate ownership of the deer, the Bureau may have been too successful. The teacher at Shungnak observed in 1919 that the villagers each possessed so few reindeer that none had a stake in the herd that would motivate proper care. Sixty years later, in his study of reindeer herding in Alaska, Richard Stern pointed to this situation as a persistent problem with Native-owned herds. Stern noted that the average owner had animals to help his subsistence, but not enough to generate a sustained market operation. 116/

After 1914 non-Natives, most notably the Lomen family of Nome, began herding reindeer. As both white and Native herds grew in the 1920s and 1930s reaching a peak of nearly 800,000 animals, competition for range hurt the industry. Moreover, the Lomens had difficulty selling the product in the Lower 48 and ownership and management problems and a limited local market continued to beset Native operators. Some Natives were able to accumulate enough animals to merit making herding a full-time venture. But the Bureau of Education opposed concentrated ownership and thus supported joint-stock companies in herds beginning in the 1920s. However, these did not prove efficient. Therefore, in the 1940s, after the government bought out the Lomens and other white owners in the late 1930s, the federal government began to encourage individual ownership. This system continues. Today, following encroachment of caribou into the area north of the Seward Peninsula, reindeer herding is limited to the area south of the Selawik River and the number of animals is about twenty-five thousand. The reindeer is primarily valued, not for its meat, but for its antlers, which are sold as aphrodisiac in the Orient. 117/

Missions, paid employment, and government schools altered Natives' lives in a variety of ways. The Eskimos generally adopted Christianity readily. Wages permitted purchase of more white goods. Not only did Eskimos acquire such basic trade items as flour, tobacco, firearms, and ammunition, they also bought stoves, furniture, and sewing machines. By 1919 nearly every family in Shungnak had a sewing machine and one had an organ. With these innovations the Native women adopted the new techniques of bread-baking and sewing. 118/ The schools promoted these skills for girls and taught boys carpentry. Some schools acquired whipsaws or even sawmills with which they built riverboats which gradually replaced the traditional umiat. 119/ The teachers also brought western medicine to the Natives and assisted them to plant gardens of potatoes, cabbages, turnips, lettuce and radishes 120/ and to establish village councils. 121/

For all the changes brought on by the intrusion of white society in the wake of the gold rush, most Natives continued to gain a large measure of their livelihood from traditional sources. Families settled in villages so that children could acquire an education. Some

men herded caribou, sought wage labor, and used western firearms and wooden boats. Women used sewing machines and metal stoves. Still the Natives were only grafting what they desired of western culture onto their own.

Although the modifications in Natives' lives varied from area to area, a couple annual reports from Fred Sickler, the teacher at Shungnak through most of the 1910s, captured much of the variety, flexibility, and sense of compromise with which they accepted changes offered by western society. He reported in 1916 that many Natives had engaged in mining for wages during the Squirrel River rush around 1910. As a consequence these people, who previously had had little except Native food, "became so accustomed to imported foods that these became necessities." Once Kobuk mining slowed, some of the men shifted back to trapping as a primary means of getting cash while others went to the Koyukuk for seasonal work. There were few fur-bearers near Shungnak, so trappers sledded fifty to over one hundred miles to reach good grounds. Some of these chose to keep their children in school and return periodically to visit. But those who stayed out all winter without return visits could harvest twice as many pelts. Consequently, some men took their children out of school and moved their families with them to their traplines. On their traplines game and fish normally were plentiful and they were less susceptible to contagious diseases. Although he was the teacher, Sickler found it impossible to argue with the logic of those trappers who took their families out of the village for the winter: "under the present system industry and education lie in opposite directions."

Sickler also discovered that some inhabitants may have had social reasons for spending little time at Shungnak. Elders explained to him that the river people were not used to living together. Rather, they traditionally tended to scatter; before the school "we never spent more than a year in the same house." The comparatively close and constant contact of Shungnak resulted in gossip and strife, which some chose to avoid by leaving. 122/

Three years later Sickler drafted another particularly insightful report. He described the Natives' activities over the previous year. Only a few herded reindeer. Although a dozen men mined and others headed to Kotzebue to trade and get jobs piloting boats in the summer, most villagers engaged in traditional fishing and hunting. In late September the women picked berries and dug roots while the men went on their fall bear hunt. In October the villagers returned to Shungnak where they prepared for the winter. Trapping was the principal occupation through the winter, while in the spring the Natives hunted muskrat and a few planted gardens.

Sickler also noted a mixture of tradition and innovation in other practices. The Natives came to the teacher often to have cuts and sores dressed and for treatments with cathartics and iodine. But most failed to take medicines requiring regular dosages unless the teacher visited them; then they would take their prescription only so as not to refuse. 123/

In the decades since Sickler penned his reports the Natives of Shungnak and the rest of Alaska's Northwest have continued to pursue the opportunities offered by their traditional ways and the evolving white society which touches their territory. An anthropological study by D. C. Foote and H. A. Williamson summarized the lives of Noatak and Point Hope residents up to the early 1960s. Despite their seeming remoteness from the world economy, both villages suffered a loss of income from the drastic drop in fur prices in the 1930s. But just as in the Lower Forty-eight, the New Deal provided some assistance. The Civilian Conservation Corps and the Works Progress Administration undertook small projects in the area which generated wages. In

the late thirties and early forties old age assistance, welfare, aid to dependent children, and aid to the blind added to the villagers' cash income.

The 1940s saw a return of prosperity. Summer employment opportunities increased, fur prices rose markedly, and the large military presence in the territory generated a much larger market for Eskimo curios and skin clothing. Point Hope's annual income from curios and Eskimo clothing catapulted from thirty-three hundred dollars to eighteen thousand between 1939 and 1943. Fur prices increased; for example, the value of a white fox skin doubled and that of a polar bear tripled between 1948 and 1961. Noatak inhabitants devoted more effort to muskrat hunting in the forties when the price reached $1.50 per pelt. To do this villagers discontinued their traditional spring move to the coast. Through the fifties few families went to the sea. Rather, short trips by the men between February and April replaced the movement of all villagers. 124/

Wage employment, especially that outside the villages, rose in the 1950s. Even in the depression years of the thirties, Noatak men got longshoring work late in the summers at Kotzebue. In the fifties construction of the Distant Early Warning defense sites provided nearly every able-bodied man in Point Hope with seasonal work at good wages. Noatak men took jobs in the canneries of southern Alaska as well as construction and interior mining employment. In 1960 over 80 percent of physically capable Noatak men pursued wage labor. Roughly equal numbers worked in the canneries; in Fairbanks, primarily in the mines; and in Kotzebue. Most of the latter worked for B&R Tug and Barge 125/, which at times during the summers of the 1960s employed over 250 Natives in northern Alaska. 126/

In 1958 the total incomes of Point Hope and Noatak were $110,000 and $69,000, respectively. The sale of Native products accounted for a third of Point Hope's earnings, but only 12 percent of those of Noatak. Summer wages brought in about a quarter of each village's cash. Forty-five percent of Noatak's money and thirty percent of Point Hope's came from government salaries and unemployment benefits, and government benefits accounted for seventeen percent and nine percent on village income, respectively.

In both settlements the increase in post-war earnings spurred modernization of home construction and the purchase of durable goods. By 1959 there were seven frame homes in Noatak. Villagers bought radios, phonographs, and furnishings. Outboard motors were popular acquisitions. In 1940 there were not any in Point Hope and Noatak had only two in 1947. By 1959 the former had forty-five outboard motors and the latter twenty-eight. 127/

For all the increase in cash employment, Foote and Williamson found that the Natives continued to depend primarily on hunting and fishing to survive. Because most jobs were seasonal, not even involving all of the summer, residents could still pursue game and fish. The researchers stated that Noatak residents could not survive without caribou and that the products of the hunt provided "most of the food, fuel, and work clothing" for Point Hope. The bulk of Noatak's diet consisted of caribou and fish. The village's store took in more money for candy and tobacco than for canned goods. Between September 1960 and June 1961, 84 percent of Noatak's fresh meat was caribou; nearly all the rest was fish. Similarly, 80 percent of Point Hope's food came from hunting and fishing and 20 percent from imported food. Thus Foote and Williamson assessed the importance of wage and subsistence labor as follows: "Summer employment is not a desperate attempt to make ends meet; it is an integral part of the activities of the heads of many . . . households. In fact, the majority of families that benefit directly from summer wages

are the most prosperous in the community. On the other hand, hunting is not a substitute for a better way of life that is unattainable. . . . Hunting is considered a very good way of life." 128/

Foote and Williamson observed that after 1910 there was a shift in the role of whites in the Eskimo communities of Northwest Alaska. The white population which depended upon Natives to supply commercial commodities for market was gradually replaced by one dedicated more to servicing Native needs. 129/ The whalers vanished and the mining force shrank. In their stead were teachers, missionaries, and a number of traders and shippers who brought goods to the villages.

Since Foote and Williamson's report, the passage of the Alaska Native Claims Settlement Act has again altered the Eskimos' role in the Northwest. NANA and Bering Straits Native Corporation have emerged as major land owners in the region. They have used their wealth to purchase hotels and construction companies in the Northwest. NANA also holds title to potentially rich mineral deposits.

Minerals and oil are still major attractions of the region. Currently oil exploration is occurring in the Norton Sound. During the sixties and more recently a number of companies have proposed to dredge the seabed near the mouth of Daniels Creek and off Nome. 130/ Gold mining has continued on the historic Nome placers and other outlying mines. However, the greatest interest in expanding Alaska's mineral activity has focused on the copper, lead, and zinc deposits in the Noatak and Kobuk drainages. In the late 1940s Rhinehart Berg noted copper deposits north of the village of Kobuk. The Kennicott Copper Corporation, through its Bear Creek Mining Company, gained options to Berg's discovery and undertook extensive exploration in the 1950s and development work in the early 1960s 131/, before giving up on the operation in the mid sixties due at least in part to falling copper prices. However, exploration continued. In 1965 Bear Creek discovered the Arctic deposits of copper and zinc near the divide between the Kobuk and Noatak rivers north of Shungnak and five years later I. L. Tailleur reported the Red Dog lead-zinc-barite concentration north of the Noatak. 132/ Bear Creek announced in 1981 that it intends to mine nine thousand tons of ore from the Arctic deposit before the end of the decade. However, to date large-scale mining of these deposits, along with the Lik lead-zinc deposit along the Wulik River await adequate transportation. NANA and Cominco American Inc. which have joined forces to develop the Red Dog mine are seeking State assistance in solving the problem of how to get more than one hundred thousand tons of ore a year to market. 133/

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CHAPTER THREE

WATER TRANSPORTATION

Travel in Northwest Alaska, whether by river or road, has always been oriented toward the sea. The sea's resource wealth has drawn inland Eskimos and the relative ease of coastal travel, including that to Siberia, has dictated that the Natives' trading centers be at the ocean's edge. Whaling first attracted whites in large numbers to Norton and Kotzebue sounds, but when mining emerged as the region's leading economic activity, whites came to view the sea as the primary supply route from Seattle and San Francisco to western capitalism's remote northern outposts.

The ocean is not an ideal access route to northwestern Alaska. This region is cursed with some of the shallowest seas in the world. Nowhere on the coast can ocean-going vessels dock. Deep-draft ships must anchor fifteen miles away from Kotzebue. Lightering services to town in 1967 accounted for a fourth of all shipping charges from Seattle to Kotzebue. Shippers also employ lighters at Nome, which since its founding has been the primary entrepot for the southern Seward Peninsula. Ships there do not have to anchor as far off shore as at Kotzebue. 1/ However, the Nome coast is completely unsheltered and is frequently battered by storms, which in the gold rush era sent prudent captains to the lee side of Sledge Island, twenty miles west of the city. St. Michael, though today of little importance, once was the major port in the region. It served as the transfer point from ocean-going ships to Yukon River steamboats as early as 1869 and remained the primary route to the upper Yukon drainage until the completion of the White Pass and Yukon Route in 1900 and to the lower Yukon until the Alaska Railroad's riverboat service began in 1923. 2/ St. Michael is somewhat sheltered, but as at Nome and Kotzebue, cargo and passengers have to be lightered to shore.

