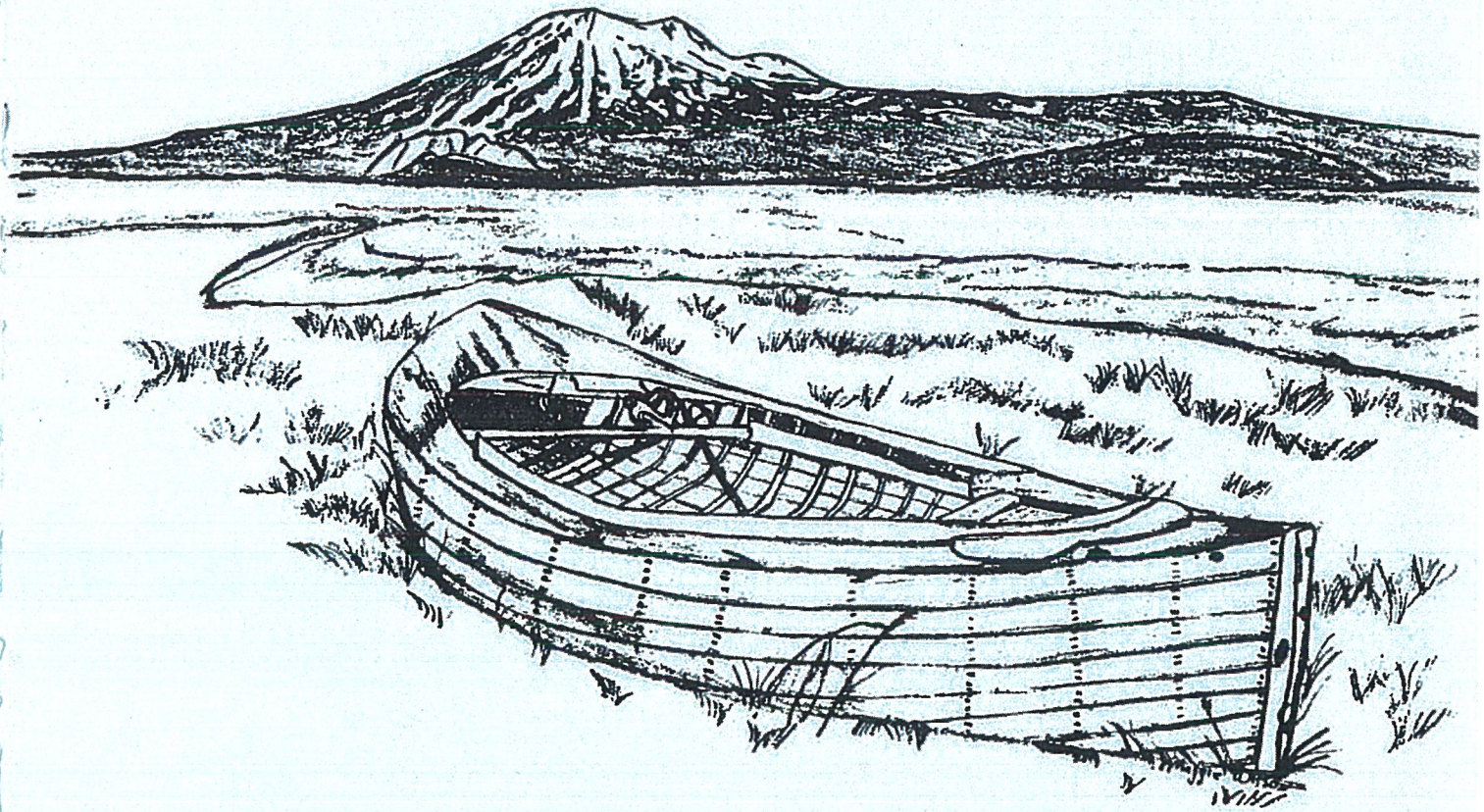
WRB 96-12

EGEGIK RIVER / BECHAROF LAKE WATERSHED NAVIGABILITY RESEARCH REPORT

By
Margaret Wilson
and
Warren Keogh



Water Resources Branch
U.S. Fish and Wildlife Service
Region 7
Department of the Interior
October 1996
(Revised June 1997)

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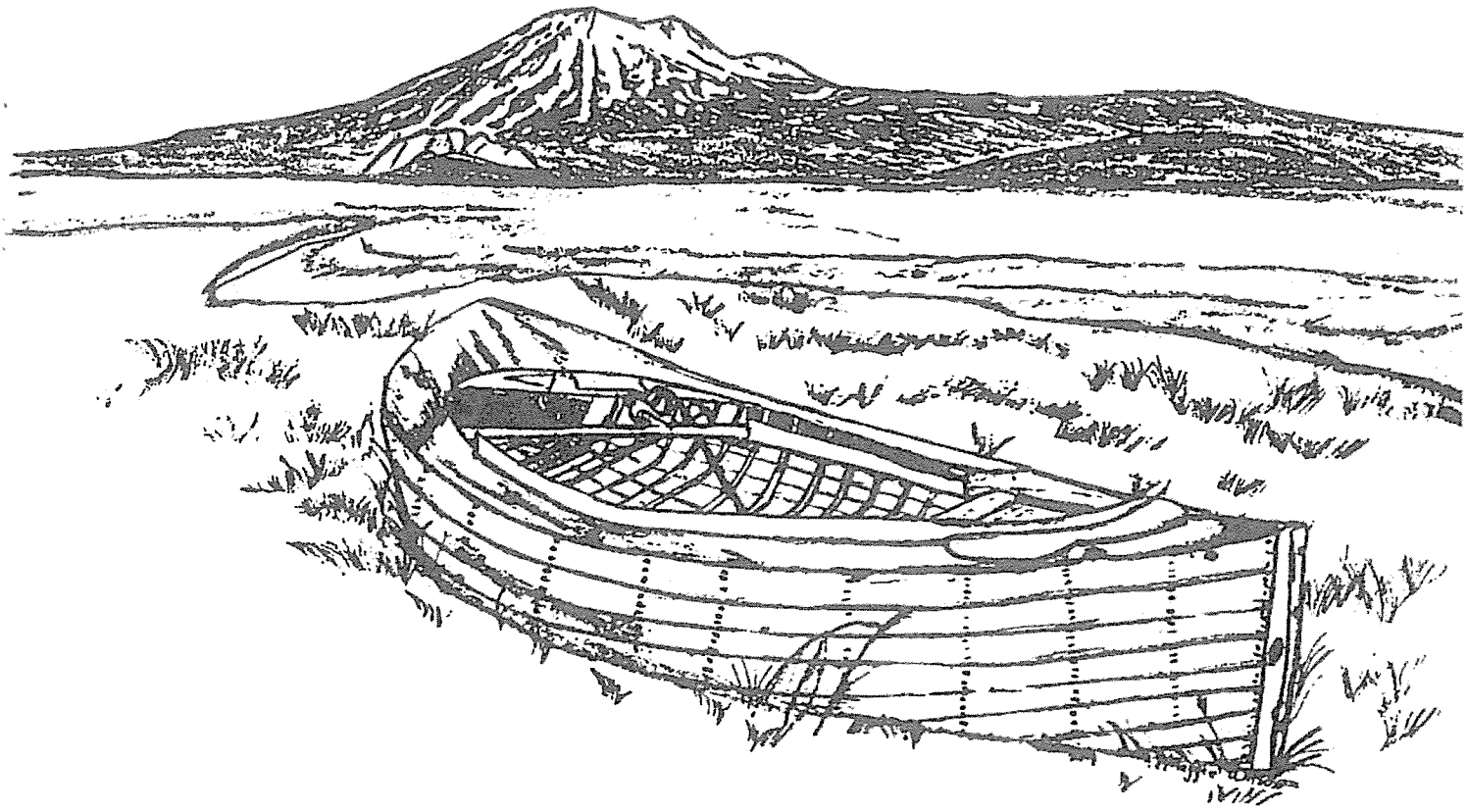

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I. Introduction

I. INTRODUCTION

This navigability report is prepared in response to a request from the U.S. Fish and Wildlife Service (Service) Region 7, Bristol Bay/Kodiak Ecosystem Team to research navigability of the Egegik River/Becharof Lake Watershed. The project is funded partially by discretionary Ecosystem Team funds. The report is prepared by the Region 7 Water Resources Branch, Division of Realty, which also partially funded the research.

The purpose of this report is to present information needed to make decisions on title navigability by Region 7. However, Service recommendations regarding waterway navigability within the Egegik River/Becharof Lake watershed are not made in this report.

This report is one of a series of navigability reports written in response to the State of Alaska Attorney General's notice of intent to file suit for quiet title on submerged lands in Alaska, including rivers and lakes. That notice (Cole 1992) was filed with the Secretary of the Interior on August 27, 1992, and claims that title to certain submerged lands passed to the State of Alaska at the time of statehood. The claim is based upon the Equal Footing Doctrine, the Submerged Lands Act of May 22, 1953, and the Alaska Statehood Act of July 7, 1958. Three water bodies included in the State of Alaska's notice and initial list are Egegik River, Becharof Lake, and Ruth Lake and outlet. Ruth River, which connects Becharof Lake and Ruth Lake, is the unnamed Ruth Lake "*outlet*" and included by inference.

This report examines the navigability of waters in the Egegik River/Becharof Lake basin, a watershed discharging into upper Bristol Bay of the Bering Sea. Navigability research complements a concurrent Service hydrologic reconnaissance for future hydrologic research in this watershed.

This report reviews navigability information on a basin-wide basis. Previous Region 7 navigability reports, such as the Innoko River Navigability Research Report (Wilson 1995), dealt specifically with the mainstem of a river. The Egegik River/Becharof Lake Navigability Research Report is an ecosystem and drainage basin-specific approach where the physical margins of the watershed, rather than refuge borders, determine report boundaries. As such, waters and lands studied within this watershed cross governmental agency and institutional borders, and vary in land status. The Egegik River/Becharof Lake watershed basin includes portions of Becharof National Wildlife Refuge (BNWR), Alaska Peninsula National Wildlife Refuge (APNWR), Ugashik Unit, Katmai National Park and Preserve (KNPP), State of Alaska lands, Becharof Corporation lands, and other private lands. (See Figures 1 and 2).

The basin-wide approach of this report is a prototype that tests the value and suitability of this methodology for Region 7 navigability research. One intent of this basin-wide prototype was to enhance the potential of avoiding litigation through negotiation with the State of Alaska. However, the Federal/State Navigability Task Force formed to explore navigability negotiations in early 1995 is dormant at the time of this writing.

Chapter II addresses land status. Chapter III is a regional overview with general background information. The physical environment, human geography, and historical use of the area are examined. Chapter IV is an analysis of main water bodies and their tributaries. Their names, locations, hydrologic characteristics, impediments to travel, and waterway changes before, at, or since Alaska statehood are noted. General use, economic activity, travel and transportation, and sites of human occupation, commerce, or seasonal activity are detailed to the extent possible for each unit of the Egegik River/Becharof Lake drainage. The navigability status of Water bodies, as administratively determined by Federal agencies, is reported for each watershed unit. Extensive use of excerpts from primary and secondary sources is intended to help the reader more accurately understand the topic and better evaluate the significance of each source.

The large drainage basin (Figure 3) of this report easily divides into three watershed units; Egegik River and Becharof Lake, King Salmon River, and Kejulik River. These watersheds are further partitioned. The Egegik River and Becharof Lake Watershed has three parts; Egegik River, Becharof Lake proper, and Island Arm, the southeastern embayment of Becharof Lake that includes Ruth Lake and Ruth River. The King Salmon River Watershed extends across the northern portion of the entire report area. The King Salmon River Watershed has two parts, King Salmon River and Upper Tributaries of King Salmon River. The smaller Kejulik River Watershed drains into eastern Becharof Lake and is treated as a single drainage area without segmentation.

While an abundance of information exists for some aspects of these basins, data are scarce or absent in others. A file of assembled navigability information pertinent to the Egegik River/Becharof Lake basin complements this written report. The file is located at the Water Resources Branch Office, Division of Realty, U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska.

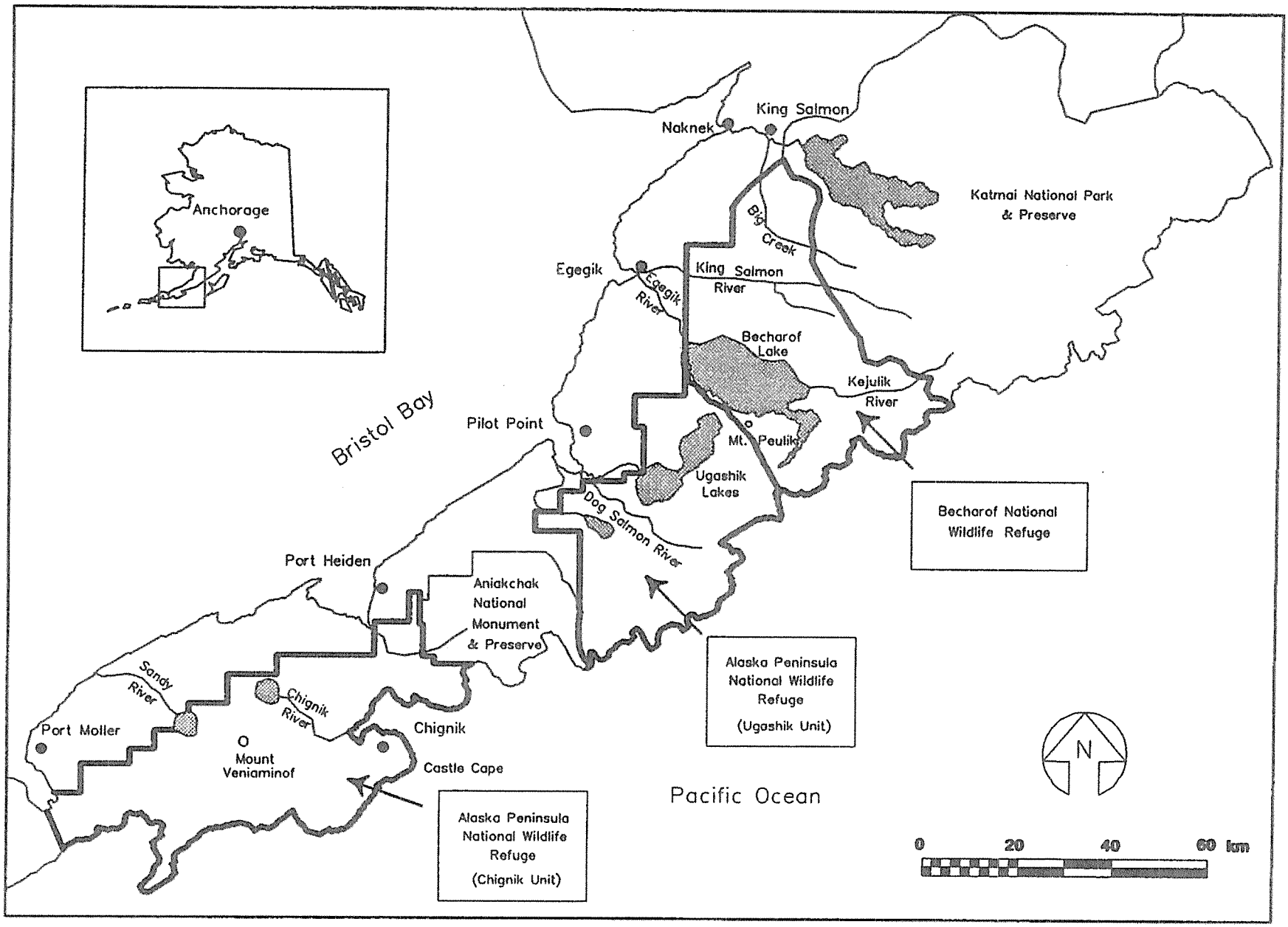


Figure 1. Vicinity map of Alaska Peninsula.