Supplying Alaska's northwest coast is limited to the open water season. Breakup normally occurs at Nome in late May and at St. Michael in early June. At both places freeze-up takes place in the second week of November. The ice retreats from Kotzebue in late May or early June. However, because the Sound remains clogged with ice, ocean vessels can only reach Kotzebue for about one hundred days from early July to early October. 3/

Besides Kotzebue, Nome, and St. Michael, lighters have brought cargo ashore at numerous secondary access points to Alaska's Northwest. During the gold rush, ocean-going ships anchored off a number of placer gold regions; normally these were at the mouth of a river large enough to furnish small steamboat access inland. Such "ports" included Golovnin Bay for the mines in the Council area, Port Clarence, through which the Kougarok and Bluestone districts could be reached, and Kiwalik, from which small boats proceeded up to Candle. 4/ More commonly, shippers transferred cargo from ocean-going to coastal vessels at Nome or St. Michael. From these points the smaller coastal ships supplied the mining camps of the Seward Peninsula, anchoring not only at Golovin, Teller, and Kiwalik, but also at Dime Landing, Bluff, Solomon, and the Shishmaref Inlet. 5/

The region's rivers and streams disgorge their ice in mid to late May and freeze over five months later. 6/ Many are short or so shallow as to discourage travel. Early prospectors found the open country of much of the Seward Peninsula to be easier to traverse than it was to ascend the rivers. Nevertheless, Natives, prospectors, miners, and, more recently, shippers and recreationists have navigated watercraft of varying descriptions on many of the area's rivers.

Anthropologist Ernest S. Burch, Jr. published a series of papers based on ethnographic and historical research conducted in 1968 in which he concluded that rivers "were the primary avenues of inland transportation in aboriginal northwest Alaska." Most of his data referred to people traveling to reach hunting and trading sites on Kotzebue Sound and the Chukchi and Beaufort seas. Burch wrote that inhabitants along the lower Noatak and Kobuk rivers and short rivers such as the Kivalina sledded to the coast carrying their umiaks in April to hunt seals. But bands living farther up the Noatak, Kobuk, and Selawik traveled in their umiaks and kayaks on the spring flood, arriving at the coast in June. (Russians and some Americans used the Russian terms for umiak and kayak--bidarra and bidarka.) Normally all the residents of the upper Noatak drifted down each summer making for flotillas of several score crafts. Only traders among the Kobuk and Selawik people came to the coast. Average downstream speed was forty-five to fifty miles per day. The return trip, undertaken between mid August and mid September, was far more arduous. Sails occasionally could propel the boats, but normally people poled and tracked upstream. Dogs could do much of the tracking. Travel was also slowed because the umiaks were commonly loaded with several tons of essential cargo. If the water was high it could take Natives four to six weeks to cover the same distance they had made in three or four days of easy downstream travel in the spring. During low water the weaker current and exposed gravel bars made tracking easier. Still, the Eskimos could go only about nine miles in a day. 7/

Although early explorers of the Kobuk River observed numerous Native birchbark canoes, 8/ Burch indicated the primacy of the seal or walrus skin umiak with a driftwood frame. Ocean-going umiaks were thirty to nearly forty feet long. These were taken upriver. Umiaks especially built for river travel were longer and could transport a crew of twelve with four to five and a half tons of cargo while drawing less than two feet of water. A major liability was that the skins had to be dried regularly to preserve them. Consequently, every day or two the Eskimos hauled the cumbersome vessels out of the water. Also, the river-style craft was too flimsy to survive any rough weather on the ocean. 9/

Evidence of aboriginal boat travel exists for rivers on the Seward Peninsula and on the coastline south of the peninsula. Natives may have traveled between Port Clarence and Golovnin Bay via a Kuzitrin-Pilgrim-Niukluk-Fish River route in order to avoid coastal storms. 10/ Caribou hunters annually kayaked up the Koyuk, Inglutalik, and Unalakleet rivers. 11/ In 1866 a Western Union employee wrote that Natives traveled in bidarkas many miles up the Inglutalik to fish. 12/ And certainly Eskimos used some type of watercraft to access their summer fishing settlements, which anthropologist Kathryn Koutsky stated were "located at the confluence of almost every tributary of the Fish and Niukluk rivers" as well as at several points along the Serpentine River. 13/

The whites who swarmed to the region in the late nineteenth century introduced new types of watercraft. In July 1884, Lieutenant J. C. Cantwell's launch entered the Kobuk River, beginning the first steam-powered ascent of a river in northwest Alaska. 14/ During the unwarrantedly enthusiastic rush to the Kobuk in 1898 and 1899, numerous

small steamboats hurried up and down this river. 15/ Steamboats also were used on the Kiwalik, Kuzitrin, Fish, and Niukluk rivers during the early twentieth century in connection with mining. 16/

Whites utilized pole boats and small riverboats. Pole boats were narrow tapered vessels, twenty to thirty feet long. They could carry close to a ton and brought supplies up the smallest and swiftest streams to the sites of prospecting or mining. 17/ Riverboats were broader, shorter, and had a flat bottom and square bow. Prospectors and miners in the early part of the century used pole boats and riverboats on scores of rivers in northwest Alaska.

Moreover, Natives adopted wooden boats. By 1919 a Native of Koyuk and Shaktoolik had attached a gasoline engine to his boat. 18/ In the 1910s Bureau of Indian Affairs officials reported that some Natives in Shungnak built wooden boats, though their traditional birchbark craft continued to predominate. Also, Shungnak residents continued to use large seal- or walrus-skin umiaks until at least 1920 and one or two skin-covered kayaks persisted until 1939. Gradually canvas replaced skins on the kayaks and double-pointed wooded boats came to predominate. There were only three inboard and one outboard motors in Shungnak in 1939, but by the mid 1960s virtually every family had at least one outboard for their wooden boats. 19/

Prospectors' and miners' use of the region's rivers declined after the first part of the gold rush. Interest in exploring many streams evaporated when the first few parties ascending a river failed to find colors. Conversely, if a stream yielded good returns, investors bought up claims and shipped in equipment by trails, roads, or railroads, which frequently provided more efficient transport than small, winding, and normally frozen rivers.

Nevertheless, water transportation has remained important in the past three-quarters of a century, not only for maintaining Native subsistence activities, but also for supplying villages and furnishing recreational opportunities. Natives spread out from the communities of Alaska's northwest to hunt, fish, and trap along many water bodies. As the Native allotment information contained in the Appendix indicates, many of these people reached their subsistence land by boat. During WWI and possibly after, small gasoline-powered schooners regularly ascended the Koyuk River to Dime Landing and lighters reached Council via the Fish and Niukluk rivers. 20/ Small steamboats and lighters took supplies up the Kiwalik to Candle prior to WWII; tugs and barges have moved heavy freight up to the town in the 1970s. 21/ All this century, heavy freight has moved far up the Kobuk to river communities. Deep-draft barges can negotiate the river to Kiana. Shallow-draft barges normally can reach Ambler and occasionally they can make it to Kobuk. 22/ Finally, since WWII, the airplane and the gradual "crowding" of other parts of Alaska has helped promote recreational activities in the northwest, including fishing and float trips by riverboat, kayak, canoe, and inflatable raft. Among the more attractive streams for recreationists are the Noatak, Selawik, Koyuk, Unalakleet, and Kobuk rivers, along with the Kobuk's tributaries, the Ambler, Salmon, and Squirrel rivers. The Bureau of Outdoor Recreation and the National Park Service have examined all of these as potential Wild and Scenic rivers.

As in the first chapter, the water bodies are listed in north-to-south order with tributaries listed after the streams into which they empty. Streams which flow directly into the ocean are in capital letters; tributaries are underlined.

KAY CREEK, NIAK CREEK, ALKALUGEN CREEK, UKINYAK CREEK, ANGOLIK CREEK, SIGRIKPAK CREEK, SINIKTANEYAK CREEK, AKALOLIK CREEK,

NALAKACHAK CREEK, KUNUK CREEK, ANGAYUKAK CREEK, ISUK CREEK, AGARAK CREEK, IKIJAKTUSAK CREEK, NASORAK CREEK, OGOTORUK CREEK, TUMI CREEK, KUROPAK CREEK, KIKTOYA CREEK, KISIMILOK CREEK.

All these water bodies flow to the ocean between Cape Lisburne and Cape Seppings and are within the area exploited by Natives of Point Hope. Those listed through Akalolik Creek are north of the Kukpuk River; the others are to the south.

Anthropologist Ernest S. Burch, Jr. utilized his own interviews with Point Hope residents undertaken in 1969, 1970, and 1980 and the ethnographic work of other researchers from the 1940s through the 1970s to present a general description of the life of Point Hope Natives in the first three-quarters of the nineteenth century. The subsistence region of these people included these creeks and the unnamed creeks which flow into the ocean between them. 23/ However, Burch found no evidence of water travel on them. Indeed, he wrote that "boat travel in the Point Hope Region was restricted to the ocean and lower Kukpuk River, the other rivers being too shallow to float even such shallow-draft craft as umiat." 24/ Similarly, James W. VanStone, another anthropologist, who wrote a book on Point Hope focusing on the mid twentieth century, mentioned summer fishing and boat travel on the Kukpuk but on no other stream. 25/

The lowest portions or all of these creeks from the unnamed stream emptying into the ocean several miles north of Kapaloak Creek southward through Isuk Creek were included in lands for which BLM issued an interim conveyance to the Natives of Point Hope in January 1977. None were found navigable. The conveyance document, however, did reserve a fifty-foot easement for a proposed trail along the left bank of Akalolik Creek to facilitate travel across Native lands. 26/

UNNAMED CREEK (mouth in Sec. 16, T. 8 S., R. 60 W., Umiat Meridian), KAPALOAK CREEK, KILIKRALIK CREEK

These water bodies flow into the ocean north of the Kukpuk River. According to anthropologist Ernest S. Burch, Jr., who did ethnographic research at Point Hope in 1969, 1970, and 1980, Point Hope Natives had a fall-winter camp on these streams during some portion of the period 1800-1875. Arthur J. Collier of the USGS noted an abandoned village on Kapaloak Creek in 1904. Burch's study is not clear whether the camps were a mile above the mouths or at the mouths of these streams. Access to the streams from Point Hope certainly was by umiaks. Whether they traveled up the stream is uncertain, though Burch did state that "boat travel in the Point Hope Region was restricted to the ocean and lower Kukpuk River; the other rivers being too shallow to float even such shallow-draft crafts as umiat." The lower half of Kapaloak Creek and all of Kilikralik Creek were in lands for which BLM issued an interim conveyance in 1977. The agency found neither stream to be navigable. 27/

KUKPUK RIVER

Anthropologist Ernest S. Burch, Jr. utilized his own interviews with Point Hope residents undertaken in 1969, 1970, and 1980 and the ethnographic work of other researchers from the 1940s through the 1970s to present a general description of the life of Point Hope Natives in the first three-quarters of the nineteenth century. Umiak travel on the Kukpuk River was important to fall subsistence hunting and fishing. Their umiaks were approximately thirty feet long, six feet wide, and two and one-half to three feet deep. Most Point Hope Natives who wintered along the Kukpuk tried to ascend the river in September although some waited until October to sled up the river. There they would

take advantage of good char and grayling fishing and hunt caribou. Burch did not state how far up the Kukpuk the Natives went in their umiaks. However, he located fifteen fall and winter sites on the river, as indicated by the collective recollections of his informants. Most were below the Ipewik River, two were at the mouth of this important right bank tributary, and three were farther upstream. Two of the sites above the Ipewik were at the mouths of Kokirat Creek and Kakpeyak River. The third was at Alolukrok, which is marked on USGS quadrangle maps in Sec. 34, T. 32 N., R. 29 W., Kateel River Meridian. Normally Natives occupied one house at Kokirat Creek and Kakpeyak River and two dwellings at Alolukrok. But Burch believed these sites were no longer regularly used by the 1880s. Rather the Natives restricted themselves to a handful of camps from Ogsachak Creek downstream. 28/

Continued Native use of the river in the 1920s probably prompted USGS geologists Philip Smith and J. B. Mertie to observe that the Kukpuk "affords an easy route into the interior." Anthropologist James W. VanStone, who studied the Point Hope people extensively in the mid 1950s, described a fall subsistence practice substantially unaltered from that described by Burch. Fishing at the mouth and along the lower reaches of the Kukpuk River was still the primary activity of the season and the residents also hunted caribou from outboard-motor-powered skin boats. VanStone said the Natives ascended the river "a short way." 29/ Burch may give a more precise upper limit to the Natives' autumn ascent of the river. After stating that by the 1880s fall settlements were confined to points at or below Ogsachak Creek, he wrote that in "regular years" sites up to this same point were the only ones which "have been regularly occupied as fall fish camps." Burch changes the verb tense from the previous sentence from past to present, making it plausible that "regular years" is a typesetting error for "recent years." 30/

Besides the Natives' subsistence river travel, there has been at least one scientific boating trip on the Kukpuk. In 1927, an expedition associated with the Field Museum, traveled in the open season on the Kukpuk an unstated distance looking for birds. Although the report of this trip leaves the mode of transport uncertain, the party had a rowboat and kayak on their yacht. 31/

Between 1958 and 1960 Donald C. Foote and H. A. Williamson conducted a study of the people of Point Hope. Among their observations was that from 1940 to 1959 the number of outboard motors in the settlement rose from zero to forty-five. During the summer these motors powered boats up the Kukpuk to Ogsachak Creek to gather food. 32/

The BLM in 1977 addressed the navigability of the Kukpuk and the propriety of easements near it in conveying lands to Tigara Corporation representing Point Hope Natives. The conveyance area included all of the river west of the township line common to T. 33 N., Rs. 29-30 W., Kateel River Meridian. Also in this land were many Kukpuk tributaries, including about the lowest ten miles of the Ipewik. The BLM declared that a portion of the Kukpuk was navigable due to tidal influence, but otherwise it found the river and its tributaries to be nonnavigable when issuing the Interim Conveyance in January 1977. At the same time it accepted two easements along the Kukpuk. It placed an easement originally proposed by the Land Use Planning Commission and BLM's Fairbanks District Office along the left bank of the Kukpuk through the selection area. This followed an existant route of travel and its one-hundred-foot width would permit construction of a two-lane road. The Interim Conveyance also called for a site easement recommended by ADF&G at the confluence of the Ipewik and Kukpuk. The site extended twenty-five feet into the riverbed and was to be used as a boat-landing and camping ground. 33/ In June 1983 the BLM again found the Kukpuk nonnavigable, this time in connection with State-selected land upriver from the village's land through T. 32 N.,

R. 28 W., Kateel River Meridian. 34/ That same month the BLM found the Ipewik to be nonnavigable in State-selected T. 10 S., Rs. 53-54 W. and T. 11 S., R. 56 W., Umiat Meridian. 35/

ASIKPAK RIVER

The BLM accumulated information on the Asikpak River in the course of conveying land to the village of Kivalina. At a village meeting at Kivalina on April 28, 1976, residents stated that this water body was too shallow for boats. 36/ Howard L. Smith of BLM's Fairbanks District Office gathered information from Kotzebue guide Nelson Walker, from unspecified residents of Kivalina, and from a survey of Native allotments to prepare a May 27, 1977 report on the stream's navigability. Smith concluded that the area was used primarily for winter hunting, but that the Asikpak was "passable to shallow draft river boats to a limited extent during periods of high water." 37/ Sherman Berg, a realty specialist at BLM's State Office wrote a memo on April 11, 1980 noting that Keith Woodward, a BLM natural resource specialist stationed at Kotzebue, had no information to add to Smith's. 38/ The State informed the Bureau's navigability section in a March 22, 1983 letter that "jet boats can travel 8-10 miles" up the Asikpak. 39/ Nevertheless, on June 24, 1983 the BLM issued its final easement report for the Kivalina conveyance. It determined the Asikpak River to be nonnavigable. 40/

IMNAKUK CREEK

Imnakuk Creek is within the Kivalina village conveyance area, but no information on travel along it is in the BLM's files. On June 24, 1983 the agency determined it to be nonnavigable. 41/

KIVALINA RIVER

Anthropologists Doris J. Saario and Brina Kessel studied Kivalina inhabitants' subsistence life between 1959 and 1961. They noted that villagers used "large, open skin boats" to seine fish. However, they primarily fished the Wulik River. The researchers wrote that no fishing occurred on the Kivalina "because it is too shallow and has few fish except Arctic grayling." 42/

In 1981, a BLM party attempted to inventory archaeological sites along a projected mining road near an unnamed tributary of the Kivalina. Their base camp was in the northern half of T. 32 N., R. 23 W., Kateel River Meridian. They originally intended to survey fifteen to eighteen miles of the river, but "a sudden drop in water level just before the field crew arrived prevented them from floating the river." 43/

The BLM accumulated information on water travel on the Kivalina River in the course of conveying land to the village of Kivalina. Village residents at an April 28, 1976 meeting stated that they did not want easements through their land along the Kivalina which was one of their prime subsistence areas. They went on to state that they could prove this river was too shallow for boats. 44/

Phil Driver wrote to BLM on May 27, 1976 that he had a Trade and Manufacturing site on the Wulik River which he used in conjunction with his fishing and hunting guiding operations on both the Wulik and Kivalina rivers. He began occasional use of the area in 1969; regular open season use of the lodge began in 1973. He guided twenty-five to thirty people annually from 1973-75 and used a raft and a riverboat. He also stated that most of the charter services at Kotzebue brought fishermen to the Kivalina River. 45/

On May 27, 1977 Howard L. Smith of BLM's Fairbanks District Office drafted a report on the navigability of the Kivalina River relying on information from Driver, two Kotzebue men, and Ken Alt of ADF&G in Fairbanks as well as a survey of Native allotments. There was less subsistence and recreational use of the Kivalina River compared to the Wulik. Smith wrote that subsistence use was most intense at the river's mouth, but noted Native allotments along the stream to T. 30 N., R. 21 W., Kateel River Meridian. He stated that recreation-oriented activity, such as Driver's, largely took place above T. 29 N., R. 24 W., Kateel River Meridian, though as much as a quarter of all recreational use was farther downstream. Shallow-draft boats twenty to twenty-five feet long were the common craft of the area. Smith learned of no obstructions on the river to boat travel. 46/

In January 1978 Smith elaborated on boat use on the Kivalina in his analysis of a proposed streamside easement along the river. He wrote that Driver did about half of his guiding on the Kivalina and that he went downstream as far as Sec. 7, T. 28 N., R. 25 W., Kateel River Meridian. Smith stated that the Kivalina was,

> passable to shallow draft river boats to a point about 5 miles above the selection boundary [township line common to T. 29 N., Rs. 24-25 W., Kateel River Meridian]. However, from the vicinity of the northern boundary, where the river becomes braided, passage is difficult even to river boats, according to Mr. Driver. Other than Mr. Driver's guiding operation, no evidence was obtained on commercial use of the Kivalina and it appears that only shallow draft boats have used the stream.

Smith thus recommended that the river be determined nonnavigable and that, because recreation-oriented users flew into the portion of river above the selection area, an easement need not be placed along the river. 47/

Sherman Berg, a BLM realty specialist, wrote a memo on April 11, 1980 addressing the navigability of water bodies in the Kivalina selection area. His report added no information to that supplied by Smith. However, he recommended that the Kivalina be determined navigable because "trade and travel" was or could be conducted on it. 48/ On March 22, 1983 the State navigability staff wrote BLM that boats traveled up the Kivalina "well above Kitingirak Gap." 49/ The BLM determined the river to be navigable through the selection area on June 24, 1983. 50/

The BLM has also made navigability determinations for the upper Kivalina in State-selected lands. On September 10, 1980 the State Director approved a Fairbanks District Office recommendation that the river be declared nonnavigable in T. 32 N., R. 23 W., Kateel River Meridian, well upstream of a braided section in Tps. 29-30 N., R. 24 W., Kateel River Meridian where the District Office stated the gradient obstructed navigation. The BLM again found portions of the Kivalina nonnavigable on June 29, 1983 in a memorandum concerning State-selected lands in T. 30 N., R. 24 W., and Tps. 31-32 N., Rs. 24-25 W., Kateel River Meridian. The BLM's Navigability Section supported this determination in part on information provided by Keith Woodworth, a natural resource specialist in the Fairbanks District Office. Woodworth said that boats had gone up the Kivalina as far as Sec. 26, T. 29 N., R. 25 W., Kateel River Meridian. This statement probably included a typographical error as the Kivalina only traverses Section 36 in this township. In any case, Woodworth indicated that the river was very shallow and had a steep gradient preventing travel farther upriver. 51/

KAYAKTURIAK CREEK

In 1959, 1960, and 1961, Doris J. Saario and Brina Kessel conducted an anthropological study of Kivalina. They later reported that villagers picked berries along Kayakturiak Creek, which apparently is the untitled stream on USGS maps entering Kivalina Lagoon between the Kivalina and Wulik rivers. A small-scale map in Saario and Kessel's article places the berry-picking area one to two miles upstream. The researchers described the creek as "very shallow and difficult to navigate." 52/

WULIK RIVER

Doris J. Saario and Brina Kessel lived in Kivalina for much of the period between August 1959 and May 1961 to conduct an anthropological investigation. They noted that "everyone in the village owns or has access to a wooden rowboat." The villagers fitted fifty-gallon barrels into these to haul fresh water from the Wulik River. The Natives had kayaks and open skin boats to retrieve sea mammals shot in open water during the winter.