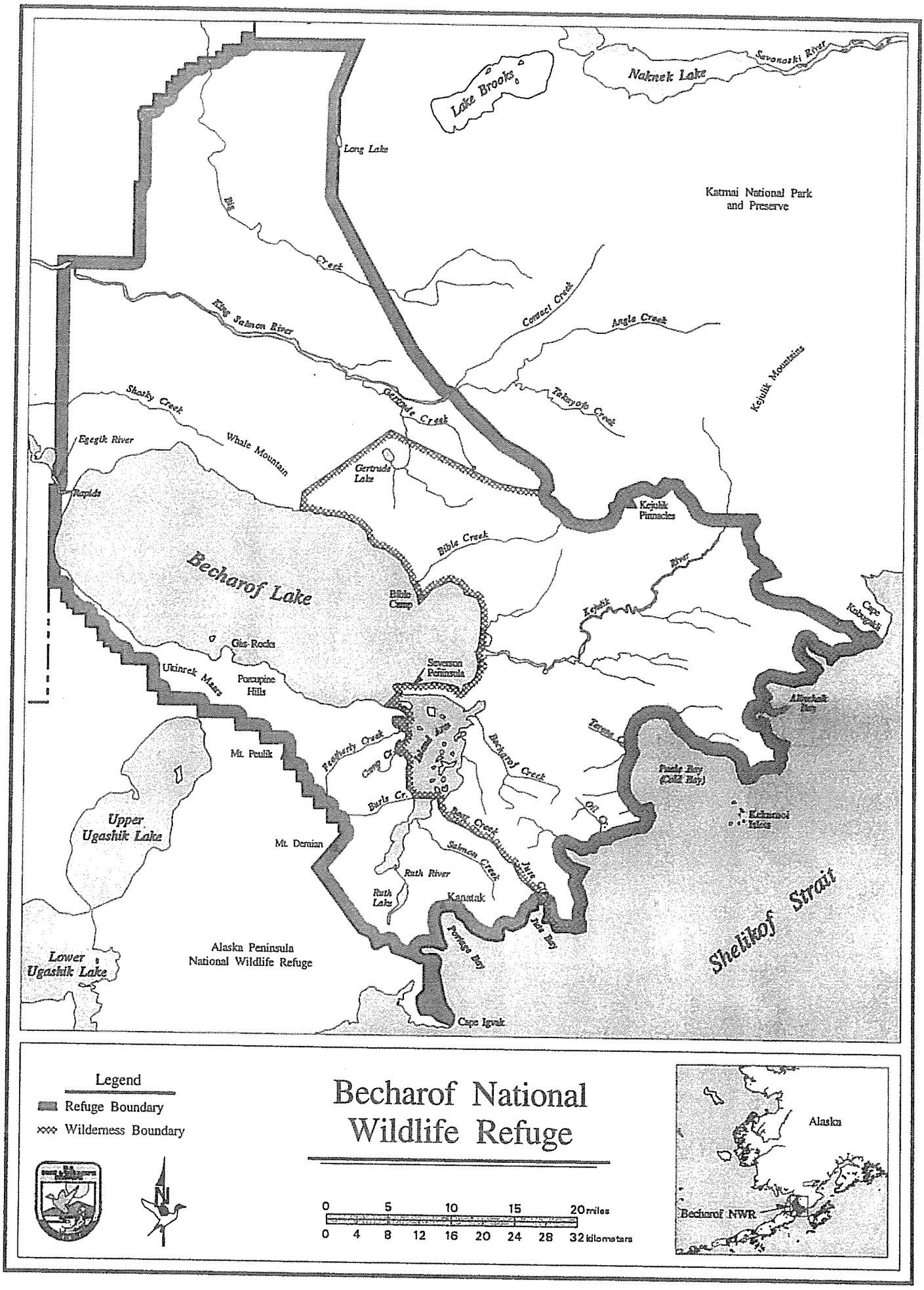
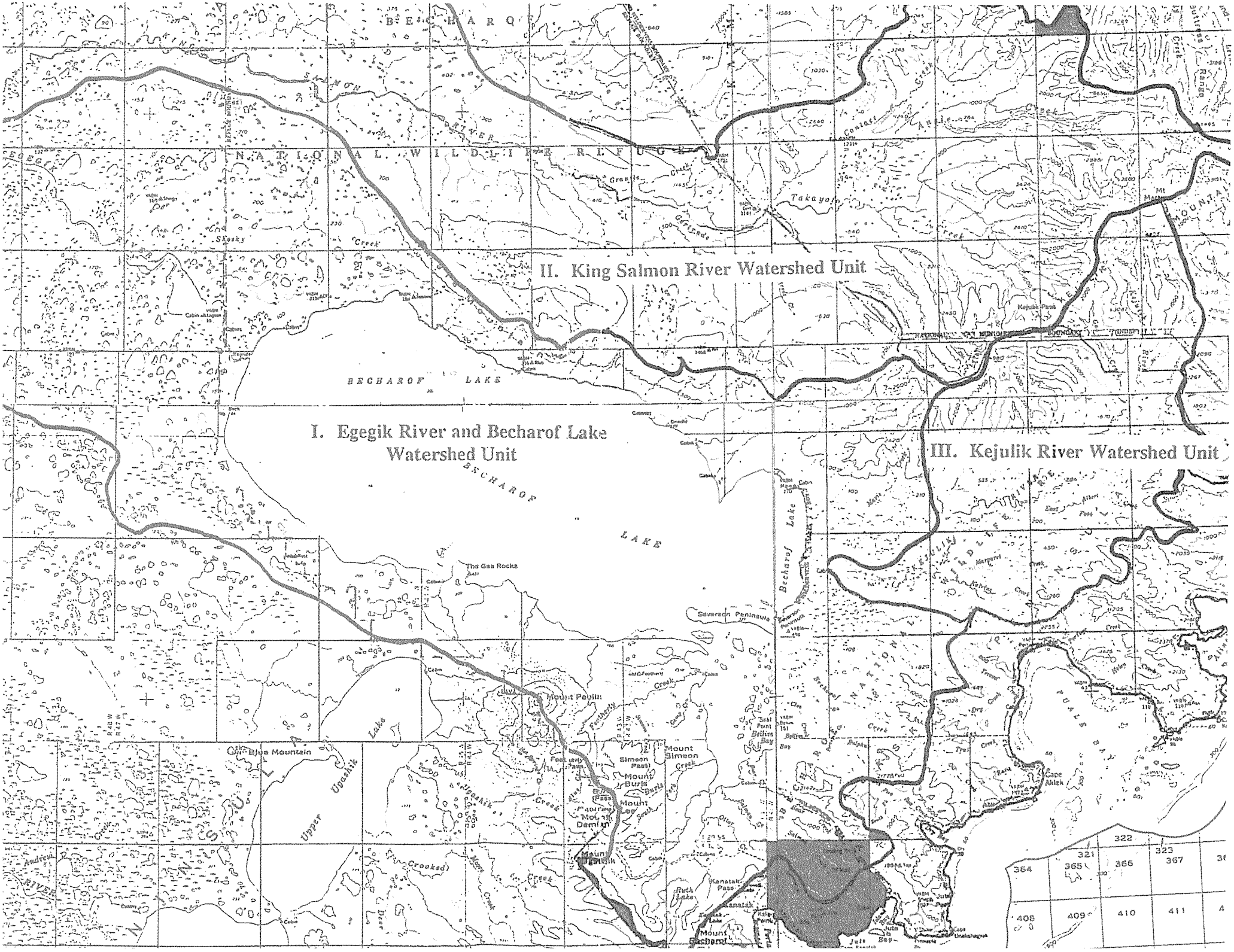

Lake Brooks
Naknek Lake
Savonoski River
Long Lake
Katmai National Park and Preserve
Big Creek
King Salmon River
Contact Creek
Angle Creek
Kejulik Mountains
Takayofo Creek
Gertrude Creek
Shosky Creek
Egegik River
Whale Mountain
Gertrude Lake
Rapids
Kejulik Pinnacles
Bible Creek
Becharof Lake
Bible Camp
Kejulik River
Cape Kubugakli
Gas Rocks
Ukinrek Maars
Porcupine Hills
Severson Peninsula
Alinchak Bay
Mt. Peulik
Featherly Creek
Camp Cr.
Island Arm
Becharof Creek
Puale Bay (Cold Bay)
Burls Cr.
Oil Cr.
Kekurnoi Islets
Upper Ugashik Lake
Mt. Demian
Bear Creek
Salmon Creek
Jute Cr.
Ruth River
Ruth Lake
Kanatak
Shelikof Strait
Portage Bay
Jute Bay
Lower Ugashik Lake
Alaska Peninsula National Wildlife Refuge
Cape Igvak
Legend
Refuge Boundary
Wilderness Boundary
Becharof National Wildlife Refuge
0 5 10 15 20 miles
0 4 8 12 16 20 24 28 32 kilometers
Alaska
Becharof NWR

Figure 2.



II. King Salmon River Watershed Unit
I. Egegik River and Becharof Lake Watershed Unit
III. Kejulik River Watershed Unit
BECHAROF LAKE
BECHAROF LAKE
Becharof Lake
The Gas Rocks
Severson Peninsula
Mount Paulik
Mount Simeon
Mount Burris
Mount Lee
Mount Damlin
Mount Ugashik
Blue Mountain
Upper Ugashik Lake
Kanatak Pass
Ruth Lake
Mount Becharof
Cape Akiak
Takayofa
Kejulik Pass
Mt Martin
Skosky Creek
Andreafsky River
Crooked Creek
Deer Creek
Moore Creek
Ugashik Creek
Burris Creek
Simeon Creek
Feather Creek
Bellim Bay
Seal Point
Jute Bay
Jute Point
Puale Bay
Kejulik River
Margaret Creek
Katrina Creek
Dry Creek
Tyrus Creek
Ralph Creek
Bear Creek
Otter Creek
Salmon River
Gertrude Creek
Granite Creek
Contact Creek
Apple Creek
Mountain
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II. Land Status

II. LAND STATUS

The majority of the Egegik River/Becharof Lake watershed lies within the Becharof National Wildlife Refuge (see figure 4). Beginning at river mile (RM) 32.5 on the Egegik River and continuing to its origin at Becharof Lake (RM 34), the land surrounding the river is managed by the Becharof National Wildlife Refuge. Beginning at RM 25 of the King Salmon River and continuing upstream approximately 38 miles to RM 63 where Takayofo and Contact Creek join to form the King Salmon River, the land surrounding the river is managed by the Becharof National Wildlife Refuge. The land surrounding the creeks forming the headwaters of the King Salmon River are managed by Katmai National Park and Preserve (National Park Service). The land surrounding all of Becharof Lake, Ruth Lake, and the small tributary streams draining into these lakes is managed by Becharof National Wildlife Refuge. Beginning at the mouth of the Kejulik River and continuing to approximately RM 34.5, the land surrounding the river is managed by the Becharof National Wildlife Refuge. From RM 34.5 to the river's headwaters, the land surrounding the Kejulik River is Katmai National Park and Preserve land. These lands are managed by the National Park Service. There are parcels of private land interspersed with Refuge lands. (See Figure 4, Generalized Land Status).

A. Non-Federal Interest and Federal Interest

To identify current non-Federal and Federal interest lands within the Egegik River/Becharof Lake watershed, refer to BLM Land Status records, filed by Range and Township. A list of Township and Range information needed to locate the appropriate Land Status records is listed in the Appendix. Each Township in the Becharof Lake watershed has a Master Title Plat (MTP), showing current land status, and an Historical Index showing land status change over time. The Miscellaneous Document Index and the Alaska Automated Land and Minerals Records System, Public Land Orders (PLO), and other Land Status records may be useful in tracking specific land status information. Current MTPs are on file at the BLM Public Room, 222 West 7th Avenue, Anchorage, AK and the U.S. Fish and Wildlife Service, Division of Reality, 1011 East Tudor Road, Anchorage, Alaska. Other land status records listed here are filed with the BLM.

B. Becharof National Wildlife Refuge Native Land Holdings

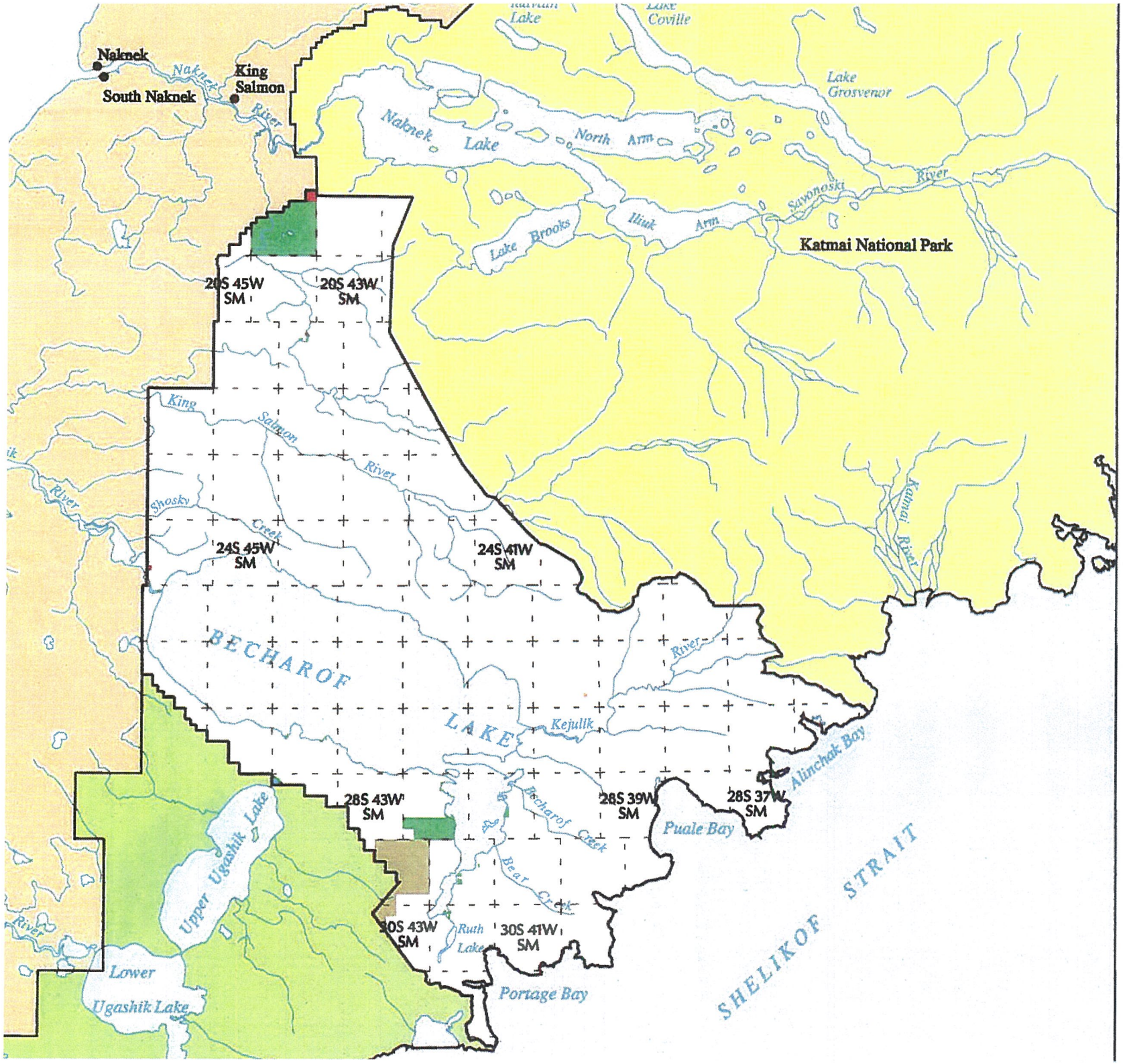
Figure 4 is the most current Generalized Land Status map for Becharof NWR, current as of July 1996. It shows Native selected, conveyed, and patented lands within the Becharof

National Wildlife Refuge. Under the Alaska Native Claims Settlement Act of December 18, 1971, Village Native Corporations throughout Alaska are entitled to lands surrounding their villages. Village Corporations could select lands from within 25 townships surrounding their core township. There are no villages located within the boundaries of Becharof National Wildlife Refuge. However, the Alaska Peninsula Village Corporation has made land selections along the northern boundary of the refuge, but the selections do not lay within the Becharof Lake watershed. In the Island Arm area of Becharof Lake, Koniag Regional Corporation has made three types of land selections: 14(h)(1) selections, 14(h)(8) selections, and in-lieu subsurface selections. The several 14(h)(1) selections are small cemetary or historical sites around Island Arm that may be conveyed to the Regional Corporation. A 14(h)(8) selection, including surface and subsurface estate, consists of several sections in T. 28 S., R. 42 W., S.M., but it is not a valid selection. The in-lieu selections (subsurface estate, oil and gas only) are valid and encompass several sections near the Refuge's southwest boundary.

Under the 1906 Alaska Native Allotment Act, individual Natives were entitled to allotments of land not to exceed 160 acres. Within the Refuge, a small number of allotments are situated along the shore of Becharof Lake's Island Arm and near the Egegik River. The right to explore and/or develop oil and gas deposits beneath the conveyed Native allotments has been reserved by the United States in those parcels located within the Becharof NWR.

The abandoned village and historically important town site of Kanatak lays within Refuge boundaries, but outside the watershed. In the vicinity of this site, Koniag Regional Corporation has two 14(h)(1) selections. Also, two private holdings and two empty surveys are located at Kanatak.

Any conveyance of Federal lands is done by the BLM. The BLM Master Title Plats show the current status of Federal lands within the Becharof Lake watershed and indicate any past land conveyance by the Federal government.



Becharof National Wildlife Refuge

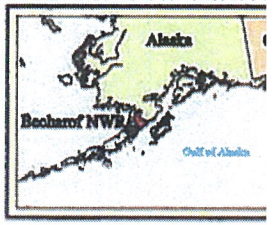
Generalized Land Status

Legend

- Native Conveyed
- Native Selected
- State Conveyed
- Other Private
- Regional In-Lieu Subsurface Selection

Notes

- Land status represents USFWS of BLM records.
- Small parcels may not show at t
- Land status current to 7/23/199



III. General Background

III. GENERAL BACKGROUND

A. Physical Environment

The Egegik River/Becharof Lake watershed is situated on the northeastern portion of the Alaska Peninsula, south of the village of King Salmon and southeast of the village of Egegik. The width of the peninsula in this area is 125 kilometers from Shelikof Strait to the Bering Sea and includes two principle physiographic provinces. On the eastern end of Becharof Lake, the Aleutian Range rises nearly 2000 feet, then drops precipitously to the rugged Pacific Coast. The position of this divide is notably asymmetrical, lying closer to the Pacific Ocean than Bristol Bay. The range includes ancient uplifted strata modified by Quaternary glaciation and volcanism. Its peaks are separated by broad glacial valleys and are capped by snow fields and alpine glaciers. Principle Quaternary, or recent volcanic features in the immediate area include Mt. Peulik and the Gas Rocks. The Ukinrek Maars just south of Becharof Lake were formed by phreatomagmatic eruptions in the spring of 1977 (BIA 1991b:2). The volcanic origin of the area is very evident with cinder beds radiating from volcanoes and bare rock being common above the 2000 foot elevation (USFWS 1985:16).

West of the Aleutian Range, Becharof Lake extends into the Bering Sea lowlands, a broad coastal plain of lakes and meandering streams that slope gently toward the Bering Sea. The shape of most topographic features, including lakes and rivers in the lowlands, are controlled by drift deposits derived from Quaternary glaciation. Major existing lakes, including Naknek Lake to the north and Ugashik Lakes to the south, are all retained behind large, well-defined moraines of the Iliamna glacial advance. Becharof Lake itself has probably existed more or less in its present form for well over 10,000 years (BIA 1991b:2).