The villagers also used the umiaks for general transportation and to seine fish. No outboard motors were in the settlement until 1950. By the time of the study there were eight in the fourteen- to eighteen-horsepower range propelling the umiaks. The most intensive seining took place on the Wulik. In 1959 low water prevented the establishment of fish camps above a point about at the east end of T. 28 N., R. 24 W., Kateel River Meridian. The following fall the water was higher and fishing was poor in the lower river. Therefore, the Natives set up fish camps up to what the researchers termed "the base of Iyikrok Mountain." This apparently was below the mouth of Tutak Creek according to the markings on a map accompanying the report. Saario and Kessel stated that fishing camps did not exist above the base of the mountain. 53/

The BLM investigated the navigability of the Wulik River in the process of conveying land to the village of Kivalina and to the State. Upon learning of the Natives' selection in the area, interested parties wrote to BLM of the river's recreational potential. On September 18, 1975, Ed Swanson, president of Knik Kanoers and Kayakers, informed BLM that Bob Armstrong of ADF&G had floated an unspecified portion of this prime fishing stream. 54/ Phil Driver wrote on May 27, 1976 that he had a Trade and Manufacturing site on the Wulik which he used in conjunction with his fishing and hunting guide operations on the Wulik and Kivalina rivers. He began occasional use of the area in 1969; regular open season use of the lodge began in 1973. He guided twenty-five to thirty people annually from 1973-75 and used a raft and a riverboat. Driver also stated that most of the charter services at Kotzebue brought fishermen to the Wulik River. 55/

Kivalina villagers met with BLM representatives on April 28, 1976 and voiced their opposition to easements along the Wulik through their land. They stated this river was a prime subsistence area and that they could prove it was too shallow for boats. 56/

Howard L. Smith of BLM's Fairbanks District Office prepared a report on the navigability of the Wulik River within Native-selected land on May 27, 1977 based on information from Driver and two Kotzebue men and from an examination of the location of Native allotments. Smith noted that there were numerous Native allotments concentrated below T. 29 N., R. 22 W., Kateel River Meridian and that Driver and other recreation-oriented use primarily took place above T. 28 N., R. 24 W., Kateel River Meridian. Shallow-draft riverboats twenty to twenty-five feet long were the common type of craft. Smith knew

of no obstructions in the river, but stated that during dry weather the upper portions became too shallow for riverboats. 57/

In January 1978 Smith completed a report on easements in the Kivalina village selection, including a streamside easement for the Wulik River. This document repeated much of the information put forth in the May 1977 report. Smith added that Kotzebue guide Nelson Walker handled as many as fifteen charter flights a summer for sport fishermen to the Wulik. He found no evidence of boat access from the river's mouth to the Wulik's good recreational fishing areas and "no information could be obtained on commercial use of the stream." 58/

Sherman Berg, a realty specialist with BLM's navigability section, prepared a memo on the navigability of water bodies in the Kivalina selection on April 11, 1980 in which he reiterated much of Smith's information. Berg added that Keith Woodworth, a BLM natural resource specialist at Kotzebue, corroborated Smith's data on the type of riverboats on the Wulik. Berg also recommended that the river be found navigable through the selection area because it was used or could be used for "trade and travel." 59/ The BLM adopted this recommendation in a final easement decision issued June 24, 1983. 60/

In September 1980 the BLM considered the navigability of the Wulik within State-selected lands. The selection included the entire river from T. 28 N., R. 23 W. through T. 32 N., R. 19 W., Kateel River Meridian. Keith Woodworth of BLM's Fairbanks District Office wrote "shallow draft riverboats" had ascended the river to about a quarter mile northeast of Tutak Creek. "At this point," Woodworth recorded, "the Wulik makes a sharp bend and a drop in the riverbed occurs. The steep shallow-riffles at this point preclude nearly all riverboat travel." He added that, "allotment parcels below this point are accessible by riverboat." Consequently, Woodworth and the Fairbanks District recommended that the river be determined navigable through the selection to the southern boundary of Native allotment F-13783-B in Sec. 27, T. 29 N., R. 22 W., Kateel River Meridian. The State Director concurred with this recommendation on September 10. 61/

Ikalukrok Creek

On September 3, 1980, Keith H. Woodworth of BLM's Fairbanks District Office submitted a report addressing the navigability of Ikalukrok Creek up through T. 31 N., R. 19 W., Kateel River Meridian. Woodworth noted that it was a shallow stream with numerous bars and riffles. He did not recommend it be considered navigable and a week later the State Director determined the creek to be nonnavigable. In June 1983, however, Dennis Daigger of the Alaska Department of Natural Resources wrote to BLM to present new information about the Ikalukrok. He stated that Fred Decicco, an Alaska Department of Fish and Game biologist in Fairbanks who had conducted fish surveys on the creek, believed that flat-bottomed skiffs equipped with jet motors could ascend the creek. At the mouth of an unnamed stream in the NE4, Sec. 14, T. 31 N., R. 19 W., Kateel River Meridian the character of the Ikalukrok changed making boat traffic further upstream difficult. According to Daigger, recreationists have been the primary users of the stream. 62/

OMIKVIOROK RIVER

The BLM accumulated information on the Omikviorok River in the course of conveying land to the village of Kivalina. At a village meeting at Kivalina on April 28, 1976, residents stated that this water body was too shallow for boats. 63/ Howard L. Smith of BLM's Fairbanks District Office gathered information from Phil Driver, a hunting and

fishing guide with a lodge on the Wulik River, Nelson Walker, a guide at Kotzebue, and from unidentified residents of Kivalina. In a report dated May 27, 1977, Smith wrote that there was little or no recreational activity on this stream and that the existence of only one Native allotment along it suggested that subsistence use also was very limited. Nevertheless, he stated that twenty- to twenty-five-foot-long, shallow-draft riverboats could ply the lowest two to three miles of Omikviorok River, but only in periods of high water. In January 1978, Smith reiterated this information except to state that there were two Native allotments on the river. 64/ Sherman Berg, a realty specialist at BLM's State Office wrote a memo on April 11, 1980 noting that Keith Woodworth, a BLM natural resource specialist stationed at Kotzebue, had no information to add to Smith's. 65/ On June 24, 1983 the BLM issued its final easement report for the Kivalina conveyance in which the Omikviorok was determined to be nonnavigable. 66/

NEW HEART CREEK, UMAGATSIAK CREEK, AGAGRAK CREEK

The lowest one mile of these creeks pass through the Kivalina village selection area. No mention exists of them in the BLM's village file and on June 24, 1983, the agency determined them to be nonnavigable. 67/

KILIKMAK CREEK

The Arctic Environmental Information and Data Center in 1975 reported the annual subsistence catch on the Kilikmak was over one hundred salmon. 68/

Unnamed Lake (Secs. 25-26, 35-36, T. 23 N., R. 22 W., Kateel River Meridian)

In mid August 1973 a party of scientists examined this lake. They accessed the lake by floatplane, probably a Cessna 185. They found its maximum depth to be 1.9 meters. 69/

NOATAK RIVER

John Muir provided the earliest reference to Native water travel on the Noatak River, which he called the Inland River. In mid July 1881 Muir observed the now-abandoned village of Sheshalik on the Hotham Inlet where each year at that time Natives gathered to trade. Muir noted their kayaks and large umiaks and stated that after trading and socializing "they break up their camps and go to their widely scattered homes, some a month's journey or more up the Inland and down the Colville Rivers." Muir added that Colville Natives annually reached Hotham Inlet via the same route or traded with Noatak Natives near the portage at the heads of the two rivers. 70/

Assistant Engineer S. B. McLenegan of the U.S. Revenue Service and Navy Lieutenant George M. Stoney provided more insight into Native travel on the Noatak River. These men explored the river independently in 1885. McLenegan reported seeing a fishing village near Okak Bend (T. 31 N., R. 1 E., Kateel River Meridian) and caches of Native sleds and some abandoned umiaks above the bend. The last cache he saw was at a large tributary from the east-southeast, probably the Cutler River. McLenegan theorized that the Natives abandoned upriver travel at these points because of the difficulty of boating. 71/

Stoney credited Natives with the ability of boating farther up the Noatak than did McLenegan. (He also described Native boats and their method of piloting them. However, his information about this was derived primarily from his experience on the Kobuk. Consequently, his observations are discussed in the Kobuk River section.)

Stoney's information came from his own and his subordinate, Ensign W. L. Howard's, winter travels and discussions with Natives on the Noatak. Stoney reported that:

> Aneyuk [a map in Stoney's report suggests this was at the mouth of the Aniuk River] is the highest point on the Notoark [sic] river reached by the natives in boats. In the fall they come here and wait for the snow to sled into the interior. The skins of the boats are cached until the next season and their frames are placed on high racks to prevent animals eating the lashing. In the spring the people come down by sleds to Aneyuk, put together their boats, and go by water to the coast. This custom is general, only a few families remain in the mountains. 72/

Recent ethnographic works elaborate only modestly on these reports. Anthropologist Ernest S. Burch, Jr. has most directly addressed the travel patterns of Northwest Natives. He relied heavily on interviews he conducted in 1968 and on written histories. According to Burch, Natives on the lower Noatak sledded from their winter camps to the coast carrying their umiaks. Presumably, they boated up the river in the fall. Natives farther upstream followed the travel pattern described by McLenegan and Stoney. Speaking in general terms of a variety of northwest rivers, Burch stated that umiaks were covered with walrus or seal skins, were over forty feet long, and were capable of transporting a crew of twelve and over four tons of cargo while drawing less than two feet of water. Going downstream they could proceed at about fifty miles per day; the return trip rate was about nine miles per day. 73/

McLenegan and Stoney left records of their journeys on the river. McLenegan and a seaman named Nelson began to ascend the Noatak on July 2, 1885 in a twenty-seven-foot-long, three-hole kayak they had acquired in Unalaska. They were unable to persuade any Native to accompany them. Indeed, the Natives they encountered in Hotham Inlet described the Noatak as "very swift, shallow, and difficult to navigate, and that it would be impossible to do so in the bidarka." On Independence Day McLenegan and Nelson passed through the Igichuk Hills where the current became so strong that they had to abandon paddling and begin to pull the boat up with rope. This lining operation was made more difficult because the river was very high, creating many channels. McLenegan wrote that, "most of the channels were small and insignificant, many of them not having sufficient water to float the bidarka." He added that when the water level dropped, the river ran in a more confined bed. Heavy rains around July 6 and 7 raised the river still farther and made pulling against the current more difficult. They continued to line and paddle until by the 15th they entered the Noatak Canyon. Here the river was in a single channel making lining much easier. Until the 20th or 21st they paddled and sailed their kayak. Then for a five-mile stretch in the vicinity of Nimiuktuk River the Noatak was braided and difficult to ascend. On July 22 the men cached much of their supplies because their kayak had weakened. The next day they were again able to sail and paddle upstream. On the 24th the river widened and became shallower and more difficult to ascend. That day they reached a deserted fishing village, probably that at the Okak Bend, where there were "many dangerous rapids." The men remained in camp through a rain storm on the 25th. The next day they entered a low country with many channels and lakes. They tracked, occasionally dragged their kayak, and portaged once. On the 28th McLenegan and Nelson passed the Cutler River. They stayed in camp the following day. 74/

The 30th was their last day going upriver. McLenegan wrote that, "the Noatak was now a mere chain of rapids following in quick succession." Two left bank tributaries entered near to one another. There was an especially dangerous rapid near the mouth of one of these. McLenegan's uppermost point of travel is uncertain. A map which accompanied

his report shows depth measurements for about ten miles above the Aniuk River, although these measurements may have been obtained on a hike rather than by a boat trip. He estimated he had gone five hundred miles on the Noatak. He observed that "further progress was almost impossible." McLenegan added that, "the condition of the river was now such that it was not prudent to proceed further with the bidarka, for should any accident occur we should have no means of returning to the coast"; they were two hundred miles above the nearest timber. McLenegan climbed a nearby hill. From this viewpoint he decided "that we had passed the head of boat navigation and a point considerably above that traveled by the natives. The river was now very narrow, and in most places the water did not exceed a foot in depth." 75/ The two men remained in camp on the last day of July. On August 1 they hiked upstream and near the end of the day they climbed a hill. McLenegan wrote that the Noatak had now "degenerated into a mere rambling creek, the waters of which would not float even our light canoe." Numerous lakes made it impossible to trace the river to one source. 76/

McLenegan and Nelson began boating downstream on August 3. The water was very high and dangerous. However, concern for the safety of their cache 125 miles below from the rising water impelled them to hurry. They noted that Native caches were in danger of flooding, indicating the unprecedented nature of the high water. The river rose eight feet that first day. By the 5th they reached the Noatak Canyon. On their passage through the flats above the Igichik Hills the current was ten to twelve miles per hour. Here they passed Natives struggling to get their kayaks upriver. On August 10 they ended their Noatak journey on the Hotham Inlet. 77/

McLenegan rendered the following summary impression of the Noatak: "The Noatak is not navigable for other than native canoes; the many rapids, combined with the shallow water and rapid current, renders navigation with larger boats quite out of the question." 78/ He also drafted a map giving depth measurements. In the delta the river was two to two and one-half fathoms deep. It was as much as seven fathoms deep in the Lower Noatak Canyon through the Igichuk Hills. The river dropped gradually from twelve feet to three to five feet deep between the Lower and Grand canyons. In the Grand Canyon it became deeper again--up to twelve feet. The Noatak was five to six feet deep upstream to a point about midway between the mouth of the Nimiuktuk River and Okak Bend. From this point to the bend the water occasionally was only three feet deep. At the bend there was as much as twelve feet of water. Farther upriver the depth was three to four feet in most places. McLenegan's last measurement which appears to have been taken above the Aniuk River but below Atongarak Creek was two feet. 79/

Stoney provided much less information concerning the Noatak. He had been in the upper valley in December 1885, having crossed from his base at Fort Cosmos on the Kobuk River. In the following summer, his subordinate, Ensign M. L. Reed, explored the lower portion of the river. Stoney's published report leaves much about Reed's trip uncertain. Stoney had two steam-powered vessels--"a large stern-wheel steamboat" called the Explorer and a steam cutter called the Helena. On July 12 one of these towed Reed and his party sixty miles up the Noatak where they were left to carry on explorations. What watercraft he used, how many men were in his party, and how far Reed traveled upriver are uncertain. Stoney had explored the upper valley down to a right bank tributary above the Aniuk, and Reed's mission was to complete the survey of the river. The finished report contains a map of the entire Noatak; however, it is questionable whether he could have made the entire trip upriver since his party was back at Hotham Inlet on July 22. 80/

Stoney recorded the following conclusions concerning the Noatak's usefulness for travel:

> The river is full of sand bars and islands making navigation difficult; it is generally narrow, until about sixty-five miles above its mouth, when it opens out to greater width for twenty miles up and becomes dotted with innumerable sand bars and islands. . . . The channel is narrow and crooked, and the current rapid, to within fifty miles of the mouth, and when the river is swollen from the rains it is impossible to stem it; when the water is low it can be ascended since the foothold can be had for tracking. Although this river is like the Putnam [Kobuk] the current is much stronger, but both rivers are so affected by the height of the water that no approximate strength of current could be determined. 81/

Two sources refer to turn-of-the-century white boat use or potential use on the Noatak. Samuel C. Dunham in an 1898 Labor Department bulletin noted that steam launches could navigate the river for 450 miles. 82/ And the published diary of Martha E. Hadley, a Quaker missionary, made several references to ascending the Noatak an unstated distance from Hotham Inlet in 1899 and 1901 with a launch and barge to gather wood. 83/

A number of U.S. Geological Survey reports issued after the turn of the century made mention of the Noatak River. Walter C. Mendenhall, who led a USGS party through the Kobuk drainage in 1901, wrote that there was an easy winter portage from that drainage via the Reed River to the headwaters of the Noatak. He added that the Noatak "is reported . . . to be navigable by small boats where first seen [from this portage], although natives report that falls exist below." 84/ In 1906 Alfred H. Brooks in a summary of knowledge of Alaskan geography, noted that there had been little exploration of the Noatak and stated that, "the current of the stream is reported to be swift, and in the basins the river is split up into may shallow channels, so it is very doubtful whether steamboat navigation could be feasible." 85/

Philip S. Smith led the first USGS excursion on the Noatak in 1911. The six-man group reached the Noatak from the Alatna River after portaging via Portage Creek, a tributary entering the Noatak at river mile 409. The men used three canoes on their exploration. The weather was ideal; "numerous slight showers kept the streams at a good stage, but did not make traveling disagreeable." 86/

The party's first camp on the Noatak was pitched on July 28 at the mouth of Portage Creek. Smith wrote that the Noatak was navigable by canoe with "few dangerous places" up to this point but that in this "upper part . . . the stream has washed out of the gravel deposits through which it flows many large boulders that make riffles which require careful watch." 87/ He also noted that above the Nimiuktuk River the current averaged only two to three miles per hour. 88/ He observed old boat frames and coverings at the abandoned village at Okak Bend. Farther downstream between the Nimiuktuk and Kugururok rivers, Smith stated that the water became deeper and was subject to rapid rain-induced rises. 89/

Most of Smith's published comments on the Noatak refer to the area below the Noatak Canyon. Of the long braided area near the village of Noatak, Smith stated that:

> the stream splits up into so many channels that the depth of water in any one is not always sufficient to float a boat and therefore the course must be selected with care. Except at the very mouth of the river the current is so strong that little or no progress can be made upstream by rowing or sailing. Good tracking can usually be

> found, though the numerous meanders, with cut banks, make frequent crossing from side to side necessary. 90/

In a separate report he described the same area as follows:

> The main river occupies a strip of the valley floor about 2 miles wide, within which it is a network of anastomosing or braided streams, most of them shallow and difficult to follow. Although the gradient of the river is low, the volume of water is so great that the current is strong and progress upstream can be made only by tracking. 91/

The river narrows and deepens as it begins its course, first along the northern flank of, and then through, the Igichuk Hills. Finally, the river again spreads out at its delta. Here Smith wrote that the "main river is about a mile wide and has a gentle current. It is not much obstructed by islands or sand bars. At its mouth it is so shallow that boats must follow the channel." 92/ Smith's only mention of seeing other watercraft on the Noatak referred to nearly twenty Native vessels loaded with families heading upstream to the village of Noatak. 93/

In 1908 the federal Bureau of Education established a school on the Noatak at what soon became the village of Noatak. Bureau records contain papers concerning the operation of the school to at least 1916 which are replete with references to travel on the river up to the village. The Kotzebue Sound Lighterage Company brought building supplies for the school, including lumber, shingles, and doors, as well as chairs, benches, and books to the site in 1908. Unfortunately, the correspondence does not reveal the type of watercraft the company used. 94/

Most of the teachers' reports to their superiors contained descriptions of their ascent of the Noatak. Elmer M. Harden started from Kotzebue in a skin boat loaded with supplies on September 16, 1909. Twenty-five miles out of Kotzebue he had to resort to tracking the boat and not far from that point he had to cache half the supplies an estimated fifty miles below the settlement. On the last two days of his five-day journey he encountered drift ice which he feared would rip his boat. Harden recommended that the government contract directly with the Natives to deliver freight at Noatak. He argued that they were well equipped for the task in that they knew the river and had dogs for towing. He stated that some Natives earned money hauling goods. Harden added that there were many riffles and that "no steam boat [sic] or launch in this part of the country . . . will go up this river except in the time of a flood." 95/ However, in mid August 1910, a launch took Harden to Noatak in three days and two nights. The launch took supplies up to within five miles of the village where it had to cache half of it before proceeding to Noatak. The launch on a second trip brought up all the cached supplies except one thousand pounds moved by a skin boat. 96/

Noatak's teachers approvingly reported Natives adopting white culture. Harden noted that they built their first wooden boat on the river in 1911 and that a second was under construction in 1912. He remarked that the Natives had been hindered from building such boats earlier because they lacked a good whipsaw until the Bureau sent one in in 1911. Harden's replacement, Frank B. Snowden wrote that a villager built two large riverboats, the biggest forty feet long and six feet wide, in the spring of 1913. Both teachers believed that Natives saw the superiority of the wood to the skin boat and anticipated the complete substitution of the former for the latter. 97/

Noatak's teachers also urged their superiors to provide them with better transportation. Snowden's list of recommendations in 1913 began with a request for a powerboat. He

stated that there was no regular run on the river and the few boat owners in Kotzebue charged "enormous" fees to charter one. He argued that a boat could pay for itself in one or two summers. His successor, Clarence Ausley, made much the same argument two years later, adding that shippers knew the teachers had to pay any price to get to their post and that it was sometimes difficult even to find a boat at Kotzebue capable of safely transporting several tons of supplies. 98/

The teachers did not get immediate relief. Ausley hired a "small gasoline launch" in the fall of both 1914 and 1915. Launch travel ceased two days into these journeys because of low water; Ausley and his cargo went in skin boats the rest of the way to Noatak. In 1916 he returned to the coast to bring up his wife and personal supplies in a skin boat. He found the slow pace at which the Natives he accompanied upriver traveled to be exasperatingly slow. At least partly because of this he requested the Bureau furnish him with a small rowboat with a two-horsepower motor so he might travel up and down the river on his own schedule. 99/

Government agencies sporadically provided more information on the Noatak. In 1926 the U.S. Coast and Geodetic Survey described the Noatak: it "has numerous rapids, and is not navigable for any distance for boats larger than native canoes." The Coast and Geodetic Survey did not indicate the source of its information. Its 1938 and 1954 reports repeated this description verbatim. 100/ In February, 1945, Everitt M. Calhoun filed a Post War Planning Survey form for the village of Noatak with the Alaska Indian Service. He stated that riverboats supplied the town, but that "Freighting is very difficult by river because of low water in fall of the year." Shallows were particularly troublesome in the five to eight miles just below the village. 101/

A June 1953 draft Corps of Engineers report noted the traffic on the river. The report stated:

> Barges can be taken upriver to a point about 18 miles below Noatak village without much difficulty. From this point on, freight is usually carried by small boats unless rains cause high water for several days. Approximately 200 tons are annually freighted to Noatak village; no settlements of any consequence are found upriver from the village. The navigation season usually extends from mid-May to October.

It is not certain how the Corps obtained this information. However, the Corps did conduct an overflight of the river from about sixteen miles above Noatak village to the mouth. At the time of this reconnaissance the river was low and many sandbars were evident upriver from a point about eighteen miles below the village. A 1956 study of the Noatak and Kobuk drainages also noted the use of shallow draft barges and tugs to take supplies to the village of Noatak. 102/ A 1965 the Corps reported that the B & R company barged supplies to Noatak from Kotzebue at a cost of $39 per ton or forty cubic feet. 103/

Most likely, the Corps got most of its information from the owners and managers of B&R Tug and Barge Company. This firm supplied Noatak and all the rest of the communities from Barrow to Shishmaref beginning in the early 1950s. By 1954 it was the exclusive supplier along the region's rivers. B&R began operation in 1951 with three wooden tugs, the Little Tula, the Herald J, and the Tula, which were 36-feet, 40-feet, and 70.6-feet long, respectively. They also had three barges; two were 60-feet long and the other was 80-feet long. By 1964 the company had added four more barges between 85 and 115 feet in length and had replaced all of its original motive power. It then operated two wooden tugs about 50 feet long and five steel tugs between 46 and 59 feet long. 104/

Except at high water, these boats were unable to travel the entire distance to Noatak. According to Ray Heinrichs, who was B&R's operations manager through the 1960s, even the smallest of these vessels normally was only able to ascend to six or eight miles below the village. From there B&R's Maybelle and open Native-owned skiffs transported supplies upriver. Heinrichs described the Maybelle as thirty feet long with a ten-foot beam. It had an inboard Chrysler engine and a cab over nearly the entire craft and it drew about two and one-half feet of water. At high water it could haul three tons, but at lower water its capacity dropped by half. The skiffs were sixteen to thirty feet long. During high water the thirty-foot boats could haul eight full oil drums; the sixteen-foot boats could take two to four drums. Heinrichs estimated that a full drum weighed three hundred to four hundred pounds. 105/

In the mid 1960s, B&R's management compiled a photograph album of its equipment. The caption for a picture under the Streak described it as four pontoon steel boats welded together. It stated that "bulk" fuel reached most villages, but that the Noatak River "presents problems even for shallow draft vessel [sic] which will never allow bulk deliveries." Consequently, B&R's barges lightered supplies to the shore near the mouth of the Noatak where the Streak picked them up and took them upriver. In this way B&R transported seven hundred drums of petroleum and over five hundred tons of building supplies to Noatak in 1962. 106/