The elevation in the Egegik River/Becharof Lake watershed ranges from sea level to 5000 feet in the Kejulik Mountains. Most of the tributary streams feeding Becharof Lake have their origins in the Aleutian Range. Primary among them are the Kejulik and Ruth Rivers (BIA 1991b:4).

The soils in the watershed are well drained, shallow and gravelly. Coarse volcanic ash furnishes most of the parent material for soil development with morainal and associated outwash deposits beneath. Vegetation is chiefly moist tundra, comprised of low shrubs, grasses and sedges rooted in a continuous mat of mosses and lichens. Willow and alder thickets are found along most streams and cover broad areas around Island Arm, especially toward the southern end. Large unvegetated areas are common along Becharof's southern

shore. There are no trees in the Becharof Lake area but there are stands of cottonwood trees up the Kejulik River valley.

The Egegik River/Becharof Lake watershed supports numerous species of mammals, fish and birds. Moose, caribou, brown bear, beaver, and porcupine are common. Ptarmigan, gulls, and a wide variety of waterfowl inhabit the area. All five species of salmon occur in the watershed as well as lake trout, Dolly Varden or Arctic Char, Rainbow Trout, grayling, and pike (USFWS 1985:37).

The Egegik River/Becharof Lake watershed area lies within a moderate polar maritime zone. Weather is characterized by high winds, small temperature variation, generally overcast skies and abundant precipitation. Fog and drizzle are common throughout the summer, while winter precipitation includes snow and freezing rain. The heaviest rain and snowfall occur on the Pacific Ocean side of the peninsula, while the Bering Sea side enjoys more clear weather but lower average temperatures. The Bering Sea and the Pacific Ocean are the dominant weather influences generating winds with high moisture content that blow constantly across the peninsula. Cyclonic storms frequently move across the peninsula from the Bering Sea, dominating weather for most of the year. High winds and turbulence are especially common in mountain passes (USFWS 1985:16). Winds average 11 miles per hour; temperatures average between 12° and 54° Fahrenheit (BIA 1991b:5). No sharp distinction occurs between seasons because of the influence of surrounding oceans. Vegetation does not begin to grow until late May or early June, and the first frost usually occurs in late September; ponds usually freeze by mid-October to early November (BIA 1991b:5).

Table 1. **Chronology of Recorded Historical Events, Alaska Peninsula, Becharof Lake Area.**

1762 First Russian fur hunters arrived on Kodiak Island (VanStone 1984a:149).

1778 Captain James Cook's first European exploration of Bristol Bay followed his exploration of Cook Inlet and Shelikof Strait (VanStone 1984a:150).

1784 Gregorii Shelikov established a trading colony at Three Saints Bay on Kodiak Island. This colony expanded trade to the eastern portion of the Alaska Peninsula.

1791 Dmitri Bocharov traveled across the Alaska Peninsula, ascended the Egegik River, crossed Becharof Lake, and portaged to the Pacific Ocean. This travel produced the first charts of the area (Yefimov 1964).

1804 Russian-American Company established trading posts at Katmai Village and Sutwik Island (Morris 1987:21).

1818 Petr Korsakovskii's expedition traveled from Shelikof Strait to Becharof Lake via the Kejulik River and descended the Egegik River to Bristol Bay (VanStone 1988).

1819 Russian-American Company established a trading post at Nushagak to support trade in the Bristol Bay area (VanStone 1984a:150).

1837-
1838 A Smallpox epidemic occurred on Alaska Peninsula, on Kodiak Island, and in southwest Alaska. The Koniaq and the Aleut communities lost 43 percent of the population
(Fortuine 1992:235).

1845 Russian Orthodox Church was built in Nushagak (Smith 1980:123).

1867 The United States purchased Alaska from Russia (Naske and Slotnick 1987:63).

1868 U.S. Geodetic Survey named Becharof Lake after Russian navigator Bocharov (Orth 1921).

1895 Salmon saltery was established at Egegik (Morris 1987:21).

1899 Egegik Packing Company opened a fish cannery at Egegik (Stirling 1985:103).

1900 Influenza and a measles epidemic occurred in the Bristol Bay area (Fortuine 1992:216). Alaska Packers Association established a cannery at Egegik.

Table 1. Chronology of Recorded Historical Events, Alaska Peninsula, Becharof Lake Area (continued).

1902	Oil drilling began at Puale Bay (Morris 1987:21), and extensive U.S. Geologic Survey activity began (Martin 1903).
1903	Second cannery operated by North Alaska Salmon Company opened at Egegik (Stirling 1985:103).
1910	Oil lands withdrawn from mineral entry (Martin 1921).
1912	Novarupta erupted forcing the residents of the villages of Katmai and Douglas to relocate. Some of the refugees established a village at Perryville while others resettled at Kanatak (Hussey 1971:366).
1918	Katmai National Monument was established (Morris 1987:21).
1918-1919	An influenza epidemic severely reduced the local Native population; Egegik Village moved to the south side of Egegik River, and other villages were abandoned (Morris 1987:21).
1920	Mineral Leasing Act of 1920 opened lands to entry (Bascle et. al 1986).
1921	Predatory fish kill operation by the Bureau of Fisheries began in Becharof Lake (Bower 1921-1926).
1922	Kanatak experiences its second oil boom as a result of a Congressional oil-leasing bill. Oil drilling activity focused west of Island Arm near Becharof Lake (BIA 1971:9).
1924	A new road was constructed from Kanatak to oil camps (Alaska Road Commission 1924).
1926	Standard Oil Company and others abandoned oil drilling near Kanatak (Bascle et al. 1986).
1929	A Post Office was established at Egegik (Dikerson 1989).
1932	Egegik River was surveyed by the Corps of Engineers (Hurley 1932).
1936	First Becharof Lake salmon spawning ground surveys occurred (McCundy 1973).

Table 1. **Chronology of Recorded Historical Events, Alaska Peninsula, Becharof Lake Area (continued).**

1938	Standard Oil unsuccessfully drills for oil at Salmon Creek, near Jute Bay (Lucas 1938:2).
1940-1945	Labor scarcity due to non-Native's involvement in the War effort resulted in more opportunities in the commercial fisheries industry, previously unavailable to local Natives (Morris 1987:21).
1941	Corps of Engineers blast boulders from Egegik Rapids to improve navigation (Corps of Engineers 1954:70).
1952-1955	The Department of Fisheries built and maintained a salmon counting weir on the Egegik River (Anonymous 1953:104).
1954	The village of Kanatak was abandoned (BIA 1971:11).
1957-1959	Humble Oil drilled for oil at Bear Creek near Jute Bay (Bascle, et al., 1986:4).
1959	Alaska became the 49th state, and fish traps became illegal (Naske and Slotnick 1987; Morris 1987:21).
1971	Alaska Native Claims Settlement Act (Morris 1987:21).
1975	Limited entry to Alaska's commercial salmon fishery was established (Morris 1987:21).
1978	The Secretary of the Interior, using emergency withdrawal powers, added 1.2 million acres of land to the Becharof Wildlife Refuge, and 1,370,000 acres of land to the Katmai National Monument (a total of 110 million acres of land was withdrawn from Alaska control for Federal conservation purposes) (Morris 1987:21).
1980	Alaska National Interest Lands Conservation Act (ANILCA) was enacted; Alaska Peninsula and Becharof Wildlife Refuges were designated, and Katmai National Monument was redesignated as Katmai National Park and Preserve. Subsistence hunting and fishing established as a priority use on Federal lands (Morris 1987:21).
1992	U.S. Fish and Wildlife Service limited the number of big game guides and outfitters permitted to operate in the Becharof National Wildlife Refuge (USFWS 1994).

B. Human Environment

1. Native Americans

The earliest known archeological sites in the area are found at Ugashik Narrows 20 miles south of Becharof Lake. The contents from the sites date back to about 7000 B.C. Though Ugashik Narrows sites and other adjacent sites are situated outside the Becharof Lake watershed, their proximity suggests human activity was likely within the watershed beginning 9000 years ago (USFWS 1985:45).

From about 4000 B.C. to the beginning of the Christian era two separate cultural sequences appear to have developed in nearly total isolation from each other, one on the Pacific Side of the Aleutian Range and one on the Bristol Bay side. On the Pacific side of the mountains the steep terrain limited the land use, so people relied heavily upon marine mammals (USFWS 1985:45). When Russian fur traders visited the peninsula's Pacific Coast in the early 1760s, they found Pacific Eskimos, or Aleuts, a diffuse group closely related linguistically to inhabitants of Kodiak Island, occupying much of the area (BIA 1991b:4). The Aleuts spoke a dialect of Yup'ik Eskimo which is strongly represented in the Bering Sea Region (D.W. Clark 1974:2).

The Aleuts practiced what was called the Pacific whaling and fishing subsistence pattern. Marine mammals and fish were their main source of food. Their economy centered around the sea mammals - whales, seals, sea lions, sea otters, and others - which were basic necessities for not only food but clothing, boats, and oil for lamps (Hussey 1971:63). Overland trails across the Aleutian Range (Figure 5) connecting with waterways across the Alaska Peninsula were used for trade between the Aleuts and the Yup'iks on the Bering sea side of the peninsula (Hussey 1971:67).

The Bering Sea shore of the Alaska Peninsula was occupied by the Yup'ik Eskimos. At the time of European contact the Yup'ik were occupying the mouths of the Naknek, Egegik and Ugashik Rivers (BIA 1991b:8). The subsistence pattern of the Yup'ik was that of the Bering Sea hunters and fishermen (Hussey 1971:74). Salmon was their primary food source with caribou a secondary food source. Using a series of established seasonal camps, these people followed a migratory pattern of resource harvesting along the major waterways of the Alaska Peninsula (Morris 1987:18).

2. Russian Exploration

The first European sightings of the Alaska Peninsula occurred in 1741, when ships from the Bering-Chirikov expedition sailed past the coast. The first Russian to land on the peninsula was Gavrill Pushkarev in 1761 (USFWS 1985:45). The Russians gradually expanded their interest in the Alaska Peninsula in their search for furs. In 1784, Gregorii Ivanvich Shelikov established a colony at Three Saints Bay on Kodiak Island. Operating from this location he expanded his company's trade influence to Kodiak Island, Cook Inlet, Prince William Sound, and the southern coast of the Alaska Peninsula (Morris 1987:18). In 1785, the Russian fur traders set out on an expedition to explore the coastline of the Alaska Peninsula. During this journey they learned of several portage routes to the west side of the peninsula (Dissler 1980:12). During subsequent years a series of trading posts were established, including one at Katmai Village and at Sutwik Island near Chignik. By the early 1800s fur trading was well established on the peninsula.

Although early Russian exploration of the peninsula was limited primarily to the coastal margins, the peninsula's interior became well known to the Russian fur traders by the late eighteenth century (BIA 1991b:9). Brooks and VanStone report that Dmitry Bocharov, Becharof Lake's namesake, traveled across and mapped the peninsula from Egegik to Kanatak in 1791 (BIA 1991b:9). In 1818, Peter Korsakovskiy portaged overland from Puale Bay to Becharof Lake, (the exact place of portage is not clear) then descended Egegik River to the Bering Sea. He camped at a small Native village near the mouth of Kejulik River and members of the party briefly explored Island Arm (BIA 1991b:9). Russian charts depicted Becharof Lake and the Egegik River with a fair degree of accuracy from 1791 forward (BIA 1991b:9).

3. Anglo-Americans

Scientific exploration

Although Alaska was purchased by the United States in 1867, it was not until 1881 that the first documented expedition to the Alaska Peninsula was conducted. Charles McKay was hired by the Smithsonian Institute to establish a Signal Service Station at Fort Alexander (Nushagak) in 1881. During the next two years McKay made numerous trips to the surrounding areas for the documentation and/or collection of faunal and botanical species. He made several excursions to the Becharof Lake - Ugashik Lake area (Dissler 1980:18).

Geologists Dall and Becker investigated the mineral resources of the Alaska Peninsula in 1895. According to their map they crossed the peninsula from Katmai to Becharof Lake. Dall described the petroleum that they found as "*a dark lubricating oil, which is said to float on the surface of certain ponds or lakes.*" The Becker-Dall expedition has been termed "*the first attempt at systematic investigation of the mineral resources*" of the Alaska Peninsula. It marked the beginning of a coordinated series of Alaskan studies by the U. S. Geological Survey (USGS) which are ongoing (Hussey 1971:319).

In August 1903, the USGS conducted exploration of the coal and petroleum resources of the Cold Bay (present Puale Bay) area. The study was conducted by geologist George Curtis Martin (Hussey 1971:324-325). In the early 1900s several naturalists traveled to the Alaska Peninsula (Dissler 1980:23). In July 1902, a biologist and two assistants made a biological reconnaissance of the Alaska Peninsula for the Department of Agriculture. The party was headed by Wilfred H. Osgood, a naturalist for the Division of Biological Survey. The party crossed the peninsula from Cook Inlet to Bristol Bay by way of Iliamna Lake, Lake Clark, and the Nushagak River. On their return trip they traveled from Egegik by canoe up the Egegik River and across Becharof Lake to the well known portage that led across Kanatak Pass to the village of Kanatak on Shelikof Strait (Figure 5). An assistant on that expedition, Alfred G. Maddren, remained in the Becharof Lake region through the following winter and sent collected biological specimens to Osgood (Hussey 1971:322).

4. Settlements and migration

Kanatak

Kanatak (also known as Kanataq) is an abandoned Aleut village on the upper east side of the Alaska Peninsula across Shelikof Strait, northwest of Kodiak (Figure 5). It was an important Native crossroad, heading the trail over the pass to Becharof Lake (Campbell 1995:79). According to an 1893 priest's account, Kanatak was established by Aleuts fleeing unfair trading company agents at Ugashik (Campbell 1995:81). The 1890 census lists 26 Natives in 7 families occupying 2 houses (BIA 1991b:7). In 1902 the village numbered 23 people. The population increased to 69 when displaced refugees from the 1912 Katmai eruption settled in Kanatak. The Katmai eruption was so violent that it destroyed the villages in the Katmai area and caved in the sod huts at Kanatak (BIA 1991b:7).

In the 1920s and 1930s, Kanatak experienced a population boom due to oil exploration in the nearby area. From 1902 to 1920 the permanent white population was limited to one or

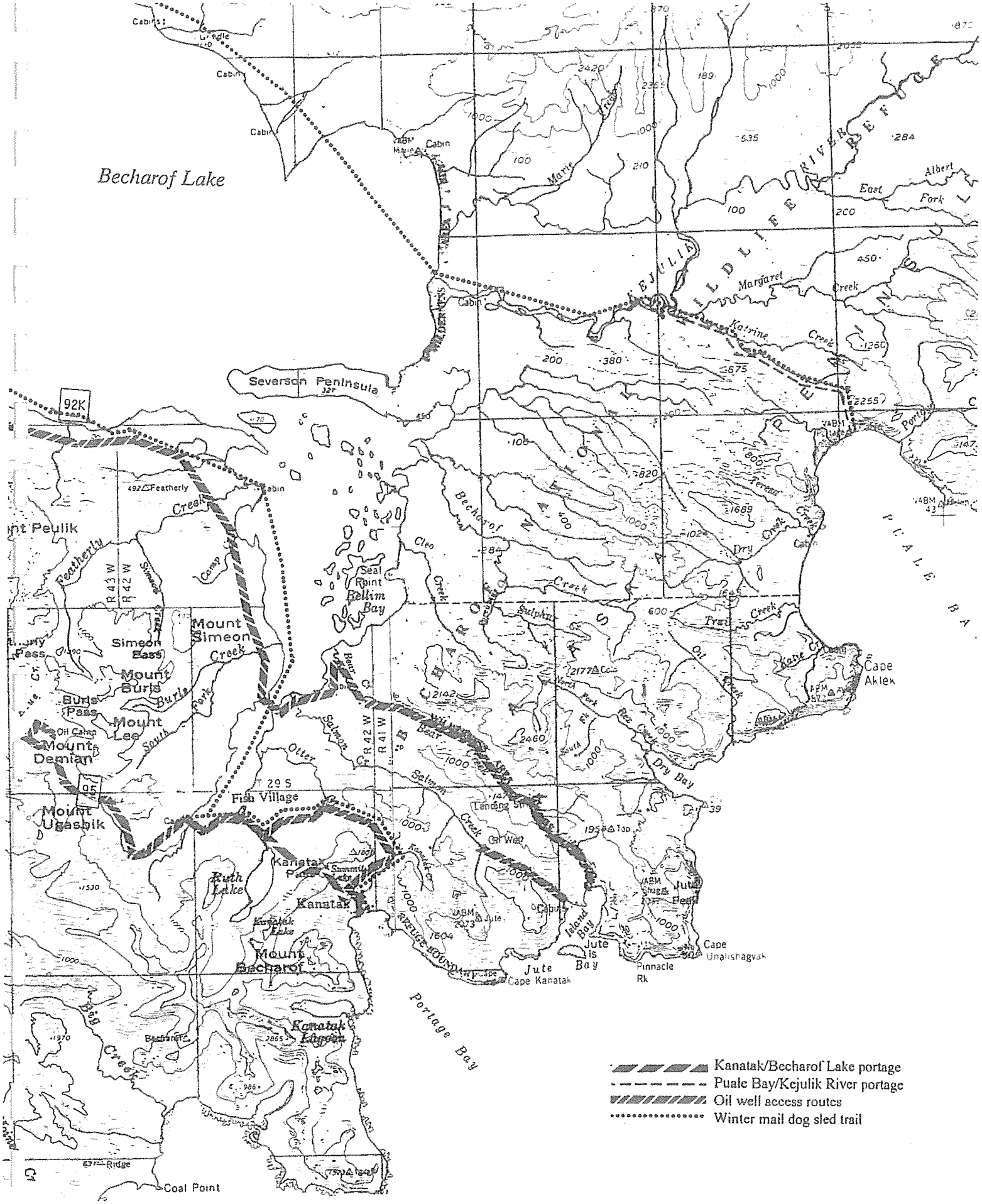

Becharof Lake
Severson Peninsula
92K
Mount Simeon
Simeon Pass
Mount Burls
Burls Pass
Mount Lee
Mount Demian
Mount Ugashik
Fish Village
Kanatak Pass
Kanatak
Ruth Lake
Mount Becharof
Kanatak Lagoon
Seal Point
Bellim Bay
Cape Aklek
Dry Bay
Jute Is
Jute Bay
Cape Kanatak
Cape Unalishagvak
Pinnacle Rk
Portage Bay
Coal Point
Kanatak/Becharof Lake portage
Puale Bay/Kejulik River portage
Oil well access routes
Winter mail dog sled trail

Figure 5.

two persons at the trading post, several oil prospectors, and some trappers. In the spring of 1920 after the passage of a new congressional oil-leasing bill, there was a new influx of oil prospectors to the area (Capps 1923:86). In 1922 the population reached 250 people almost overnight, causing the town to increase from a few buildings to 122 buildings, with 29 of those being businesses (BIA 1991b:7). During the boom Kanatak had a school, a post office, a restaurant and two general stores. During the 1930s steamships made regular calls with mail and freight bound for Kanatak and other Bristol Bay villages (BIA 1991b:13).

With oil drilling came better trails built by the oil companies, and eventually a territorial road from Kanatak leading inland to the oil fields (Figure 5). Trails radiated out from the village leading to both the West and the Cold Bay (Puale Bay) oil fields. A foot-trail went from Cold Bay to Portage Bay. Another road led from Kanatak around the head of Becharof Lake and across the hill to the head of Ugashik Creek. Stephen Capps, a geologist for the U.S. Geologic Survey, who studied the area in 1921 stated that "*there are few places in Alaska where land travel for horses and men is so easy*" (Capps 1923:88). A wagon trail was built from Kanatak to Becharof Lake and a road house was built where the road reached the lake, 8 miles away. The road was maintained intermittently by the Alaska Road Commission from 1924 to 1940. The Alaska Road Commission maintained dog-sled trails continued on beyond the road system connecting to the Bristol Bay area.

Kanatak was an important travel corridor. A trail from Kanatak cut through a low mountain pass to Ruth Lake at the southeastern tip of Becharof Lake (Figure 5). The trail was the shortest overland route to Becharof from the Pacific Ocean side of the peninsula. Early Eskimos from the Bristol Bay region used the trail to trade with the Aleuts on the Pacific Side. Early in this century the portage was used for mail, which was landed at Kanatak by steamer then transported by dog sled to Egegik and other Bristol Bay villages (Figure 5). During the 1920s and 1930s, Kanatak villagers traveled this route each summer to work in Egegik's commercial salmon fishery and canneries. In the following quote, Paul Boskoffsky tells L. J. Campbell of the Alaska Geographic Society about the days when the people of Kanatak would leave the village for a summer of fishing (Campbell 1995:85).

> *"Most of the villagers spent summers away, in Egegik, Chignik, Ugashik or Kodiak. A festive atmosphere would engulf the village each spring as families made preparations for the summer away. His family, other villagers and their dogs would walk along the trail through the mountains to Marraataq, or Fish Village, a small year-round settlement at the edge of Becharof Lake. This would take about four hours. They kept boats at Fish*

Village. While there, they would go to Egg Island and gather gull eggs, some to take on to Egegik. They would also bury some eggs, a method of preserving them until they returned in the fall. Then they'd boat across the lake and down the river to Egegik.

"When summer work in Egegik ended, they would boat back upriver with a winter's supply of flour, rice and other purchased groceries. They'd arrive at Fish Village in time for Chum Salmon, which they'd catch and dry for winter. They'd also pick berries and do a little hunting. Then they'd load everything in packs on their backs and on their dogs and walk home to Kanatak, often making several trips."

Oil drilling ceased in 1940, and Kanatak's population dwindled as the oil field workers left. World War II further reduced the population, and by 1942 only 81 people remained. The school closed in the late 1940s. The post office, established in 1922, diminished in importance when airplane mail deliveries to the region replaced the arduous overland hauls made by dog team (BIA 1991b:10). In a fatal blow to Kanatak, the post office closed in April 1954 while the few remaining villagers were away fishing. Since the mail-boat no longer supplied mail service, the villagers had to haul their groceries and supplies to Kanatak over the Kanatak/Becharof Lake portage from Egegik (BIA 1991b:13). The only other way to get groceries was by expensive charter boats or planes. There was little reason to stay so the remaining villagers left.

The people of Kanatak left so suddenly that most of their belongings were left behind. In a hurry to relocate before schools started, they planned to come back for their belongings but the buildings were subsequently looted by boaters, occupied by squatters, and eventually most buildings were burned down. Most of the people relocated to the villages of Egegik, Perryville, Ugashik, Karluk, and various Kodiak Island villages, where they had ties to the commercial fishing industry (BIA 1991b:11). In 1976 the Koniag Corporation claimed Kanatak as a historic village site (Campbell 1995:79).

Egegik

Egegik is located along the southern shore of the Egegik river where it empties into Bristol Bay (Figure 9). It is the southern-most village in the Yup'ik speaking Eskimo area. Bristol Bay is the largest producer of salmon in the world, thus commercial salmon fishing is the major economic industry in Egegik. The first salmon saltery, established in 1895, and the canneries which soon followed, set the tone for the contemporary community. The early processors attracted people to work as cannery workers and fishermen. Local Native

people as well as Outsiders were attracted to the fishery related work. A portage between Becharof Lake and the village of Kanatak provided relatively easy access to the Egegik fishing grounds for persons living on the Pacific coast (Morris 1987:23).

Starting in the 1940s and continuing today, transportation to Egegik is primarily by aircraft. Though not a deep sea harbor, ocean-going vessels have access to the community. Egegik experiences a substantial population increase during the commercial salmon season. From late April or early May as many as 1,000 persons from outside the Bristol Bay area, both fishermen and processors, arrive in Egegik. Most of them leave in early August (Morris 1987:24).

5. Travel Routes

Portages, trails, and water routes

A major historic travel route crosses the Alaska Peninsula from Bristol Bay to Shelikof Strait using the waterways of the Egegik River and Becharof Lake then overland across the Aleutian Range. There are two different overland routes across the Aleutian Range (Figure 5). The first portage starts at Puale Bay (Cold Bay) crossing a low pass, then down Katrine Creek to the Kejulik River to Becharof Lake. The second more recent route, titled in this report as the Kanatak/Becharof Lake portage, starts at the village of Kanatak, crosses the Aleutian Range at Kanatak Pass, then terminates at the southwest corner of Becharof Lake. Both portages historically were used for trade between the Aleuts on the Pacific Coast and the Yup'ik on the Bering Sea side. Trade items consisted of caribou skins, caribou meat, furs, amber, and walrus ivory. The Aleuts were skillful carvers of walrus ivory, though walrus did not inhabit the Pacific shore of the Peninsula, and the tusks had to be traded from the Natives of Bristol Bay (Hussey 1971:67).

Early accounts of one of the portages (it was not specific which portage) was documented by Martin Sauer, in his translation of the Joseph Billings expedition of 1785-1794 to Siberia and Russian America. Billings wrote of hearing about a portage west of Kodiak where the Russian traders and Natives would portage their boats across a low mountain pass, then boat down to Bristol Bay. The portage took three days. Here the Russian traders would obtain walrus tusks (Sauer:1972:174).

In 1791, after exploring the Alaska Peninsula, Dimitrii Ivanov Bocharov returned to Kodiak from Bristol Bay via the Kanatak/Becharof Lake portage using large skin boats.

He ascended the Egegik River, crossed Becharof Lake then portaged overland to Kanatak. The crossing was said to take three days (Hussey 1971:101-104).

The Peter Korsakovskiy expedition in 1818, was the first well documented instance of Russians reaching Becharof Lake. Korsakovskiy portaged overland from the Pacific Ocean (the actual place of portage is not clear) to the Kejulik River, then down the Kejulik River to Becharof Lake. From there he descended the Egegik River to Bristol Bay (BIA 1991b:9).

During the Nome gold rush (1898-1900) the Puale Bay/Becharof Lake portage (Figure 5) was used on occasion by prospectors on their way to Nome. The Puale Bay/Becharof Lake portage was not as popular as the farther north Katmai portage via Katmai Pass due to the poor boat landing conditions at Puale Bay (Hussey 1971:302).

In July 1902, naturalist Wilfred H. Osgood and two assistants were sent out by the Department of Agriculture to make a biological reconnaissance of the Alaska Peninsula. On the return leg of their journey from Bristol Bay, Osgood ascended the Egegik River in September 1902, traveling via canoe from Egegik to Becharof Lake. The party portaged overland from Ruth Lake to Kanatak, where they continued on by boat to an oil prospecting camp at Puale Bay (Osgood 1904:19-20; Dissler 1980:23).

In 1932, the U.S. War Department did a study on the Egegik River to determine how to improve the waterway for boat travel. It was suggested that the boulders at the rapids at the outlet of Becharof Lake be blasted to remove their hazard. By 1941, the boulders were removed clearing a three foot deep channel through the rapids (Corps of Engineers 1954:70). In the report of their findings the importance of the waterway as part of the Kanatak/Becharof Lake portage is emphasized. The report states:

> "*Becharof lake is navigable for its entire length of 43 miles and, together with Egegik River and a wagon road extending from the lake to the village of Kanatak on Portage Bay, forms a through trade route between the Pacific Ocean and Bering Sea*" (Hurley 1932:12).

The report goes on to talk about the wagon road from Kanatak to Becharof Lake (Figure 5):

> "*There is an 8 3/4-mile wagon road, constructed and maintained by the Alaska Road Commission, extending from Kanatak to the upper or south end of Becharof Lake. There has been a decided increase in traffic over*

> *Becharof Lake and Egegik River since the building of this road, the construction of which was completed in 1925. The inhabitants of Kanatak use this road exclusively in their annual migration to Bristol Bay, sailing down Becharof Lake and Egegik River to Bristol Bay. The winter mail is also carried over this route"* (Hurley 1932:16).

The establishment of the commercial fishing industry in the late 1800s and the appearence of Egegik canneries in the late 1890s created increasing employment opportunities for Shelikof Strait Natives. The canneries at Egegik increasingly drew migrant Native labor from Kanatak and other Pacific Coast villages who crossed the Kanatak/Becharof Lake portage each season to work in the Egegik fishery (BIA 1991b:5). Most of the inhabitants of Kanatak made a twice-yearly trip over the portage. Use of the portage by local Natives and others is documented in the 1932, Department of War Egegik River Study:

> *"About one half of the total native labor for the Egegik fishery comes from the east coast. The Indian laborers generally move their families with them, and as a result about 100 local people cross the peninsula each spring and return in the early fall. The passenger traffic of Indian families and their house hold goods is estimated at about 200 trips annually. In addition, there is considerable travel over this route by nonresidents, amounting to about 200 trips per year. This is accounted for by the fact that the trip across the peninsula can be accomplished in 1 day at a cost of $15 whereas a trip by steamer over 880 miles of open water around the peninsula requires 7 or 8 days, costs $65, and is the only usually traveled alternative route. This steamer makes only one round trip per month"*
> (Hurley 1932:16).

Wilson Fiske Erskine (1960:71) operated the motor vessel *Kodiak* during the 1930s hauling freight to Kodiak area villages including Kanatak. He mentions the Kanatak to Becharof Lake portage in his book *White Water, an Alaskan Adventure*:

> *"Portage Bay earned its name from its use as the terminal of the most feasible overland route to the northern side of the peninsula. Many summer fisherman use the route each year to get to the rich red salmon grounds of the Bering Sea. The route is simplified by nature for this purpose by the strategic situation of Becharof Lake, which covers two thirds of the distance and has its tributary spilling into the northern sea, all navigable by small boat. By portaging from the Pacific Coast side to the lake, it is possible to ride the balance of the way to the Bering Sea on fresh water"*

After Kanatak was abandoned in 1954, and the people dispersed to various villages, the portage was little used. For the past decade, Paul Boskoffsky of Egegik has taken a group of Bible camp students to retrace their ancestors' route over the mountains from Becharof Lake to Kanatak (Campbell 1995:85). Today there is still some interest in the portage. Several people have proposed upgrading the trail over the Kanatak pass as well as removing boulders from the Egegik River rapids to transport fishing boats across the peninsula for the Togiak Herring Fishery (pers.com. Russell, 1995).

Mail routes:

The post office at Puale Bay (Cold Bay) was active from the early 1900s until 1921 (BIA 1991b:10). Winter mail bound for Bristol Bay and Nome was landed at Puale Bay by steamer then carried by dog team, traveling over the Puale Bay/Kejulik River portage (Figure 5), to Becharof Lake, then along its northern shore and down the Egegik River to the Bering Sea Coast. In 1922, the post office and store were moved down the coast to Kanatak where oil activities were in full swing. The mail route was changed, off-loading mail was at Kanatak instead of Puale Bay, then it was taken across the Aleutian Range on the newly built road connecting Kanatak to Becharof Lake (Figure 5). The mail route continued along the south shore of Becharof Lake, then along the Egegik River to the Bering Sea Coast (Campbell 1995:85). By 1928, shelter cabins had been established at strategic points along the trail, notably at the northwestern corner of Island Arm and at Gas Rocks (Figure 6).

The Alaska Road Commission staked and brushed out winter route 92K from Kanatak to Egegik, as stated in their annual report from 1927:

> *"Four miles of trail were staked west of the lower end of Becharof Lake, 36 miles around the lake were brushed out and two miles staked around Gas rocks. A special examination was made of a route from the lower Kuskokwim district to the coast at Kanatak with a view of establishing a permanently marked winter trail from the Bethel district to some point on the winter boat route down the Alaska Peninsula. As a result of this examination the route from Egegik to Kanatak has been permanently marked"* (Alaska Road Commission 1927:67).

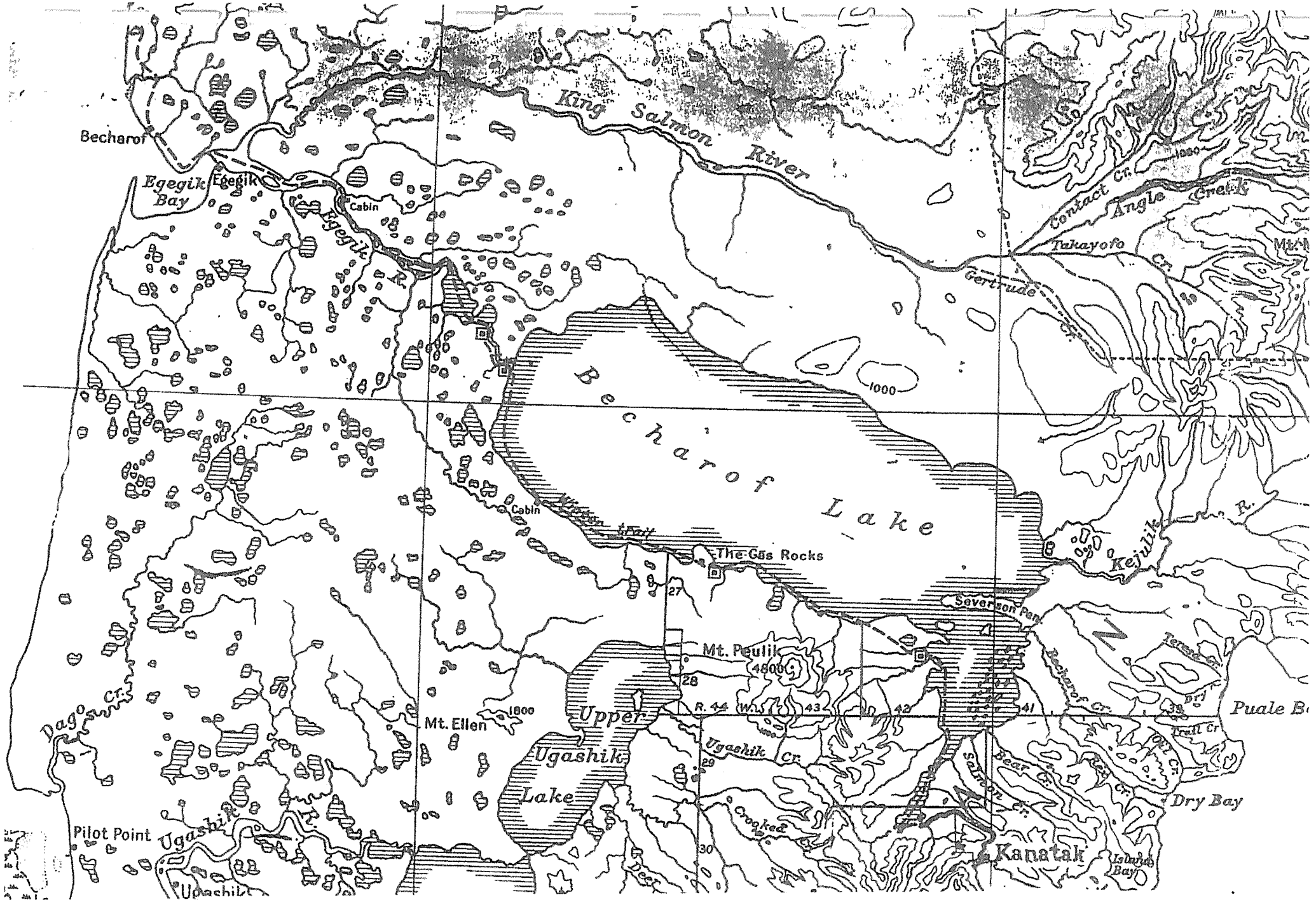


Figure 6. Section of 1957 Alaska Road Commission map showing dirt road from Kanatak To Island Arm, winter dog sled trail, and Alaska Road Commission safety cabins. Source: Briesemeister 1957

The 1927 and 1928 Alaska Road Commission annual reports state that in 1927 two 10' x 12' shelter cabins were built. One was located on the upper end of Becharof Lake (57 miles from Egegik) and one on the lower end of Becharof Lake (21 miles from Egegik) (Alaska Road Commission 1927:67). In the 1928 report route 92K was described by stating: "*This winter trail extends from Egegik on Kvichak Bay, up the Egegik River, around the southwest side of Becharof Lake to Kanatak. It is part of the through route from Bethel to Kanatak*" (Alaska Road Commission 1927:63). A third shelter cabin was built on the route in 1928 one mile east of Gas Rocks (Alaska Road Commission 1928:67).