Two or three years later B&R experimented with the Streak. A mechanic with Kennicott Copper, who was in the area in connection with the company's mining prospects on the upper Kobuk, told Heinrichs of airboats used in South America. Heinrichs decided to attempt a similar innovation. B&R placed an airplane motor on the sixty-foot-long Streak and thus powered the boat to and from Noatak. However, the experiment failed because of the excessive amount of fuel the engine required to propel the craft. 107/

Between 1958 and 1960 Donald C. Foote and H. A. Williamson conducted an anthropological study of Noatak. They noted that the villagers' growing purchasing power permitted them to buy outboard motors; the number in the settlement rose from two in 1947 to twenty-eight in 1959. They also observed the importance of boat travel in caribou hunting. Hunters could only kill caribou within five miles of the river because of the difficulty of packing the meat out on foot. Foote and Williamson noted that in 1960 the hunters ascended the river to "Ningnoktok," a place somewhere above Kelly River. They also stated that in 1960 villagers boated up to Evaingiknuk Creek to seine fish. 108/

In the early 1960s archaeologists began extensive research in the Noatak drainage. No fewer than three parties descended on the river in 1961. At least five other expeditions occurred in the next three summers. Commonly, the researchers did not specify their method of travel through the valley. At least some took a boat or canoe. In 1962 William Irving traveled eight hundred miles in a boat on the Noatak and some of its tributaries. He used the boat at least as far up as the Nimiuktuk River. However, the previous year he and his assistants confined themselves to air and foot travel. Douglas D. Anderson in 1964 went upriver in a boat as far as Okak Bend. 109/

Claire Fejes published People of the Noatak recounting her experiences and the stories told to her by Natives on her visits to Sheshalik and Noatak in the late 1950s and mid 1960s. Sheshalik, near the mouth of the Noatak River, was the summer sealing and whaling center for Noatak villagers. Fejes spoke with a man named Gordon who recalled earlier times before his people acquired outboard motors. Then dog teams pulled the Natives' umiaks up to Noatak. He said they used dogs "to pull the load against the swift river current." Fejes described traffic in the 1960s: "The Noatak was little traveled

except by Eskimos and an occasional barge loaded with supplies. Most white people flew to Noatak. The river, . . . was said to be hazardous." 110/

Fejes boated up to the village on one of her visits in the 1960s. Three boats traveled upriver together. Two young men were in one, a man named Jack with numerous dogs took the second, and Jack's son-in-law, a woman named Okukchuk, and Fejes were in a third. Fejes' was a "long wooden boat" equipped with a twenty-eight-horsepower engine. It carried four drums of gas and a year's supply of flour and sugar in fifty-pound sacks. The weight totaled more than two tons. The other boats had all sorts of supplies and were powered by eighteen-horsepower motors. 111/

Although the river's mouth was "a choked angry mass of churning water," they eventually reached the calmer waters of the river itself. Recent rains had raised the river and given its current increased power. The river narrowed at its lower canyon and Fejes "had trouble passing." The men drove the boats through the night although they waited for light to pass through "a swift whirlpool current." Fejes praised her helmsman for "guiding our boat past the shallow water and the deadfalls of trees that threatened us, unerringly coming through the dark river." They arrived at Noatak that morning. After a visit at the village Fejes returned to Kotzebue by riverboat, on the way encountering other Natives motoring up to Noatak. 112/

In the 1960s, Jane Pender coaxed a Native family to take her much farther upstream than Fejes had gone. Pender, a woman friend, and two men left Kotzebue at the end of July in a heavily-loaded, outboard-motor-powered, thirty-foot wooden riverboat. They reached Noatak their first day out. Pender recorded that the river up to the village "is well traveled and fairly well known." They spent their second night near Kelly River. Pender's female companion had expressed concern about rocks and white water in the Upper Noatak Canyon, but high water covered the rocks. Consequently, they had an uneventful trip their third day out, stopping that night at Sapun Creek. 113/

The travelers first experienced difficulty in ascending the river once they got above Okak Bend. A shallow bar required them to track and pole. They eventually were again able to use the motor, but had to revert to tracking and poling five minutes later. Again they were able to use the motor for fifteen minutes, then more tracking and poling, then ten more minutes of motoring until they reached the Aniuk River, which they ascended for several days. Their return trip down to Noatak was accomplished in less than three days and with no reported incidents. 114/

Pender's friends indicated that they had hunted in the Aniuk valley. Edwin S. Hall, an archaeologist, visited the Noatak River in the early 1970s and reported that in the fall Noatak villagers hunted caribou in the middle portion of the river from boats. Hall did not define what he meant by the middle portion of the river. 115/

Dee B. Crouch and his wife floated most of the Noatak in a folding double kayak in 1971; Crouch later wrote that the trip could have been made in a canoe or inflatable raft. In July they flew into Lake Omelaktavik (T. 26 N., R. 15 E., Kateel River Meridian). After portaging, they began to float the river. Near Lake Matcharak they began to run "small rapids," which required caution to avoid rocks. Crouch wrote that "late in the season, the river above this point could be quite low, making travel frustrating as well as hazardous to the bottom of a boat." After a week the couple reached the Cutler River, where overnight a hard rain raised the Noatak four inches. Although warned of rapids in the canyon area above the Kelly River, they found that "there were only two corners where water stacked up near the outside." Crouch stated that in "low water this might

change, as the river reportedly drops off some small ledges. In any event, there are no surprises and portage would be easy." After thirteen days on the river they reached Noatak village, from where a Native took them by riverboat to Kotzebue. 116/

Various government parties also studied the Noatak in the 1970s. Thomas D. Hamilton and seven others in a Bureau of Outdoor Recreation group canoed the river in 1972. A floatplane transported the men and their gear to an unnamed lake three miles east of Lake Omelaktavik. On the last day of July they began traveling downstream. They averaged over twenty miles a day, arriving at the village of Noatak on August 15. 117/

From Anorat Creek down to Ipnelivik River, Hamilton found the water was deep enough for canoes or small rafts. About half of this stretch of river was a single channel. Braided portions were most pronounced below the confluences of major tributaries. There were bars of sand and pebbles as well as cut banks eight to ten feet high. Between Ipnelivik River and Aniuk River he found that the river alternated between a low, gentle gradient and boulder-choked rapids below steep bluffs. Hamilton considered the very steep and boulder-littered area below Douglas Creek to be the most hazardous on the river. The gradient increased down to the Aniuk. In the middle stretch, Hamilton wrote that the flood plain widened to three or four miles. 118/

The National Park Service's records (NPS subsequently absorbed BOR) hold another account of the same voyage. It indicated that the party used four aluminum canoes and that daily travel ranged between twelve and thirty-three miles. One eighteen-foot canoe was bent on rocks in strong rapids on their second day on the river. The report described the river above Lake Matcharak as from four inches to three feet deep, about seventy-five feet wide, with a three-mile-per-hour current. Because of a recent rainstorm, there was just enough water to float the canoes. The report stated that in early summer this part of the river carried enough water to float canoes, but by late July rains were necessary to have the river get enough water. 119/

The report goes on to describe the portion of the river below Lake Matcharak. Down to the Noatak's Grand Canyon it averaged two feet deep with a current of three miles per hour and a width varying from seventy-five to 250 feet. In this stretch the party encountered rapids with three-foot standing waves and spent one and one-half days lining canoes in shallow water and through extensive rock areas. In the Grand Canyon and Noatak Canyon depths continued to average two feet, but occasionally reached four and even eight feet. The flow rate increased to four miles per hour and the width varied between seventy-five and two hundred feet. Rapids were twice as frequent and twice as large as those in the preceding segment of the river, though a good route through them was generally easy to locate. 120/

Finally, the lowest part of the river was broad and braided; its depth varied between three inches and fifteen feet, the channels ranged from fifty to five hundred feet wide, and the current quickened to five or six miles per hour. Sweepers and large masses of floating sod made this portion of the Noatak hazardous. According to the report riverboats and V-hull powerboats could ascend the Noatak to the Kelly River. It also concluded that intermediate canoeists could maneuver through 90 percent of the river and that a short portage was necessary only in the uppermost part of the stream. 121/

In 1973 the U.S. Bureau of Outdoor Recreation (BOR) issued a preliminary report on the Noatak's potential as a Wild and Scenic River based on the previous year's fieldwork. The BOR recommended that the Noatak be classified as a Wild River above Kelly River and a Scenic River below Kelly River. Like on the Kobuk, there was "extensive" use of riverboats on the Noatak. The preliminary report repeated much of the earlier report's

description of the river. It differed in stating that the average depth between Lake Matcharak and the Grand Canyon was three instead of two feet and that standing waves were as much as two rather than three feet high. Also it added that standing waves in the canyon reached three feet, that the normal depth through the canyon was three to four feet and pools reached ten feet. Below the village of Noatak it indicated that the current quickened from six to ten miles per hour, but later slowed to under two miles per hour. The 1973 report stated that Natives had taken riverboats up as far as Okak Bend. Recreational use of the river was minimal although it was canoeable; most of the river would be rated II on the international white water scale. 122/

In 1974 the Department of the Interior published the following description of recreational boating on the Noatak in connection with the department's study of the area:

> An occasional party of two-to-eight [sic] canoeists or kayakers travel down the Noatak River in summer. Such parties are most frequently flown to lakes in the Noatak's upper valley from Bettles where canoes can now be rented. It is only a short portage to the river and about a 335 mile trip to Kotzebue Sound. Trips may be ended at Noatak Village where air service is available to Kotzebue or continued to the Noatak Delta across Hotham Inlet. 123/

Some non-government travelers also have recorded their experiences on the Noatak. That same year Andy Williams reported on a canoe trip he, his uncle Ogden Williams, and Al Adams and Robin Pell took down the Noatak. A floatplane landed the men, two aluminum canoes, and six hundred pounds of supplies at a lake Williams described only as "just west of the Arrigeteh Peaks" (see Survey Pass Quadrangle). Williams and Adams were inexperienced canoers, yet they had little trouble on their fourteen-day excursion to Noatak. At the beginning of the trip the river was only forty feet wide. The most exciting part of the voyage was a long series of rapids somewhere above the Cutler River, which the party spent most of their third day descending. Williams described one stretch as "a 500-yard washboard with a two-foot ledge that nearly buried the nose of the canoe in the water." His uncle and Pell got hung up on a rock here and were swamped when they tried to dislodge the canoe. On the second day after passing the Cutler River rains came and overnight the Noatak rose six feet. The flood accelerated their floating; one day they went nearly forty miles, which was twice their average. Williams summarized the Noatak as "easy for canoers, although rocks and shoals made the use of strong aluminum canoes advisable. There were few rapids, but the river was more characterized by strong headwinds that made paddling difficult." 124/

In 1975 the National Technical Information Service published a mineral study of the upper Noatak valley in the vicinity of Douglas and Midas creeks. It noted that, "access is best gained by helicopter, however, small boats can travel up the Noatak River from Noatak to within 2 or 3 miles of the examination area." The report also stated that floatplanes could land on several lakes in the area and that some gravel bars provided access for wheeled planes. 125/

In April and August, 1978, Joseph M. Childers and Donald R. Kernodle conducted a hydrological investigation of the Noatak River. They stated that they did their research in August with a riverboat, but did not state explicitly what portions of the river they boated in. However, the two men did conclude that:

> The Noatak River provides conditions favorable for recreational boating from the Ipnelivik River to the mouth. The flow through the three canyons is smooth. One 7-mi [sic] reach of boulder-strewn rapids upstream from Atongarak Creek is called Etimnikroak, or swift water, by the Eskimos. This was the only segment of the

Noatak observed during August 1978 that might cause a navigational problem for boaters. Below the Eli River the Noatak was wide, deep, and smooth flowing. 126/