Oil exploration routes:

Oil exploration activity west of Kanatak in the early 1920s resulted in the construction of a 19.5 mile long wagon road by oil companies and the Alaska Road Commission. Annual reports from the Alaska Road Commission (1922-1928) show the road connected Kanatak to the oil field at Pearl Creek dome in the Upper Ugashik Lake drainage (Figures 5, 6, and 23). The first 8.75 miles of road, known as the "Kanatak-Becharof Lake" route, or "Route 95", was constructed between 1923 and 1925. This new, alternative route to Becharof Lake avoided the steep grades of the historical portage route via Kanatak Pass summit and followed a longer, more northerly route through the upper Otter Creek drainage. This oil field route then continued westerly, crossing Ruth River, following Frank's Creek drainage, and continuing into the upper Ugashik Creek drainage.

Oil companies created other temporary routes to oil drilling sites in the decades that followed (Figure 5). In 1938, Standard Oil Company of California, with other oil companies, accessed a drill site near the headwaters of Salmon Creek from Jute Bay (Lucas 1938). Between 1957 and 1959, Humble Oil Company accessed a drill site near the headwaters of Bear Creek from Jute Bay along a route in the vicinity of Jute Creek (Paddock 1968; Bascle, et al. 1986:4). In 1959, Mobil Oil Company extended the route from the Humble Oil drill site toward the vicinity of distant Dago Lake (Kaydas 1959; Paddock 1968). This route followed Bear Creek (Figure 24) from its headwaters to its mouth on Becharof Lake, continued around Island Arm to a crossing at the Little Narrows, roughly followed the southern shoreline of Becharof Lake to a point beyond Gas Rocks, and continued on toward Dago Lake. Tractors and dozers hauled drilling rigs and other equipment to two drill sites (Great Basin #1 and #2) and retraced their route to Jute Bay the following year. Biologists with the Alaska Department of Fish and Game accompanied oil company heavy equipment during the 1960 exit to ensure remedial repairs would occur at damaged stream crossings and along streambeds. Remedial activities included removal of obstructions, the extraction of culverts, and attempted repair of stream channels, particularly Bear Creek (Noerenberg 1959; Paddock 1960 and 1968).

C. History of Using Water Bodies (pre-1959 and post-1959)

1. Subsistence

Pre-1959 Subsistence use

The Becharof Lake drainage area has been used for subsistence purposes for thousands of years. The Aleuts, located on the Pacific side of the Alaska peninsula, practiced the Pacific whaling and fishing subsistence pattern, while the Yup'ik on the Bristol Bay side practiced the subsistence pattern of the Bering Sea hunters and fishermen (Hussey 1971:63).

After European contact and the development of trapping and commercial fishing economies, local Natives continued their customary hunting and trapping activities at Becharof Lake from their home villages of Egegik and Kanatak. Kanatak people tended to use Island Arm and the eastern lake shores of Becharof Lake, while Egegik families more often camped along the western lake perimeter. Access to the subsistence use areas was by bidarkas (hide covered kayak) in the early days, which were replaced in the late 1920s and early 1930s by skiffs and canoes. Other boats commonly used on Becharof Lake and the Egegik River from the late 1920s through 1959 were the 32-foot double-ender sailboats used in the commercial fishery in Bristol Bay (pers.com. N. Abalama 1995). Local Natives hunted moose, caribou and bear around the lake, and harvested a variety of fish from the lake waters and tributary streams. The low, grassy islets in northern Island Arm provided excellent egg-gathering grounds. The Arm's southern islets were visited for wood gathering (BIA 1991b:11).

Fish Village, located on the Island Arm of Becharof Lake along the Kanatak/Becharof Lake trail portage, was an important staging area for the subsistence activities of the people of Kanatak. The village was inhabited until the late 1960s (pers.com. Kelly & Clark, 1995). The people of Kanatak would store their boats at Fish Village. They used the boats for food gathering in the Becharof Lake watershed and to travel to and from Egegik. In the fall people would return from the commercial fishing season in Bristol Bay, arriving at Fish Village in time to catch chum salmon, which they would dry for winter (Campbell 1995:85). Other people lived year round or seasonally in cabins which dotted the perimeter of Becharof Lake. Nick Abalama said they used to build cabins all around Becharof Lake to be used as bases for their trapping, and subsistence activities. These cabins were inhabited until the late 1960s and early 1970s (per. com. N. Abalama 1995). During the 1950s there were very few caribou available. Moose which did not appear in the area until the 1930s, were still very scarce. The only large game available were bears, which became an important food source. The Kejulik River drainage was a popular area to

hunt bears. Access to these bears was by boat. Later, when moose became more abundant, they were hunted in the Island Arm area (pers.com. N. Abalama 1995).

Post 1959 Subsistence Use

The residents of the four local communities of Egegik, King Salmon, Naknek, and South Naknek regularly engage in subsistence activities in and around Becharof Lake (USFWS 1985:54). In 1984 the Alaska Department of Fish and Game, Subsistence Division, conducted a subsistence study of six Alaska Peninsula communities from 1962 to 1982. In Egegik, the primary village that uses the Becharof Lake watershed, 99 percent of the residents interviewed used wild foods during the study year. Per capita harvests of wild foods for Egegik was 385 pounds per person, the third highest in the Bristol Bay study area. In Egegik caribou made up 64 percent of the total catch by weight with salmon being the second most utilized resource (Morris 1987).

Egegik's subsistence resource use area (Figure 7) stretches along the Bering Sea and inland from the area north of the King Salmon River, around Becharof Lake, then south to approximately Cape Greig (Morris 1987:93). The Egegik River, its tributaries, and Becharof Lake are areas of significant resource harvest activities (Behnke 1978:151). A number of Egegik people who originally migrated there from Kanatak retain ties to the southeastern end of Becharof Lake (Behnke 1978:156). The Kejulik River drainage as well as the Pacific Ocean side of the Alaska Peninsula are occasionally used for subsistence purposes.

Caribou, the primary subsistence resource, inhabit the whole Becharof Lake drainage area. Along the Egegik River and along the northern shore of Becharof Lake are popular areas for hunting caribou (USFWS 1985:54). Hunters take skiffs or larger boats up the Egegik River and on up to Becharof Lake if needed to hunt caribou (Behnke 1978:151). There is an airstrip providing aircraft access to the caribou located where the Egegik River drains from Becharof Lake.

Moose are usually taken by hunting from boats on the King Salmon River, along the northwest shore of Becharof Lake near Whale Mountain, or on the eastern end of Becharof Lake at such places as Featherly Creek and Severson Peninsula (USFWS 1985:54). Gull eggs are gathered on the islands in the Egegik River and ducks are sought in the mouths of creeks and sloughs off the main rivers, while geese are found in flats along the Egegik River (Behnke 1978:154).

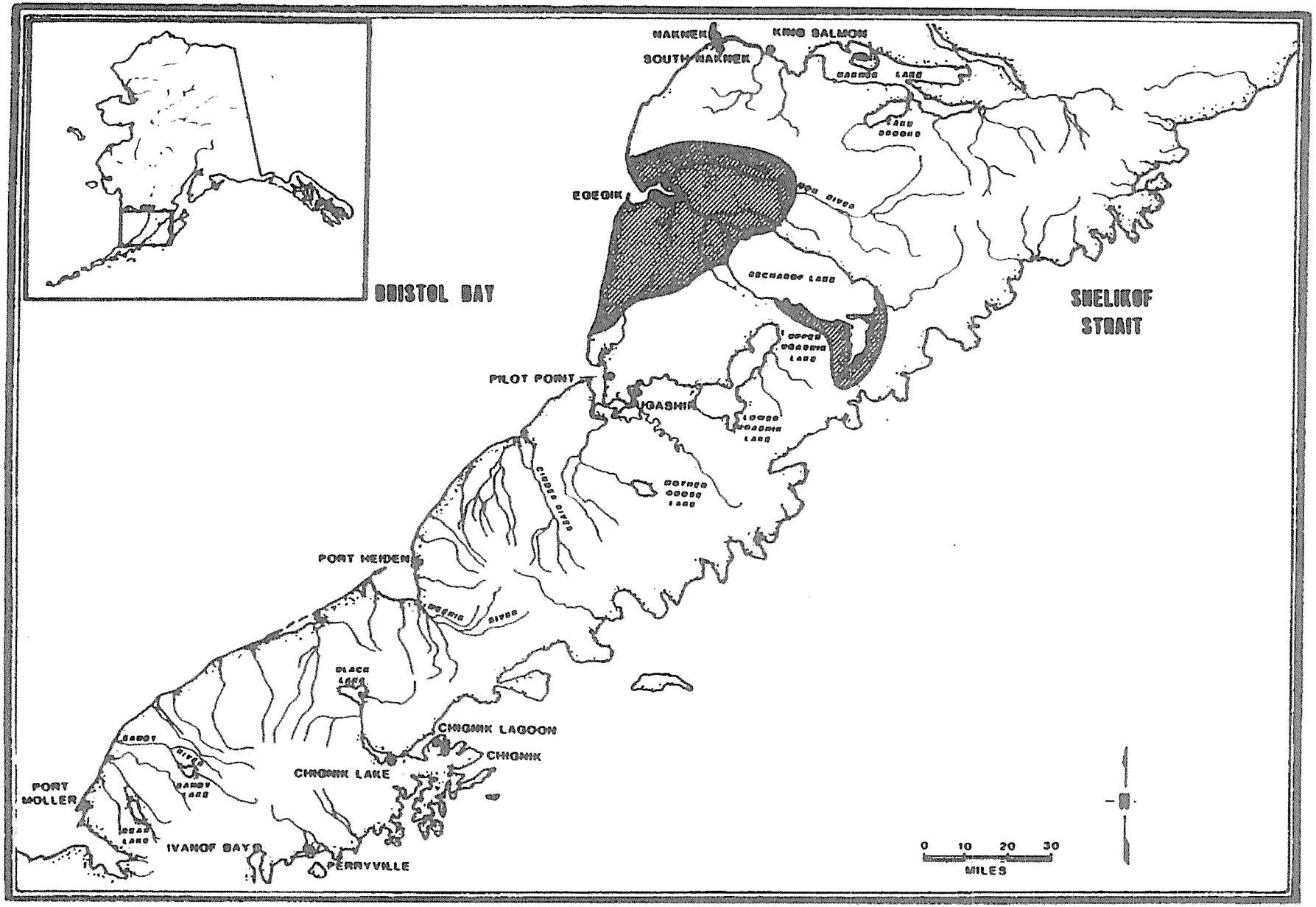


Figure 7. Egegik Village resource harvest area, 1962-1982.
Source: Morris 1987:94.

Table 2. **Egegik Residents' Seasonal Subsistence Round from 1962 to 1982.** Source: "*Fish and Wildlife Uses in Six Alaska Peninsula Communities*" by Judith Marek Morris (1987:80-86).

Spring	Breakup near Egegik usually begins in late March or April. Skiffs travel up the King Salmon River for freshwater fishing as soon as there is open water. Razor clams are gathered from beaches on the Pacific Ocean side of the peninsula. Small fixed wing aircraft are used to reach beaches on the Pacific Ocean side of the peninsula. Butter clams are harvested near Egegik. Waterfowl hunting and egg gathering occurs on the Islands in the Egegik River.
Summer	King salmon fishing with gill nets and rod and reel in the Egegik River begins in May. Commercial fishing efforts begin in June and subsistence fishing becomes a secondary concern. However, some harbor seals are harvested and choice sockeye salmon are taken from the commercial catch for personal consumption. Berry picking and Coho salmon fishing in the Egegik River begin in August. Grayling, rainbow trout, and silver salmon are harvested from skiffs in the Egegik and King Salmon Rivers. Caribou season opens in mid-August. Skiffs provide transportation to hunting areas before freeze up.
Fall	Moose hunting begins in early September. Moose hunters use skiffs to travel up the Egegik River to Becharof Lake or travel up the King Salmon River. Spawned out sockeye salmon are harvested by some local people who boat up the Egegik River near the outlet of Becharof Lake. Berry picking continues throughout the fall with skiffs, fishing boats, and airplanes being used for travel to more remote locations.
Winter	Ice fishing for smelt and freshwater fish is a winter subsistence activity. Moose hunting continues in December when travel is difficult, a time when it is too late to use skiffs and often too early to use snowmachines. Trapping begins in November and continues through March. During the winter months the rivers are frozen and residents access hunting and trapping areas with snowmachines, three wheelers, or airplanes.

Salmon, the second most important subsistence resource for area residents, are taken with gill nets in Bristol Bay, in the Egegik River, and in the tributaries draining into Becharof Lake (Morris 1987). Boats are the primary means of access to subsistence resources on the extensive waterways. Most families own skiffs, which are boats from 18 to 22 feet long powered by outboard motors. Aircraft are used quite often with people either flying their own airplanes, or being dropped off by air taxi operators. Wheeled planes land on gravel bars, along ridges, or in the "sand blow-outs" which are common in the area. Seaplanes and float planes can land on most of the waterways. Snowmobiles and all-terrain-vehicles provide winter access to subsistence areas after the waterways have frozen.

Today, local people still actively participate in subsistence activities in the Becharof Lake drainage area. One Egegik Resident interviewed has made 20 trips by boat up the Egegik River/Becharof Lake area to hunt and fish in 1995 alone (pers.com. Olsen 1995). Dan O'Hara of Naknek stated that the Becharof Lake area is still a significant subsistence use area (pers.com. O'Hara 1995). In Judith Morris' subsistence report on the fish and wildlife uses of six Alaska Peninsula communities she concludes by stressing the importance of subsistence for local people.

2. Trapping

Pre-1959 Trapping Use

Commercial trapping on the Alaska Peninsula started during the Russian Era and was well established by the early 1800s. By the time Alaska was purchased by the United States in 1867, most aboriginal peoples along the peninsula were involved in the fur trade (BIA 1991b:9). In 1921, Stephen Capps conducted geological studies for the USGS in the Kanatak area. He described the trapping taking place in the area.

> *"The trapping of fur-bearing animals for their pelts is carried on each year by natives and by a few white trappers. Many red fox and a lesser number of silver-gray fox are taken, as well as mink, martin, ermine, and land otter. This coast was formerly a rich hunting ground for the highly prized sea otter, but they are now almost exterminated and their capture is forbidden by law" (Capps 1923:85).*

Becharof Lake and the Kejulik River Valley were popular places for people to trap. The Kanatak people tended to use Island Arm and the eastern lake shores, while Egegik families more often camped along the western lake perimeter. Fur prices remained high

from 1900 until 1929, fueled by steady demand and a declining furbearer population, but the market collapsed during the Great Depression and never fully recovered (BIA 1991b:11).

Even after the fur price crash Kanatak and Egegik people continued their trapping lifestyle, though the major part of their income was derived from the commercial fishing industry. During the 1930s virtually everyone in Kanatak trapped. In 1936 there were over 35 people living in the trapping cabins that dotted the perimeter of Becharof Lake (Lucas 1936b:3). The fur buyers used to make a buying trip once a year in the spring, traveling the trail around Becharof Lake. The fur buyers would travel from Kanatak by dog sled, stopping at the camps and settlements along the way. The fur buyer's sled was full of trade goods which were used to trade for furs (pers.com. N. Abalama 1995). Trapping was the only income people had during the off-fishing season. People trapped in the Becharof Lake area in the winter and then migrated to Egegik to work in the fishery during the summer months (pers.com. Asplund 1995; N. Abalama 1995).

Another popular trapping area was the upper King Salmon River. When Katmai National Park and Preserve was established and trapping became illegal, people were displaced from their traditional trapping areas on the upper King Salmon River by the Park Service (pers.com. Asplund 1995).

In the mid-1950s there were still local people from the Egegik area actively trapping in the Becharof Lake area and seasonal trapping cabins dotted the lake shore. In the late 1950s people from the Dillingham area moved in to trap as the beaver in their area were getting scarce. By the end of the 1950s the beaver population in the Becharof lake watershed had been depleted due to the increased trapping pressure. Trapping went on in the area until the 1960s. Trappers accessed the area by aircraft, often being dropped off for the entire trapping season (pers.com. Asplund 1995).

Post-1959 Trapping Use

In 1963 Augie Alto and Paul Boskoffsky of Egegik were actively trapping and had cabins on the Kejulik River (pers.com. Tretikoff 1995). Augie had trapped in the area since the late 1950s (pers.com. Hammond 1995). There is currently some trapping taking place in the Becharof Lake watershed but the effort is greatly reduced from the past. Eight individuals were known to have trapped on the Becharof National Wildlife Refuge in 1982, earning an estimate $4,500.00 each from the sale of their furs (USFWS 1985:66). The winter caretaker of Phil Shoemaker's camp on the Upper Kejulik River usually does some

trapping (pers.com. Shoemaker 1995). In Judith Morris' 1987 subsistence report, titled "*The Fish and Wildlife Uses of Six Alaska Peninsula Communities*", she states that furbearer trapping takes place in the same areas as moose and caribou hunting. These areas are along the King Salmon River, and along the shoreline of Becharof Lake at places such as Featherly Creek and the Severson Peninsula (Morris 1987:93).

The main furbearers trapped in the vicinity of Egegik are fox, mink, land otter, and beaver. Wolves, wolverine, and lynx are occasionally taken as well. Significant trapping areas are around the shores of Becharof Lake, and in the Kejulik valley. The Kejulik River is noted as being the best trapping area in the region, having good populations of fox, wolf, and wolverine. Some access is by snowmachine but most is by aircraft (Behnke 1978:154).

3. Commercial Fishing

Pre-1959 Commercial Fishing

By the 1880s the fur resources had been severely over-harvested (BIA 1991b:5). At the same time commercial fisheries were established and commercial fishing replaced the fur trade as the primary industry. Salmon fishing quickly became the most important commercial resource harvesting industry in the area, a role which has continued into the 1990s. The commercial fishing industry employed local people from all over the Alaska Peninsula, including people from the Pacific side from places such as Kanatak. Most of the Native people who lived in Kanatak spent summers away from home commercial fishing. An Egegik River study written by the Department of War in 1932 talks about the commercial fishing industry:

> "*The fishing industry in the vicinity of Egegik employs between 400 and 600 people. All skilled labor and a small percentage of unskilled labor is imported on the cannery steamers. The additional labor required is secured locally from Egegik, Kanatak, and other points in the vicinity, and represents about 40 percent of the total employment. About one half of the total native labor comes from the east coast. The Indian laborers generally move their families with them, and as a result about 100 local people cross the peninsula each spring and return in the early fall*" (Hurley 1932:17).

Post-1959 Commercial Fishing

Bristol Bay is the largest producer of sockeye salmon in the world (Morris 1987:61) with the Bristol Bay rivers providing the rearing habitat for half of the world's population of sockeye. The Egegik River/Becharof Lake drainage is the second largest producer of Bristol Bay sockeye salmon (J.H. Clark 1980:1). In the Egegik district of Bristol Bay, five Pacific salmon species are harvested.

Commercial fishing is still the most important economic activity in the Bristol Bay area with Egegik being no exception. The economy of Egegik is dominated by commercial fishing with most of the residents participating in the fishery. Residents not directly participating in the actual act of fishing, work for the several land-based fish processors. Other cash earning opportunities in the village are scarce (Morris 1987:no page given). A subsistence survey of Egegik done in 1984 by the Alaska Department of Fish and Game found that 96 percent of the households contacted during the study reported they were commercially fishing during the 1984 season. Out of 28 households in Egegik, 17 of those were limited entry commercial salmon fishing permit holders with their fishing crews being drawn from a pool of local and non-local residents (Morris 1987:64).

Pre-1959 Predator Bounty on Trout Tails

Trout were seen as a threat to the valuable sockeye salmon stocks as they ate young salmon. In 1920 a bounty was put on trout, starting a major commercial enterprise for the local residents. In "*Alaska Geographic, Katmai Country*" the bounty program placed on trout tails is discussed:

> "*In the early days of commercial fishing in Bristol Bay, packers believed Dolly Varden and other species thought to prey on young salmon were threatening their valuable sockeye runs. In response, around 1920 the U.S. Bureau of Fisheries organized a program of predator control, offering bounties of up to 5 cents for each tail brought in from one of the targeted "predator" species. The program's purpose was not only to increase salmon runs, but also to provide an additional source of income for fisherman during the Depression. Funded first by the packers themselves and later by the Alaska Territorial Legislature, more than 13,000 sport fish were killed under the program just between 1920 and 1925; the program continued until 1941*" (Alaska Geographic Society 1989:43).

Not only did the U.S. Bureau of Fisheries pay bounties on trout tails, but they also had special eradication crews that traveled to Becharof Lake each summer from 1921 through 1926. In 1921, three employees of the Bureau of Fisheries conducted trout eradication on the creeks draining into Becharof Lake. Methods used to remove trout included seine and gillnets, spears, hand and set lines, bait traps, and set-nets. The entire lake shore and all the tributaries were visited several times by the eradication crews. In 1921 the total catch was 7,621 (Bower 1922:17), 10,063 fish in 1922, 17,210 fish in 1923 (Bower 1925a:77), and a record 40,307 fish were destroyed in 1924. By 1924 the reduction in the trout population was noticeable (Bower 1925b:101) and by 1925 the trout were becoming scarce so in 1926 the eradication was discontinued (Bower 1927:257).

4. Oil Exploration

Pre-1959 Oil Exploration

During the early twentieth century the Kanatak and Becharof Lake area experienced three oil booms. The first boom, centered at Puale Bay from 1902-1904, coincided with early oil exploration throughout the Alaska territory (BIA 1991b:10). By the summer of 1903 passengers, supplies, and drilling outfits had been landed at Cold Bay (the present Puale Bay). By 1903 there were several miles of wagon road from Puale Bay to the east field located on the headwaters of Becharof Creek (drains into Becharof Lake), Trail Creek (drains into Puale Bay), and Oil Creek near the head of Puale Bay (Figure 8). Before the winter of 1903, five wells had been started by the Pacific Oil and Commercial Company and by J. H. Costello (Hussey 1971:324-325). These wells did not produce enough oil and gas to be commercially developed. Two more wells were started by each company with the same results of not enough gas or oil. By 1904, the wells had been abandoned and by 1906, there was no more oil drilling activity. In 1910, the Federal Government withdrew from entry all petroleum-bearing lands in Alaska, putting a temporary damper on oil prospecting in the Territory. Some of the operators in the Cold Bay area had established title to their claims so these lands were exempt from the withdrawal.

The enactment of the Mineral Leasing Act in 1920 rekindled interest in the Puale Bay-Becharof Lake area, spurring a second oil boom (Morris 1987:20). Associated Oil Company, and Standard Oil Company drilled wells in the early to mid-1920s (Bascle, et al. 1986:4). Oil drilling was focused west of Island Arm, below Mt. Peulik with Kanatak as the principle port (Figure 8). Kanatak became a boom-town of 200 people overnight. Between 1921 and 1925, a wagon road was built from Kanatak to the drill sites, passing close by the traditional Kanatak fishing village at the outlet of Ruth Lake. No commercial

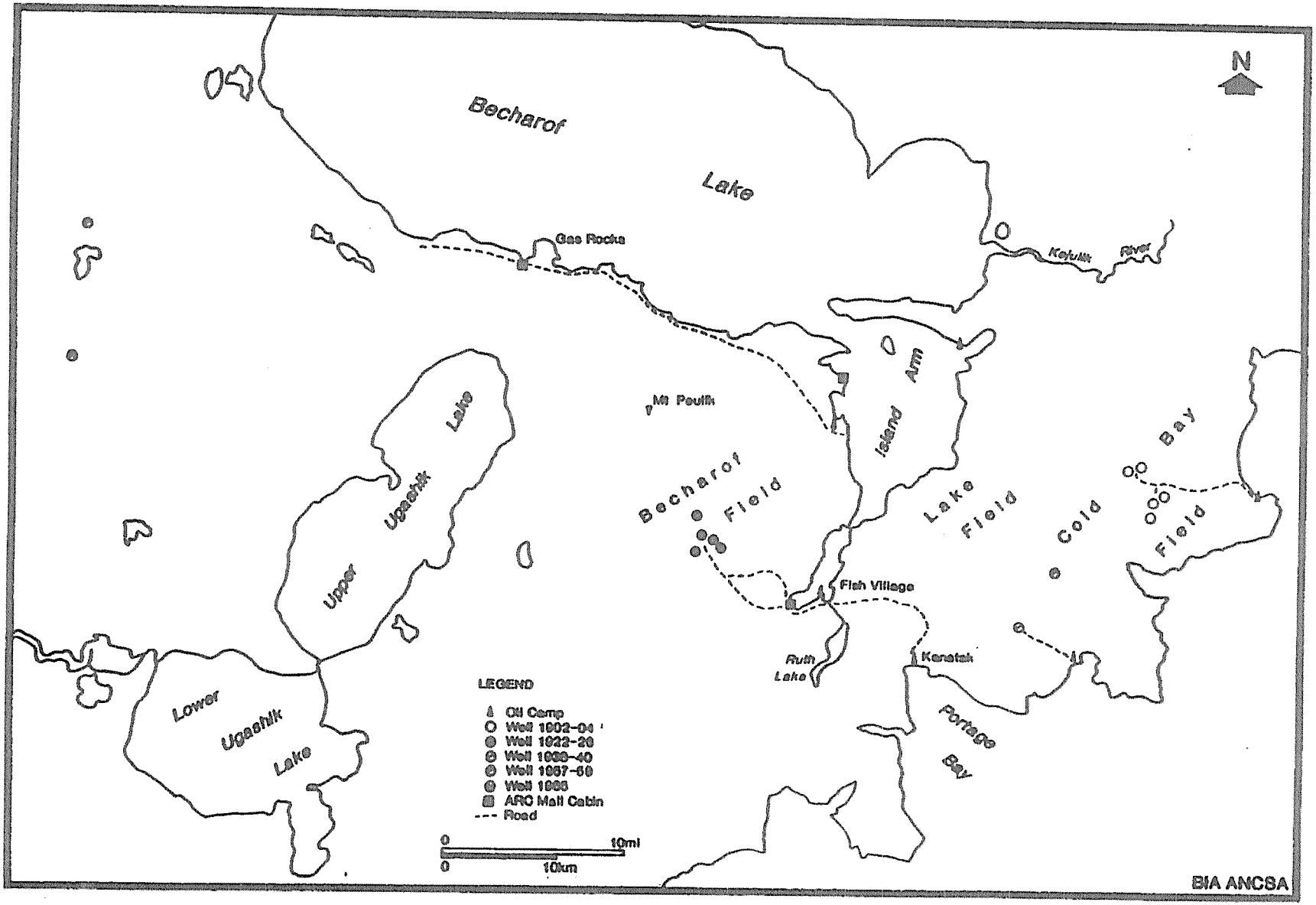


Figure 8. Becharof Lake area exploratory oil drilling map, 1902-1982.
Source: U.S. Bureau of Indian Affairs 1991b.

quantities of oil were found and by 1926, this boom too was spent--leaving mostly Native residents at Kanatak. (BIA 1991b:11).

Interest in the Puale Bay area was revived for the third time in the mid-1930s. Geologists from several oil companies performed field examinations and reconnaissance surveys of much of the prospective areas on the Alaska Peninsula. The Salmon Creek area near Jute Bay (Figure 5) was drilled by a joint venture between three oil companies in 1939, but once again the well did not produce commercial quantities of oil (Bascle, et al. 1986:4).

Sporadic oil exploration continued on the Alaska Peninsula until the outbreak of World War II, when operations ceased. The next oil drilling period dated from 1957-1959, consisted principally of prospecting with a few wells. The Humble Oil and Refining Company drilled at Bear Creek (Figure 8) but encountered no commercial quantities of oil (Bascle, et al. 1986:4). An oil camp was established on the western side of Island Arm and near the base of Severson Peninsula and another camp was established at Fish Village consisting of one building. In addition a road was built from Island Arm along the southern shore of Becharof Lake (Figure 5) beyond Gas Rocks (BIA 1971:11).

Post-1959 Oil Exploration

Several wells have been drilled on the Alaska Peninsula since 1959, with the last one being drilled and abandoned in 1985. None of these have been within the Egegik River/Becharof Lake watershed (Bascle, et al. 1986:4).

5. Tourism/Recreation

Sport Hunting Pre-1959

Guided hunting in the area began after WWII, when some of the local people began guiding as a supplement to their fishing income. Nida Nelson, a past resident of Kanatak, recalls a bear hunter being dropped off by a float plane at Fish Village in the early 1950s. Dan Amok took him bear hunting in his boat. Often when the local people returned to their trapping cabins around Becharof Lake in the winter, they found that the cabins had been used by fly in sport hunter and fishermen (pers.com. Nelson 1996).

Sport Hunting Post-1959

Though remote, the Becharof Lake drainage area is a popular place for guided hunts. Commercial guides started using the area in the 1950s, but did not have a noticeable impact on the area until the 1970s (pers.com. Asplund 1995). Jay Hammond, one of the first commercial guides in the area, first started hunting in the Kejulik River area in 1946, and continued through 1985. He had a camp on the Kejulik River that was accessed by aircraft. Jay kept a small skiff at the cabin which was used for hunting and fishing along the Kejulik River. Jim Cann started guiding in the Kejulik River area in the late 1940s operating out of his homestead on the Kejulik River. Jim gained access to the area by aircraft and also had a skiff on the river (pers.com. Cann 1995). During the late 1960s and the 1970s Park Munsey and Jake Gregory guided in the Island Arm area of Becharof Lake. Access to these areas was by aircraft (pers.com. Cann 1995).

Gradually the number of guides and outfitters increased in the area, especially during the 1980s, as the area became discovered. Special Use Permits issued by Becharof National Wildlife Refuge for outfitters using the Refuge increased from 33 in 1982, to 54 in 1987 (USFWS 1988:106). Most of the guiding activities were along the waterways. Almost all access to the area was by aircraft. Float planes can land on the rivers or lakes while the wheel planes land on river gravel bars or sand blow-outs. The King Salmon River has the best gravel bars for aircraft access (Behnke 1978:131). Jet boats are becoming more popular and are used by guides for hunting. Jetboats are now used on the King Salmon, the Egegik River, and the Kelulik River (pers.com. Asplund 1995).

In 1992, the U.S. Fish and Wildlife Service implemented its own guide/outfitter management system after the State Supreme Court ruled that exclusive guide areas were unconstitutional (USFWS 1993:116). The geographic boundaries of the guide areas were redrawn resulting in the refuge being divided into six different guide areas (pers.com. Potter 1995). Three of these areas are within the Becharof Lake watershed. Guide area BCH 02 encompasses the upper King Salmon River and most of Becharof Lake while BCH 03 encompasses the Kejulik River drainage. Guide area BCH 04 encompasses the Island Arm area of Becharof Lake.

Area BCH 02 and BCH 03 were awarded to Phil Shoemaker in 1993. Phil has his main camp on the Kejulik River and uses river bars for spike camps. He uses aircraft for access to take clients hunting and fishing on the Kejulik River. Most of his clients are hunters or fishermen, but every year he guides a few backpackers, photographers, and kayakers (pers.com. Shoemaker 1995).

In 1993, Tracy Vrem was awarded the area BCH 04 encompassing the Island Arm of Becharof Lake. He has spike camps in the area of Featherly Creek, the south end of Becharof Lake and on Ruth Lake near the outlet of Ruth River. Access is easily gained by float and wheel planes as well as boats (USFWS 1992b). Tracy guides an average of 17 clients per year (pers.com. Potter 1995).

The Becharof Lake watershed is also a popular area for unguided hunts. The resource harvest area for the people of Naknek, South Naknek, and King Salmon includes a large area of the Alaska Peninsula. Aircraft is the major means of access for these residents. Moose and caribou hunting takes place in the upper King Salmon River-Becharof Lake area and some caribou hunting takes place on the Egegik River, depending where the caribou are located at the time of the hunt (Behnke 1978:142). On the Kejulik River air taxi operators drop off hunters by float plane on a lake adjacent to the upper river. The hunters portage to the Kejulik River, then float down to a lake adjacent to the Kejulik River near the mouth where they are flown out. There are parties of two or three floaters per year (pers.com. Shoemaker 1995).

The areas hunted by non-guided sport hunters can be divided into distinct areas. In the 1985 Final Comprehensive Conservation Plan for Becharof National Wildlife Refuge the main hunting areas are shown as well as the harvest numbers (USFWS 1985:61).

> *"The area south of the King Salmon River drainage to the Becharof Lake area, excluding the wilderness area, is heavily hunted for caribou. Approximately 68% of the recreation caribou harvest is in this area. Only an incidental moose or bear is harvested. Primary assess is by light plane in the dunes near Shosky Creek and floatplanes on small lakes as well as Becharof Lake.*
>
> *The Becharof wilderness on the eastern side if the refuge is the most remote and scenic part of the refuge. Virtually all of the bear, an estimated 15% of the caribou, and 90% of the moose taken by recreational hunters on the refuge occur here. The Kejulik River and the Becharof Lake Island Arm are both prime bear and moose hunting areas. The mountains on the Pacific coast provide good bear hunting during years with seasons. Access to the wilderness area is primarily by float planes landing on Becharof Lake, scattered smaller lakes along the Kejulik River and the northern coastline, and on sand strips throughout the area" (USFWS 1985:62).*

Sport Fishing Pre-1959

There is little written about sport fishing in the Becharof Lake watershed prior to statehood. In Frank Norris' book, "*Tourism in Katmai Country*" he outlines the history of sport fishing in the Katmai area just northeast of Becharof Lake. Frank writes that use of the area rose sharply during World War II when in 1941, the U.S. Army Air Corps established the Naknek Air Base at King Salmon. Military authorities established recreation camps in the Katmai area for the purpose of sport fishing (Norris 1992:4). Northern Consolidated Airlines flew parties to Naknek and vicinity for sport fishing (Norris 1992:12). Some of these fisherman were probably flown into the upper King Salmon River and the Becharof Lake area.