The Bureau of Land Management determined the Noatak navigable in 1982 in both the Kotzebue and Noatak village selections. The agency based these determinations on the transport of goods to the latter village, intercommunity travel between the two settlements, and the river's "significant role in providing access to public lands" north of Noatak's selection. The Kotzebue selection included the lowest portions of the river; Noatak's extended through T. 27 N., R. 18 W., Kateel River Meridian. 127/

Unnamed Lake (Sec. 11, T. 26 N., R. 15 E., Kateel River Meridian)

Floatplanes can land on this lake. This may be the lake on which a Bureau of Outdoor Recreation eight-man team landed in 1972 with canoes and supplies for a float down the Noatak River. One of the expedition's members indicated that they landed a floatplane on an unnamed lake three miles east of Lake Omelaktavik. This certainly was the lake on which a group of scientists had a camp in early and late July 1973. They flew in and out of their camp by floatplane, probably using a Cessna 185. The men measured the lake's depth finding no point at which it was more than two and one-half meters deep. 128/

Lake Omelaktavik

Lake Omelaktavik (T. 26 N., R. 15 E., Kateel River Meridian) is used for floatplane access to the upper Noatak valley. Dee B. Crouch and his wife landed on the lake in July 1971 to begin a float trip downriver. 129/ Two years later in July a party of scientists landed a floatplane, probably a Cessna 185, on the lake. Rains had been extremely heavy in recent days. They took soundings finding the lake's greatest depth to be three meters. 130/

Lake Matcharak

In July 1973, following very heavy rains in the area, scientists landed on Lake Matcharak (T. 27 N., R. 12 E., Kateel River Meridian). They noticed a fishing cabin on the lake and measured the water body to be "at least" ten meters deep. 131/

Aniuk River

Travel in the Aniuk valley to Howard Pass was a traditional overland route to the Colville according to anthropologists. Ernest S. Burch, Jr., who conducted ethnographic studies in Northwest Alaska in 1968, wrote that, "because of the gentle slope and the few local topographic impediments to sled travel, the Eskimos used to portage large boats . . . between river systems via Howard Pass in the spring." Burch did not make it clear if or to what extent this travel involved boating on the Aniuk. 132/

The first documented watercraft travel on the Aniuk River occurred in late July and early August 1925. That year a U.S. Geological Survey party headed by Philip S. Smith studied the National Petroleum Reserve. After canoeing up the Etivluk River, a Colville tributary, they portaged to an unspecified tributary of the Aniuk. Surveying as they went, Smith recounted that the "Aniuk was followed down without much difficulty to its mouth, which was reached August 11." 133/

The only extensive first-hand account of travel on the Aniuk stems from a summer sight-seeing trip Jane Pender took in the 1960s with two men and a woman of a Native family. They rode a heavily-ladened, outboard-powered, thirty-foot, wooden riverboat up

the Noatak to the Aniuk River. On their fourth day out of Kotzebue they reached the Aniuk. It took them about an hour to enter the mouth of the river. They camped for the evening about a mile up the tributary. The next morning they cached some of their supplies, since they intended to ascend the river to Howard Pass. That first full day on the Aniuk they had to pull the boat through three rapids. They stopped after three hours. Pender described the rest of their upriver boat trip as follows: "Day by day, we forced our way upriver. We would ride a little, then shove the boat awhile." They did not stop boating until they entered hill country. One of their party scouted the river ahead before they started to walk. On the second day of their hike they reached "the last ridge," but they had not come to the pass. One of the men killed a caribou and Pender's female friend told her they could make a skin boat and float downriver. However, they did not do so. Rather, because of heavy rains and the fear that it might sweep away their boat, they made a long one-day hike back to the boat. The next day they boated down the Aniuk and the Noatak nearly to Okak Bend. 134/

The Department of the Interior in a 1974 study of the Noatak valley's recreational potential noted that persons have taken foldboats an unstated distance down the Aniuk. 135/

Kikitaliorak Lake

As part of a biological study of the Noatak drainage, a group of scientists made a camp on the southern shore of Kikitaliorak Lake (Tps. 31-32 N., Rs. 11-12 E., Kateel River Meridian). They made north-south and east-west transects of the lake, finding it "to be fairly shallow for its surface area." The deepest spot was about sixteen feet deep, but much of the lake was only four feet. They flew in and out of the lake by floatplane, probably a Cessna 185. 136/

Kipmik Lake

A group of scientists made a base camp on the northwest shore of Kipmik Lake (Tps. 29-30 N., R. 12 E., Kateel River Meridian) July 17-23, 1973. Their report did not explicitly indicate that they accessed this mountain-bounded lake by floatplane. However, the party used a Cessna 185 extensively in their work elsewhere in the drainage, they made no mention of a helicopter, and alternative transport modes would not have allowed them to keep to the schedule reflected in their report. Therefore, it can be assumed they landed on the lake in a floatplane. They measured the lake's depth; much was thirty-three feet deep and the deepest point was nearly one hundred feet. 137/

Amitchiak Lake

The same party which camped at Kipmik Lake visited this neighboring water body on July 22-23. They sounded much of the eastern third of Amitchiak Lake, finding ridges which rose to within six feet of the surface and holes up to sixty-five feet deep. 138/

Sikik Lake

As part of a biological study of the Noatak drainage, a group of scientists landed a Cessna 185 on Sikik Lake (T. 31 N., R. 3 E., Kateel River Meridian). They reported it was one and one-half meters deep. 139/

Cutler River

Two government surveys seven decades apart provide information about Cutler River. Philip S. Smith, who led a 1911 USGS party down the Noatak pass the mouth of the

Cutler River, observed that it carried "nearly one-half the volume carried by the main river above that point." 140/ The Department of the Interior in a 1974 study of the Noatak valley's recreational potential noted that persons had taken foldboats an unstated distance down the Cutler. 141/

Unnamed Lake (Secs. 3-4, 9-10, T. 26 N., R. 3 E., Kateel River Meridian)

In early August 1973 a group of scientists had a base camp on the shore of this lake, which they called "Anuk Lake." They accessed the lake by floatplane, probably a Cessna 185. A report issued after their examination stated that the lake rarely was more than one meter deep; the greatest depth was four feet. 142/

Feniak Lake

As part of a biological study of the Noatak drainage, a group of scientists landed a Cessna 185 on Feniak Lake (T. 33 N., Rs. 2-3 E., Kateel River Meridian) in early July 1973. They used a camp on the south end of this lake as their base camp. They reported that most of the southern two-thirds of the lake was between sixteen and thirty-nine feet deep and that a hole in the northern part was ninety-one feet deep. 143/

Navashak Lake

A group of scientists on a biological examination of the Noatak drainage, landed a Cessna 185 on this lake (Tps. 31-32 N., R. 3 E., Kateel River Meridian) on July 5. They recorded its maximum depth as approximately 12 feet. 144/

Desperation Lake

There are two references to Desperation Lake. According to his Dictionary of Alaska Place Names, Donald Orth learned that local Eskimos called the lake "Tupichalik," which means "new tent," referring to a dry gravel beach on its shore "that has been used for camping purposes since man has been in the area." Also as part of a 1973 biological study of the Noatak River drainage, scientists landed a plane, probably a Cessna 185, on Desperation Lake (T. 34 N., Rs. 1 E. and W., Kateel River Meridian) in early July. 145/

Kugururok River

In 1964 archaeologists Douglas D. Anderson and Raymond Lee carried out studies along the Noatak using an undescribed boat. They attempted to boat up the Kugururok, but failed "because of shallow water." They instead hiked overland to examine a site on the river. 146/

Lake Kaiyak

Early in August 1973 a party of scientists examined Lake Kaiyak (T. 32 N., R. 12 W., Kateel River Meridian). Although the report they issued did not explicitly state that they landed on the lake with a floatplane, such access is nearly certain. The men used a Cessna 185 with pontoons in other parts of their investigations of the Noatak drainage, they did not use a helicopter, and they moved too rapidly through the area to have depended on water or land transport. They took measurements, finding its maximum depth to be about five feet. 147/

Tulugak Lake

In early August 1973 a number of scientists visited Tulugak Lake (T. 30 N., R. 13 W., Kateel River Meridian). Although the report they issued did not explicitly state that they landed on the lake with a floatplane, such access is nearly certain. The men used a Cessna 185 with pontoons in other parts of their investigations of the Noatak drainage, they did not use a helicopter, and they moved too rapidly through the area to have depended on water or land transport. They took measurements, finding it had a maximum depth of about eighteen feet. 148/

Lake Narvakrak

A group of scientists surveyed Lake Narvakrak (T. 30 N., Rs. 13-14 W., Kateel River Meridian) in early August 1973. They reached it on foot from a base camp on Tulugak Lake. They took measurements, finding its maximum depth to be only four feet. 149/

Lake Mapsa

Early in August 1973 scientists examined Lake Mapsa (T. 30 N., R. 14 W., Kateel River Meridian). Although the report they issued did not explicitly state that they landed on the lake with a floatplane, such access is nearly certain. The men used a Cessna 185 with pontoons in other parts of their investigations of the Noatak drainage, they did not use a helicopter, and they moved too rapidly through the area to have depended on water or land transport. They took measurements, finding it to be a shallow thaw pond with a depth of eight feet. 150/

Kelly River

According to a 1972 report in the National Park Service's records the Kelly is seventy-five feet wide and two to three feet deep at its mouth. 151/

Lake Tagakvik

In early August 1973 a party of scientists studied Lake Tagakvik (T. 30 N., R. 15 W., Kateel River Meridian). Although the report they issued did not explicitly state that they landed on the lake with a floatplane, such access is nearly certain. The men used a Cessna 185 with pontoons in other parts of their investigations of the Noatak drainage, they did not use a helicopter, and they moved too rapidly through the area to have depended on water or land transport. They took measurements, finding it to have a maximum depth of five feet. 152/

Unnamed Lake (Secs. 7-8, 17, T. 26 N., R. 17 W., Kateel River Meridian)

As part of a biological study of the Noatak drainage, a group of scientists landed a Cessna 185 on this lake on June 28, 1973. They reported that it had a maximum depth of about six feet. 153/

Eli River

In 1973 eleven scientists undertook a biological study of the Noatak basin. As part of their investigations the group had a base camp on a slough connecting the Noatak and Eli rivers in T. 24 N., R. 19 W., Kateel River Meridian. The slough and Eli River in this area were described as having "deep pools and long shallow runs." They reached this camp by boat and examined open tundra country northeast of it "easily . . . by traveling some distance up the Eli River by boat." A map accompanying the scientists' report indicated

they examined the Eli to a point midway through Sec. 7, T. 25 N., R. 18 W., Kateel River Meridian. 154/

Natives' selection of townships including much of the Eli River directed BLM's attention to the water body's navigability and the need for easements alongside it. The agency got much of its initial information about the river from residents of Noatak and Kotzebue, including Nelson Walker, a professional guide from the latter town. An undated navigability field report noted that subsistence use concentrated near the confluence of the Eli and Noatak and that shallow-draft river boats could not ascend beyond Sec. 9, T. 26 N., R. 18 W., Kateel River Meridian. Both the Bureau of Mines and the Alaska Division of Lands proposed easements along both banks of the Eli citing Native and some recreational use. The Alaska Department of Fish and Game asked for a campsite and boat and floatplane tie-up in Sec. 6, T. 23 N., R. 19 W., Kateel River Meridian. The agency stated that sport fisherman had camped at a site in this section before and that such a place was necessary to insure continued public use of the river. 155/