During the years of 1952 to 1956 the Bureau of Fisheries maintained a salmon counting weir on the Egegik River just below the rapids. According to the logs kept by weir personnel there were five or six parties of army personnel which went back and forth past the weir while out sport fishing every season by both boat and aircraft. In the June 27, 1953, log it states:

> *"About 4:00 p.m. an Army plane landed on the river with a fishing party consisting of General Smith and his aide. They fished above and below the weir the prescribed distance with indifferent success" (Anonymous 1953:104).*

Another entry in the log dated August 21, 1953, mentions a plane that was forced to land on Becharof Lake due to deteriorating weather. The crew of the aircraft consisted of a group of army personnel who were escorting General J. Lawton Collins on a fishing trip. In his book "*Tourism in Katmai Country*" Frank Norris writes about fly-in fishing in the area:

> *"Fly-in fishing, despite its recent surge in popularity, is a long-established recreational practice in the Katmai area. Fishermen based at Brooks Camp began to charter planes to remote spots in the monument as early as the 1950's."*

In Katmai during the 1940s, the area attracted only the hardiest, most independent fishermen. In the 1950s fishermen were limited to exclusive fishing fraternities (Norris 1992:172). There is little or no documentation of the development of sport fishing in the Becharof Lake watershed. There was never the development experienced in the Katmai area due to Becharof's remoteness, lack of rainbow trout (except on the King Salmon

River), and the fact that no lodges had been developed in the area to cater specifically to sport fishing.

Prior to statehood, sport fishermen in the Becharof Lake area consisted of Army personnel from King Salmon, as well as residents, and cannery workers from Egegik. Numbers of local residents sport fishing the Becharof Lake watershed area from Naknek, South Naknek, and King Salmon increased when they were "displaced" from their regular fly-in fishing areas in Katmai National Monument due first to the enlargement of the Monument boundaries in 1931 and then again to being crowded-out of popular fishing areas by tourists beginning in the 1950s (pers.com. O'Hara 1995).

Sport Fishing - Post 1959

Sport fishing and hunting are the two most popular activities in the Becharof Lake watershed. The Becharof Lake watershed provides high quality recreational fishing for arctic char, grayling, and salmon. Excellent rainbow trout fishing can be found on the King Salmon River. Because of the distance from the villages of King Salmon and Egegik, however, the area receives only light sport fishing pressure (USFWS 1985:63). Sport fishing primarily takes place on Gertrude Creek, a tributary of the King Salmon River and on Featherly Creek located on the Island Arm of Becharof Lake (USFWS 1983:34).

Four commercial sport fishing guides operate on the refuge and are responsible for 30 percent of the fishing. They guide approximately 120 clients per season with each having an average stay of 4 days. Gertrude Creek receives the heaviest pressure with Featherly Creek receiving light fishing pressure (pers. com. Potter, 1995). On the Becharof National Wildlife Refuge, 90 percent of the sport fishing is by non-locals (USFWS 1988:106). Access is primarily by light aircraft landing on gravel bars in the river (USFWS 1985:64).

Other Recreation

The "Bible camp" located on the north shore of Becharof Lake is a popular recreation place for the people of Egegik (pers. com. O'Hara 1995). It was built in the late 1960s and the early 1970s with building material barged up the Egegik River to Becharof Lake. Access to the bible camp is by either boat or by aircraft (pers.com. Kelly and Clark 1995). From the bible camp, Native leaders such as Paul Boskoffsky take young people on a yearly trek over the portage to Kanatak, retracing their ancestors' route (Campbell 1995:85).

Though data is scarce, recreational use of the area by non-locals is definitely increasing as indicated by the increase in air-taxi pilots, outfitters and activity of the local guides. Although recreational activity has increased on the refuge, it is still at a relatively low level because of the remoteness of the area (USFWS 1985:60).

IV. Main Water Bodies with Tributaries

IV. MAIN WATER BODIES WITH TRIBUTARIES

A. Overview

This large chapter of the report examines specific water bodies within the Egegik River/Becharof Lake Watershed. For the purposes of this report, the watershed has been divided into three smaller units; Egegik River and Becharof Lake, King Salmon River, and Kejulik River (Figure 3). These three smaller units are further divided and each subdivision is discussed separately. The Egegik River and Becharof Lake unit has three parts that extend upriver and southeasterly; Egegik River (Figure 9), Becharof Lake excluding Island Arm (Figure 15), and Island Arm including Ruth Lake and Ruth River (Figure 20). The King Salmon River unit has two divisions, the King Salmon River proper (Figure 25) and the Upper Tributaries of the King Salmon River (Figure 26). The third unit, Kejulik River (Figure 27), is undivided. Information and hydrologic data for specific smaller water bodies is provided when available.

This chapter describes each watershed unit separately. Sub-chapters for each watershed unit describe

* names and locations
* physical characteristics and impediments to travel
* pre-Statehood uses
* post-Statehood uses
* navigability status.

Water body names can include current names, known historic names, Yup'ik names, and local names. Also, the Alaska Department of Fish and Game (ADF&G) Habitat Division numerical designator for anadromous streams and lakes is included where applicable. Water body locations can be determined best by referencing the maps for each watershed and river-mile (RM) or lake-mile (LM) positions indicated in the text. River-miles were determined by using a simple, wheeled, map measuring instrument on the current USGS topographic quadrangles, 1:63,360 series. Lake-miles indicated for Becharof Lake and Island Arm are those reported in Service and ADF&G stream surveys of the 1960s and 1970s (Adams, et al. 1962; McCurdy 1973).

Descriptions of physical characteristics may include any available hydrologic information or data regarding the channel, length/width/depth, elevation, fall, or discharge (flow). Known water body obstructions, impediments to travel, and historic changes to waterways are noted.

IV. Main Water Bodies Overview

General use, economic activity (including subsistence), travel routes, modes of transportation, and sites of human occupation, commerce, and seasonal activity are detailed. A use-oriented approach differentiates between 1959 pre-statehood and post-statehood activities. This approach to distinguish human activity before and after 1959 attempts to facilitate future title determinations by clearly identifying the use of water bodies, if any, that preceded and followed abrupt change in land status.

Known administrative navigability recommendations and determinations made by the Bureau of Land Management (BLM) for specific water bodies are included. The BLM reports of navigability are made for land conveyance purposes only. The BLM navigability materials are located in the "*navigability*" files of the BLM's Navigability Section, Branch of Mapping Science, Division of Cadastral Survey and Geomatics, Anchorage office. The search for BLM navigability materials did not extend beyond that office's navigability files. Those few water bodies within the watershed designated as navigable by the Corps of Engineers (COE) and the U.S. Coast Guard (USCG) are noted. Also, some information is extracted from the State of Alaska DNR's *Bristol Bay Easement Atlas* that plots State and Federal navigable waters for a limited area within the Egegik River/Becharof Lake Watershed.

Egegik River and its Tributaries

B. Egegik River and Becharof Lake Watershed Unit

1. Egegik River and its tributaries

a. Summary

The Egegik River is a 34-mile long lowland stream that connects Alaska's second largest lake, Becharof Lake, with Bristol Bay. The river width ranges from 200 feet to 2 miles and is influenced tidally to the vicinity of the Egegik River rapids near the Becharof Lake outlet. The King Salmon River discharges into the Egegik River near its mouth. The three most notable smaller lowland tributaries are Swampy River, Shosky Creek, and Swampy Creek. The Egegik River's prominent physical features are the wide Egegik Bay at the river's mouth, two lagoons at the river's upper reaches, and swiftwater, boulder strewn rapids at the lake outlet. High winds, fluctuating water stage, shallow water, and the fast current through the rapids' protruding boulders have impacted travel on the river.

Travel on the Egegik River before and after Alaska statehood is very well documented. Though high winds and river rapids have impeded travel, Egegik River has had a long and extensive history of use by a variety of watercraft. Pre-statehood users include indigenous people, Russians associated with the fur trade, U.S. government scientists and agents, and other travelers crossing the Alaska Peninsula along the Kanatak-Egegik route. They traveled by bidarka (kayak), baidara (open skin boat), canoe, double-ender sailboats, motorized double-ender conversions, and other motorized wooden boats. One very early example of documented travel on the Egegik River is associated with the fur trade. The Russian American Company's 1818 Korsakovskiy expedition traveled down the river by bidarkas.

Post-statehood Egegik River users primarily include local indigenous people, subsistence and recreational users, commercial hunting/fishing guides and outfitters, university and government researchers, and government agents. Outboard powered inflatable boats, jon boats with outboards, motorized skiffs, and Bristol Bay fishing boats have ascended and descended the river. One large boat that successfully traveled Egegik River in the mid-1970s was the ADF&G research vessel *Illiaska,* a 32-foot long, fiberglass boat with a 10-foot beam and a 3-foot draft.

Limited documentation of boat travel exists for three Egegik River tributaries; Swampy Creek, Shosky Creek, and Swampy River. The BLM has determined portions of these three streams are navigable. A State of Alaska easement atlas shows the upper reaches of Swampy Creek that lay within refuge lands are navigable.

b. Names and locations

Egegik River lies in the coastal lowlands of the upper Alaska Peninsula and flows westerly into Bristol Bay. The river heads in Becharof Lake and drains the whole Egegik River/Becharof Lake Watershed. Though the entire watershed extends from the Aleutian Range to Egegik Bay, Egegik River proper meanders only 34 miles from its Becharof Lake outlet to its Pacific Ocean estuary. The RM calculation for Egegik River begins at Goose Point and ends at the Becharof Lake outlet. The north-south range line passing through the village of Egegik at the river's mouth is designated, somewhat arbitrarily, as the westernmost extent of the watershed (See Figure 3).

This portion of the report considers the Egegik River (Figure 9), which includes only Egegik River proper and its tributaries. It includes Swampy River, Shosky Creek, and Swampy Creek, three large named tributaries of the low-lying Egegik River drainage basin that extend around the western margins of Becharof Lake.

Speaking a nearly extinct Yup'ik dialect, Nick Abalama (1990) refers to **Egegik River** as "*Igyagiiq,*" or "*Igyagiim Kuiga.*" The meaning is unclear, but the term may be liberally interpreted as "*the river near the lake's outlet*" (N. Abalama 1990). The earliest European designation of Egegik River located in researching this report may be found on a map showing Russian navigator D.I. Bocharov's 1791 route across the Alaska Peninsula via the river. Bocharov drew the map (Figure 10) in November 1791 following his summer traverse of the peninsula. The hand-printed Cyrillic lettering on a photographic plate of the map scroll (Yefimov 1964) is not clearly legible however. One place-name cited on this map's text is "*Ig'iank River*" (Bland 1995), and likely designates the Egegik River. The translation of Korsakovskiy's journal uses the term "*Igysk River*" (VanStone 1988:26). A translation of the Russian Khlebnikov's writings cites the name "*Ugazha River*" and "*Lake Ugazha*" when referring to Egegik River and Becharof Lake (Khlebnikov n.d.:63). Orth (1971:303) indicates Egegik is an Eskimo name published in 1835 by Admiral A.J. von Kruzenstern as "*F[leuve] Ougagouck.*" The U.S. Bureau of Fisheries called it "*Ugaguk River*" in 1888 and a mineral surveyor reported it as Egegik River in 1915. Other spelling variations are Agouyak River, Igagik River, Egegick, and Ugagik River.

The three largest tributaries of Egegik River are King Salmon River, Swampy River, and Shosky Creek. **King Salmon River**, at RM 8, is the largest tributary of Egegik River. Draining over one-third the land surface area of the entire Egegik River/Becharof Lake Watershed, the King Salmon River is addressed separately in a later section of this chapter.

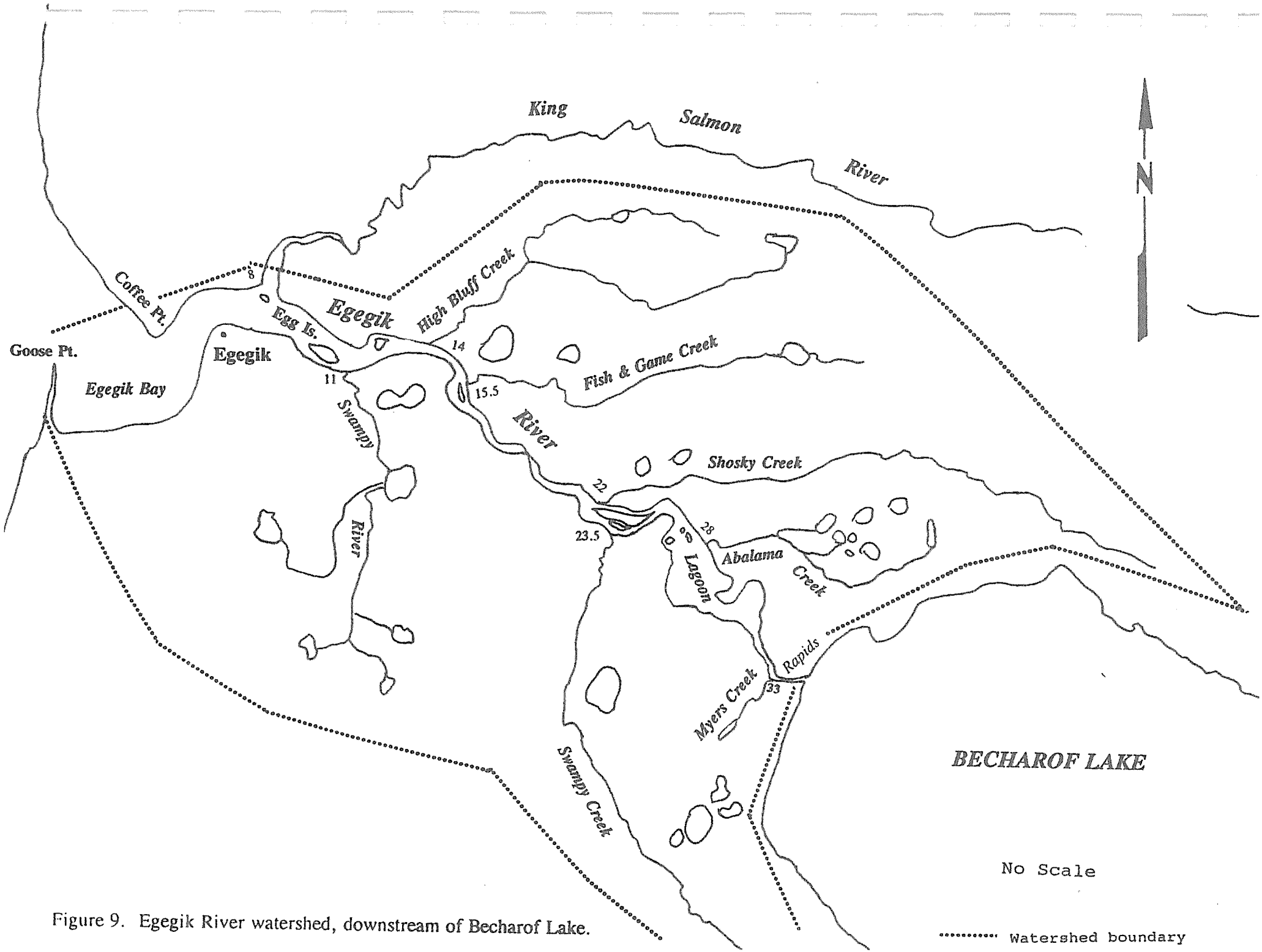


Figure 9. Egegik River watershed, downstream of Becharof Lake.

Swampy River, not to be confused with Swampy Creek, discharges into Egegik River at RM 11 (Sec. 10, T. 23 S., R. 49 W., S.M.) at a point southeast of Egg Island which occupies the central Egegik River channel. Swampy River originates at several unnamed lakes (T. 24 S., R.49 W.; T. 25 S., R. 49 W.; and T. 25 S., R. 48 W., S.M.) and winds northerly 16 miles, passing through another unnamed lake (Sec. 36, T. 23 S., R. 49 W., S.M.). Its descriptive name was given by a USGS topographer in 1923, *"because of the swampy area bordering the river's lower course"* (Orth 1971:935). An early 1920s U.S. Bureau of Fisheries hand-drawn map (Figure 13) shows this water body as Portage Creek (Wingard n.d.). A hand-drawn 1903 geologic map of the Alaska Peninsula (Maddren 1903) shows a short "*portage*" from the unnamed Swampy River to a stream that terminates near Ugashik Bay, which suggests a proto historic travel route (See Figure 16). Jay Hammond (pers.com. 1995) recalled hearing this water body referred to as "*Portage Creek*" by older Service personnel during the 1950s. A 1987 BLM memorandum (Arndorfer 1987:2) states Swampy River is known locally as "*Finney's Creek.*" Current Service staff working at Becharof NWR noted the creek as "*Finnes Creek*" (pers.com. Terrell-Wagner 1995b).

Shosky Creek flows into Egegik River at RM 22 (Sec. 6, T. 24 S., R. 47 W., S.M.). It heads at Sec. 17, T. 24 S., R. 44 W., S.M., on the south slopes of Whale Mountain, as indicated by current USGS topographic maps. Shosky Creek meanders tortuously from its source in a due westerly direction for most of its course. A USGS topographer reported in 1923 that Shosky Creek was a local name (Orth 1971:870). An early 1920s U.S. Bureau of Fisheries map has the water body labeled "*Lost Dog Creek*" (Wingard n.d.). A 1987 BLM memorandum (Arndorfer 1987:3) states the stream is known locally as "*Whitefish Creek.*" Nick Abalama (pers.com. 1995) refers to Shosky Creek as "*Whitefish Creek,*" and refers to ponds at the heads of Shosky Creek tributaries as "*Whitefish Lakes.*"

Several streams lack official names but bear local, historic, or Yup'ik names, and discharge into Egegik River. Neither the *Dictionary of Alaska Place Names* (Orth 1971) nor *Alaska Place Names, 4th Edition* (Schorr 1991) list any of the following streams.

Identified as **High Bluff Creek** (pers.com. Terrell-Wagner 1995b), this stream flows into Egegik River at RM 14 (Sec. 6, T. 23 S., R. 48 W., S.M.).