The BLM's Arctic-Kobuk Resource Area proposed to determine the Eli nonnavigable; it also believed that easements along its banks were not necessary. It could not document any significant use of the river. It found six Native allotments on the river, all below Sec. 8, T. 24 N., R. 19 W., Kateel River Meridian. The Area Office found no use in crafts larger than riverboats and that this did not go above Sec. 9, T. 26 N., R. 18 W., Kateel River Meridian. This was still well within selected lands making an easement along the river of little use in accessing public lands. In January 1978 the easement staff composed primarily of Fairbanks District Office personnel supported the Area Office's recommendations. The Notice of Proposed Easement Recommendations also reflected the Resource Area's view. The BLM, however, reconsidered the navigability of the Eli in early 1980, noting that between Secs. 7, 18, T. 24 N., R. 19 W. and Sec. 1, T. 23 N., R. 20 W., Kateel River Meridian was essentially a slough of the Noatak and thus navigable like the Noatak. A final easement and navigability memorandum issued on January 17, 1982 supported this finding. 156/

Unnamed Lake (Secs. 17-20, T. 24 N., R. 18 W., Kateel River Meridian) and its outlet

The BLM addressed the navigability of this lake in an undated navigability field report in conjunction with conveying land to Noatak Natives. The agency's Arctic-Kobuk Resource Area contacted residents of Noatak and Kotzebue, including professional guide Nelson Walker, without confirming any but sporadic floatplane use. Its report stated that only "extremely small craft, such as canoes or kayaks" could pass through the lake's outlet. The Bureau of Mines requested an easement along the lake's shore citing Native and some recreational use. The Resource Area concluded that sporadic floatplane landings on the lake did not justify finding it navigable nor approving a shoreline easement. In 1978 and 1979 the Fairbanks District Office and the Alaska State Office agreed with this assessment. However, the BLM carried on no further actions relevant to this water body because it proved to be outside the selection area. 157/

Aliktongnak Lake and its outlet

As part of a biological study of the Noatak drainage, a group of scientists landed a Cessna 185 on this lake (T. 23 N., R. 18 W., Kateel River Meridian) on June 27, 1973. They reported that the lake was "relatively deep, having a maximum depth of 4 m." 158/

The BLM gathered information about this lake and its outlet to Sevisok Slough in the course of investigating water bodies and reserving easements on Native-selected lands near Noatak. Residents of Kotzebue and Noatak indicated shallow-draft boats could navigate the outlet, which BLM called Aliktongnak Creek. However, this was not possible during periods of low water. The Bureau of Mines proposed easements around the lake and along both of the creek's banks, citing Native and some recreational use. The Alaska Division of Lands proposed an easement on both banks of the stream. The ADF&G proposed a campsite and boat and floatplane tie-up on the lake in the interest of fly-in fishermen. Subsequently, BLM's Arctic-Kobuk Resource Area prepared a report. It found no evidence of "commercial" use of the creek and only one Native allotment on the lake. The very limited recreational use of the lake (it was reputed for good pike fishing), including that by floatplanes, did not justify an easement on the lake and with no need to reach the lake there also was no justification for an easement on its outlet. In January 1978 when the easement staff met to consider easements for the Noatak selection, it supported the Resource Area's recommendations. However, by the time BLM issued a Notice of Proposed Easement Recommendations in November 1979, the land encompassing the lake was noted to be outside the selection area. 159/

Unnamed Creek (mouth in Sec. 5, T. 19 N., R. 18 W., Kateel River Meridian)

In 1973 eleven scientists undertook a biological study of the Noatak basin. As part of their investigations the group had a base camp a few hundred yards up this stream, which the scientists' report incorrectly identified as the "Seetakuyuk River" (probably a misspelling of Situkuyok River), which enters Kotzebue Sound via Tukrok River about twenty miles to the west of this unnamed stream. At the camp the stream was twenty meters wide and two meters deep. The Noatak's tributaries and distributaries in this area were generally described as "broad, shallow, and slow moving." A map accompanying the report indicated that the scientists examined this stream by boat or foot through Sec. 4, T. 19 N., R. 19 W., Kateel River Meridian. 160/

In the course of conveying lands through ANCSA to NANA Regional Corporation and the village of Kotzebue, the BLM made no mention of this stream. On June 25, the agency issued its final easement memorandum including this water body in T. 19 N., R. 18 W., Kateel River Meridian among those determined nonnavigable. The BLM subsequently granted interim conveyance for the land to the Native corporations. 161/

Shiliak Creek

Shiliak Creek is a tributary of the Little Noatak, which is a distributary of the Noatak River. In mid July 1961 archaeologist Douglas D. Anderson, guided by Carl Nelson, located an obsidian site on the creek. Anderson stated that summer access to the site was easiest by boating as far upstream as the water level permitted and then walking. In 1961 Anderson was able to boat about two miles up the Shiliak. From there he hiked in five to seven miles. 162/

The BLM has twice addressed the navigability of Shiliak Creek. In June 1982 the agency included it among those water bodies within Native-selected lands in the Kotzebue area which were nonnavigable. This determination, confirmed in an interim conveyance dated September 2, 1982, encompassed the lowest portion of the stream up through Sec. 8, T. 19 N., R. 16 W., Kateel River Meridian. 163/

In June 1984 Susan Eaton of BLM's Navigability Section wrote a draft navigability report for Secs. 4-6, T. 19 N., R. 16 W., Kateel River Meridian. Shiliak Creek passes through Sec. 4. Eaton noted Anderson's experience, cited access by Native allotment claimants on the creek, and interviewed ADF&G Fish and Wildlife personnel familiar with the

region. Eaton wrote that three Natives had allotments on Shiliak Creek in T. 20 N., R. 16 W., Kateel River Meridian. All of these reached their lands by sled or snowmobile. Three other allottees claimed land touching the stream in Secs. 8 and 17, T. 19 N., R. 16 W., Kateel River Meridian. One was at its mouth, while the farthest up was on the water body's north bank at the stream's northernmost point in the NE4 of Sec. 8. This was approximately one and three-quarters miles upstream. All three owners claimed access was by boat and the BLM's field examiners reached at least the upper two by boat. The claimants of the lowest two parcels began their use in the 1950s; the other began use of his parcel in 1965.

On June 19, 1984, Eaton spoke to Joe Dinnocenzo, the ADF&G area manager at Kotzebue, and Roland Young, a Fish and Wildlife protection officer in the same village. Dinnocenzo told Eaton that local residents took skiffs up the lowest portion of the creek. Young said that from the air he had seen boats one to two miles up the Shiliak and a thirty-foot wooden boat beached about a half-mile up. He was curious how far up he could go on the creek and so in 1982 and 1983 he took an eighteen-foot aluminum riverboat powered by a thirty-five-horsepower outboard motor up the Shiliak. Both times he traveled to a wide portion of the river or a small lake coinciding with the location of the uppermost Native allotment accessed by boat, that is the parcel in the NE4, Sec. 8, T. 19 N., R. 16 W., Kateel River Meridian. Young described the water body (in Eaton's words) "as a deep, gravel-bottomed, slow moving, meandering stream which becomes very shallow quickly just a few miles upstream." Beyond the point to which he boated, Young believed "the creek would be not only too shallow but also too obstructed by trees to be passable." 164/

KOBUK RIVER

The Kobuk River, which is open from mid May to the later half of October or early November, has long been a primary route of travel in the interior of Northwest Alaska. The earliest white explorers of the river, Lieutenants John C. Cantwell and George M. Stoney, commented on the Natives' travel on the river. Cantwell wrote that one-man birchbark canoes were common, except on the lower river where the sealskin kayak predominated. The birchbark canoes were eight to ten feet long and twelve to fifteen inches broad at the water line. Natives who canoed up to the vicinity of Jade Mountain in 1884 informed Cantwell that they did not boat all the way up the river "as the channel is filled by rocks and the banks are so steep that it is impossible to tow." In 1885 Cantwell learned at a Native village just above the Pah River that the Eskimos customarily cached their boats at a falls not far below Walker Lake. There they would wait until snowfall to venture further into the interior. 165/

Stoney rendered a far more extensive description of Native boat travel on the Kobuk. Although he stated that his account was applicable to the Noatak's and Selawik's inhabitants, it probably was most reflective of Stoney's longer stay on the Kobuk. Because of its value, his statement is quoted at length:

> When the river breaks traveling begins, some go to the mountains, and others to the coast. Those going to the coast carry their families and all their possessions in large skin boats (oomiaks). . . . Two or three small families often go in one large boat. They follow a day or so behind the ice.
>
> Stops are made on the journey to catch fish for immediate use and for use at the trading station. A rich man travels in state; he never takes any other family than his own; he hires paddlers and a steersman; and enjoys all the luxuries he can. In returning up the river, they track along the banks using dogs. A sealskin tow line

> twenty to thirty fathoms long is made fast to a knee one-quarter the length of the boat from the bow, and four to six dogs are harnessed to the other end. A boy goes ahead as a dog leader and a man follows as driver; the latter's position is not an easy one; sometimes a dog will go to one side of a bush and the next dog the other side, or the head dogs will go over a fallen tree and the others under it, causing trouble and a dog fight and necessitating a delay to straighten out again. About two miles an hour is made in tracking; delay is caused by the dogs having to be shifted often from one bank to the other in order to get good footing. Occasionally in places dogs cannot be used and recourse is had to poles and paddles. Whenever the wind is fair sail is made. Lazy Natives often wait two or three days for a wind rather that pole or paddle. Should a boat be under way all night as sometimes happens, the occupants stand regular watch.
>
> On the return trips they fish a great deal, loading the boats down with the catches. Whenever stops are made boats are discharged, hauled up and turned bottom up to dry; tents are pitched, and camp made. In times of great hurry tents are not pitched, shelter being found under the lee of the boats. 166/

Stoney's 1883 excursion up the Kobuk is the first recorded white travel in the drainage. Stoney with a man named Tucker and two Natives pulled a "dinghy" sixteen hours a day to a point at the head of the delta. They then proceeded forty miles farther up the Kobuk, which Stoney stated meant "Big River" in the Natives' language, before turning back to their base ship. 167/

Stoney returned in 1884 with three Navy men, five Natives, the steam cutter Helena, a dinghy, a "six-ton skin-boat in tow," and provisions for forty days. They entered the mouth on July 19 and traveled upriver in their steam cutter a distance Stoney estimated at 275 miles. At this point he found that "the current became so strong, and the sounding out a channel in the low river so tedious" that they abandoned the steamboat in favor of their skin boat. Paddling was not successful, so the men began tracking with an eighty-yard sealskin tow line. The men continued tracking twelve hours a day for five days. On the fifth day they pulled through boulder-strewn, six-feet-deep rapids with a current of six or seven knots. Six miles farther upriver they reached what is today known as Selby River. Because the men were exhausted and suffering from sore feet, Stoney decided to turn back. By August 22 the party was back at Hotham Inlet. 168/

Stoney returned the following year for what would be the most extensive investigation of inland Northwest Alaska until the twentieth century. After his 1884 excursion, Stoney received orders to submit a plan to his superiors for a sixty-foot, flat-bottomed steamboat. In 1885 he had "the boat", presumably on his design, named the Explorer, plus the Helena, three skin boats, a sawmill, and twenty months' provisions. His personnel included seventeen Navy men, three Native men, and the families of two of the Natives. 169/

On July 17 the Explorer and Helena began towing the three skin boats up the Kobuk. Because they had so much supplies, the boats made the trip in relays, bringing one batch of supplies up about one hundred miles, unloading, and returning for the remainder. By August 17, the boats had transported all stores and personnel 218 miles to Cosmos Creek, which bears the name of the winter headquarters Stoney established there. Stoney overestimated the distance they had traveled; he believed Fort Cosmos was three hundred miles upstream. In preparation for winter, Stoney sent three Navy men and some Natives upriver to buy and catch fish for dogs in the winter and to explore the