The tributary at RM 15.5 (Sec. 16, T. 23 S., R. 48 W., S.M.) is identified by local Service refuge technician Shirley Kelly as **Fish & Game Creek**

(pers.com. Terrell-Wagner 1995b). Nick Abalama (1990) identified the water body in Yup'ik as "*Angaculuum Kuiga.*"

Another Egegik River tributary discharges at RM 23.5 (Sec. 7, T. 24 S., R. 47 W., S.M.). It is identified as **Swampy Creek** by local Service personnel and in a BLM navigability memorandum (Arndorfer 1987:3; pers.com. Terrell-Wagner 1995b). Swampy Creek heads in an unnamed lake in Sec. 13, T. 27 S., R. 46 W., S.M.

The stream flowing into Egegik River at RM 28, Sec. 10, T. 24 S., R. 47 W., S.M., is called **Abalama Creek** according to local Service refuge personnel (pers.com. Terrell-Wagner 1995b). This water body heads at an unnamed lake in Sec. 12, T. 24 S., R. 46 W., S.M.

A short, 2 mile long tributary at RM 33 (Sec. 6, T. 25 S., R. 46 W., S.M.), approximately 1 mile downstream from the Becharof Lake outlet, heads at an unnamed lake (Sec. 12, T. 25 S., R. 47 W., S.M.). This tributary is known locally as **Myers Creek** (pers.com. Terrell-Wagner 1995b), but is shown on a 1920s vintage U.S. Bureau of Fisheries map (Figure 13) as "*Tiny Creek*" (Wingard n.d.).

c. Physical characteristics

McCurdy (1973:21) describes **Egegik River** as *"large and sluggish nearly to the lake* [Becharof Lake], *where a constriction occurs above a large lagoon area to form some rapids."*

No gaging station exists on the river. However, Service hydrologists from Region 7 Water Resources Branch very recently installed a stream gage downstream of the rapids in August 1996. No preliminary data have been recorded. Discharge and flow regimes are unknown (USFWS 1994c:7; USFWS 1985:21; pers.com. Bigelow 1995).

Egegik River heads at Becharof Lake, elevation 14 feet. Tidal effect occurs for nearly the entire length of the river, ceasing approximately 2 miles downstream from the lake outlet at river-mile 32 (U.S. NOAA 1994:275). River channel width varies from 200 feet to 2 miles. The shortest bank-to-bank distance, approximately 200 feet, occurs in the rapids one-quarter mile downstream from the Becharof Lake outlet. Exceptionally wide channels are found at RM 28 in the lagoon (over 2 miles wide), and at Egegik village, RM 6 (over 1 mile wide) as measured on USGS topographic maps. Stream velocity on the Egegik River is highest through the one-quarter mile long rapids, estimated at "*about 6 miles per hour*" [8.8 feet per second] by one COE engineer (Hurley 1932:17). A limited description of varying channel depth and other data from contemporary and historic reports follow.

C.L. Sturdevant, Corps of Engineers, District Engineer, described **Egegik River** in a 1932 river survey report. He wrote,

> *"The river* [Egegik] *and lake* [Becharof] *are frozen over during the period October to May, but there is no severe ice run during the spring break-up. Tidal effect from Bristol Bay is noted for 25 miles upstream. During the open season there is a comparatively small variation of flow in Egegik River, and the maximum range which has ever been observed, above tidal action, is about 2 feet. This small variation in stage is due to climatic conditions and the regulating effect of the lake. A controlling depth of 4 feet at low-water stage exists at numerous places in the river between its mouth and the 'rapids', which is a section of river 2,500 feet long immediately below the outlet of Becharof Lake. The average depth of the river in mid-channel through the rapids is about 10 feet; however, navigation of this section is rendered hazardous by the presence of numerous large boulders in the river bed, many which lie in the channel and are submerged from 1 to 4 feet at*

mean low water stage. [See Figure 14]. *The current in the rapids is about 6 miles per hour."* (Hurley 1932:16).

The **Egegik River** fish weir was erected initially in 1932 just below the rapids. Assembled the previous year downstream, the weir was transported to a site where the river was reported to be 790 feet wide. A U.S. Bureau of Fisheries report (Bower 1933:27) notes the maximum water depth at the weir site during construction in June, 1932, was 5.5 feet, but later in the season water depth increased approximately 3 feet. The weir ceased operation after one year due to lack of funding. It remained out of operation for 20 years until re-opened in 1952. (McCurdy 1973:24).

The U.S. National Oceanic and Atmospheric Administration (1995:274-275) gave the following 1994 description of **Egegik River**.

"It is a large river, 1 mile wide at the canneries.... The lower part of the river forms Egegik Bay. A large part of its area is bare at low water. At the entrance, shoal water extends 6 miles offshore and should be given a wide berth by passing vessels. Entering vessels, depending upon their draft and conditions of the sea, generally cross the entrance bar between half and full stages only.

"A seasonal buoy is about 2.5 miles off the entrance bar. Moderately heavy seas will break over this bar with any stage of tide, although it has 4 fathoms over it at high water. It is considered the most dangerous bar in the Bristol Bay area.

"In 1982, extensive shoaling was reported in the entrance to Egegik Bay; local knowledge is advised....

"At the entrance to Egegik River are two partially protected anchorages with limited swinging room that are used by power scows and tugs. The principle one is the channel inside Coffee Point, with depths up to 5 feet. A smaller anchorage is just E of the wharf at Egegik, with depths from 6 to 11 feet. Ebb current at the smaller anchorage is very strong.

"Egegik River is navigable to small boats for its entire length into and across Becharof Lake. Although tidal to the foot of the rapids, mean range in its lagoons is only 1 foot: 5- to 6-foot drafts can be carried through the

river, but the small lagoon reduces this to 3 or 4 feet, depending upon water stage. The controlling depth of the 1/4 mile rapids of the lake outlet is 4 feet at low water stage. Although its midchannel current averages 5 knots, slow-speed powerboats run it frequently with and without handline aid from the shore. The river is open from May to October. In 1970, the river was obstructed by numerous boulders possibly carried in through ice action."

Only nominal flood hazard information and related river hydrologic data are available for the village of Egegik. The **Egegik River** is not included in the comprehensive *Magnitude and Frequency of Floods in Alaska and Conterminous Basins of Canada* (Jones and Fahl 1994). Flood hazard for the community is low, but the area is subject to storm tides (U.S. Army Engineer District, Alaska 1993:86). U.S.K.H., Inc., a private consulting firm, performed an environmental assessment for Egegik airport sites and discussed tidal effect and storm surge on the lower Egegik River. That assessment includes the following comments.

"The 100-year floodplain of the Egegik River has been delineated within the area adjacent to Egegik Village, based on a preliminary flood hazard report prepared by the U.S. Army Corps of Engineers (COE).... The approximate boundary of the 100-year floodplain is located at the base of the bluff that borders Egegik Village.

"... the height of the 100-year storm surge was estimated to be approximately 12 feet at Egegik. Tide tables for the Bristol Bay region were examined and the level of the Extreme High Tide for Egegik was estimated to be approximately nine feet above Mean Sea Level. Thus, the water surface elevation produced by a 100-year storm surge occurring during the Extreme High Tide is estimated to be approximately 21 feet above Mean Sea Level....

"Although the additional height due to wind waves was not considered, it is expected that the fetch is too short within Egegik Bay for the generation of large wave heights. South Spit and Coffee Point effectively limit the fetch, perpendicular to the coast, to less than six miles in the immediate vicinity of Egegik Village." (U.S.K.H., Inc. 1991:24).

Swampy River was assessed by the BLM to determine navigability for conveyance purposes in 1987. Excerpts follow from a BLM memorandum regarding the physical characteristics of the stream.

> *"It is shown on the USGS Naknek A-4 (1951, minor revisions 1977) quadrangle as a double-lined stream for about one and one-half miles, and then a single-lined stream over its remaining length. The quadrangle shows it flowing through flat, open, treeless country with a negligible gradient.... In NASA photographs (CIR 60, roll 3281, frames 6727 and 6728, August, 1983), the river is a continuous thread of open water, meandering through flat terrain. Dam, white water, or other obstructions are not apparent in the aerial photos."* (Arndorfer 1987:2).

A field diary kept by Frank Chick in 1942 records the **Swampy River** channel as 60 feet wide at its confluence with Egegik River. (Stirling 1985:Appndx.4, p.370).

Shosky Creek also was assessed by the BLM in 1987. Physical characteristics cited in their navigability determination memorandum follow.

> *"It is shown on ... quadrangles as a double-lined stream for about a mile from its mouth, then a single-lined stream with a negligible gradient over its remaining length. In a NASA photograph (roll 3391, frame 376, August, 1984), the creek appears to be about fifty feet wide at the mouth; it then narrows to about twenty feet and maintains a consistent width. According to Leskosky's contacts, the stream is fifteen to thirty feet wide and three to six feet deep."* (Arndorfer 1987:3).

Swampy Creek's physical characteristics are outlined in a 1987 BLM navigability assessment that used USGS quadrangles, NASA photographs, and local contacts. It states,

> *"... it appears to be about twenty feet wide and flowing through open treeless country. The creek probably is slow-moving as it has a negligible gradient.... Most informants estimated the creek to be twenty to thirty feet wide and three to five feet deep."* (Arndorfer 1987:3-4).

c. I. Impediments to travel

Several climatologic and hydrographic characteristics impede and limit travel on **Egegik River**. High winds, slow stream current, low tide effects, shallow waters, protruding boulders in the riverbed, and swift current through the rapids have hindered river travel. Numerous accounts exist regarding travel along the river. Egegik River

travel may be characterized generally as arduous and often delayed, but nearly always successful. The following historic examples demonstrate travel difficulties on the Egegik River.

Howard M. Kuchin, Special Agent for the protection of salmon fisheries, journeyed through Bristol Bay in 1901 inspecting canneries and enforcing fishing laws. Leaving the anchored U.S.S. Grant, he entered **Egegik Bay** in a small row-boat with four oars. He later described the 6-mile trip to the Egegik cannery as follows,

> *"... to visit the cannery of the Alaska Packer's Association situated about 6 miles up the river. The trip proved a very hard one, and threatened to be a failure. The coastline is low and without distinguishing features, and except that Captain Gunderson, the pilot, was along it is doubtful that we could have found the mouth of the river. Before this was accomplished a pretty strong breeze sprung up, and the situation was rather disquieting. When the river was reached it was found that the tide was running out furiously, and it was utterly impossible to row against it. A landing was made on the shore (on the opposite side from the cannery, the other being swampy and impassable) with a view of walking until abreast of the cannery and then to make a crossing. To do this the boat had to be towed for more than three miles, and as much of the distance was over mud flats, so soft that a man sank above the knees, the difficulty of the undertaking can be appreciated. At one time, in crossing the creek that made into the river, there was danger that the whole party would go down in a quagmire. However, after a long, laborious, struggling pull the difficult task was finally accomplished, and the cannery was reached at about 9 oclock, seven hours having been spent in covering 12 miles distance from the ship."* (Stirling 1985:Appndx.4, p.59)

An attendance ledger of Egegik's Russian Orthodox Chapel (Anonymous 1967) briefly relates the death of two Egegik residents at the mouth of the **Egegik River**. The verbatim account follows.

> *"June 26-1967 Our beloved brothe in chrits Albert & Larry Engiak were drounded on the night of 26. 11:30p.m. in the mouth of Egegik River. the were comeing in from out side. the weather was very ruff. . .*
>
> *"July 8th Larry Angiak funeral service he died same time with his Father Albert. Larry's body was Found July 7. They drounded June 26th at night.*

> *while he and his father were fishing. The powerboat turn over while they were comeing in from out side of Egegik river."*
> (Anonymous 1967:24-26)

American naturalist W.H. Osgood, making a biological reconnaissance of the upper Alaska Peninsula while working for the U.S. Department of Agriculture in 1902, recounted his travel experience up **Egegik River.**

> *"The Ugaguk River* [Egegik River] *offered no great difficulties, as it is only a little more than 40 miles in length, and all but the upper 5 miles is affected by the tide. Starting at 6:30 a.m. on September 29, and stopping a halfhour for luncheon, we were still able to make camp only one mile below Becharof Lake at 2p.m. of the same day. The lower part of the Ugaguk at flood tide has the appearance of any ordinary tidal slew* [slough]. *It begins to look more like a stream about 10 miles above its mouth, where there are a few low bluffs, which, however, are not continuous. The river is wide and contains many shallow stretches, where long sand bars are doubtless exposed at ebb tide. The banks are lined with low, scrubby willows, with now and then a clump of small alders on an occasional higher and more protected bank. Often the banks are mere swamps only 6 inches or a foot above high-water mark. The stream cuts through a ledge of granite just as it issues from Becharof Lake. For about three-quarters of a mile the current is very swift, and many granite bowlders* [boulders] *project above the water. This stretch of swift water is called the Ugaguk Rapids. Several days were spent at the foot of the rapids, as high winds caused a strong surf to break along the beaches at the lower end of Becharof Lake, making it impossible to put off in a canoe....*
>
> *"On October 4, during a temporary lull in the wind, the canoe was lined up the rapids and the journey continued...."* (Osgood 1902:19).

Kanatak merchant H.N. Evans wrote to Dennis Winn, U.S. Bureau of Fisheries, in 1929. Evans comments on travel delays below the **Egegik River** rapids.

> *"A shelter cabin have* [sic] *now been erected just below the Egegik rapids which is a fine thing as often people have to lay there several days waiting a chance to get thru."* (Stirling 1985:Appndx.4, p.48).

The following excerpts from archived semi-monthly reports of U.S. Bureau of Commercial Fisheries personnel during the 1930s indicate diverse impediments to travel on **Egegik River**.

> *"8/13* [1936] *left Egegik on speedboat for Becharof Lake. Stopped below the rapids where the lake discharged into Egegik River. Strong SE wind had such a sea rolling in the river entrance that it was difficult to tell the rocks from the other breakers.... 8/22 Back down through rapids. Stuck on mud flat on lower Egegik near Cape Horn until released by flood tide on 8/22, then continued to Egegik.... 8/15* [1937] *Increasing wind resulted in gale forcing us to anchor for three hours just below Big Lagoon.*
>
> *"8/28* [1937] *Departed from Egegik towing piledriver with PB#7* [Patrol Boat #7].... *Stuck on mud flat at Cape Horn in afternoon. Anchored at Barabora Pt. for night. 8/29-Got up river and across lagoons but strong wind holding out tide and could not get across bar at head of upper lagoon. 8/30-Tried to get over bar twice today but could not make it. Wind blowing water out of lagoon."* (Stirling 1985:Appndx.4, p.46).

Perhaps the primary historic hindrances to travel on the **Egegik River** are the above mentioned high winds, sandbars, and the boulder strewn rapids at Becharof Lake outlet. In one, three year period of the 1930s several boats were *"broken"* and one life was lost in the rapids (Stirling 1985:Appndx.4, p.53). Correspondence dated January 1931 from Kanatak merchant H.N. Evans to Bureau of Fisheries agent Dennis Winn addresses the rapids as a hazard.

> *"Your representative here, Mr. Wm. Sullivan, stated to me last fall when he came up from Egegik through the rapids that three out of every five boats were badly damaged going through the rapids and the writer wants to go on record to say that he and wife and four men nearly lost the loat* [sic] *and their lives coming up in August last fall."* (Stirling 1985:Appndx.4, p.48).

The Corps of Engineers proposed a project in 1932 to establish a 100 foot-wide, one-half mile long channel through the obstructing boulders. (See Figure 14).

> *"A survey of the rapids of Egegik River reveals that a channel 2,500 feet in length must be improved if the dangers to navigation on this river are to be eliminated. The bank-to-bank width of the river in this section varies from 500 feet at the outlet of the lake to a minimum of 200 feet at a point*

> *2,000 feet downstream. The course of the river through the rapids is in the form of an 'S' curve with 135 degrees of total curvature. A channel 100 feet in width was projected to conform as closely as economically possible with the main current and it was found that there are 25 submerged boulders ranging from 25 to 65 cubic yards in volume within the limits of the projected channel and which now obstruct navigation. The average depth of the river in this reach is about 10 feet and the obstructing portions of the boulders can be removed by drilling and blasting into the surrounding deep water. The removal of a total of 150 cubic yards in the 25 locations, will provide a clear channel 100 feet wide and 5 feet deep at low water. The boulders are evidently of glacial origin and no changes in the channel except the annual variations in stage are indicated. The movement of anchor ice and lake ice during the spring break-up will have no effect on the permanency of the improvement. The extent of the proposed improvement is indicated on the map which accompanies this report."* (Hurley 1932:19).

A 1950 Corps of Engineers document comments on the **Egegik River** rapids project.

> *"A survey of Egegik River in 1932 recommended the improvement of the river by providing a marked channel 100 feet wide and 5 feet deep at mean low water stage through rapids in the river by removing obstructing boulders to that depth. The project was adopted by River and Harbor Act of Aug 30, 1935, and completed in 1941 at a total cost of $4,441.52 for new work."* (Stirling 1985:Appendix 4, p.51).

The Corps of Engineers conducted a reconnaissance of **Egegik River** in June, 1952. An abstract of that reconnaissance remarks that the project was completed in 1941 to a depth of 3 feet. The abstract further states,

> *"A resident who formerly lived at the lake had moved to Egegik and claimed that the project had not alleviated the problem. He said most people left the lake for this reason. The Corps stated that people had left due to economic changes.... Observation of the project showed that more work was needed to help the navigation situation. A 100 ft. wide channel with 2 right angle turns in water of 6-8 MPH and strewn with boulders is not a safe traffic corridor. More rocks have to be removed, especially the 4 large boulders inside the first turn below the outlet."*
> (U.S. Bureau of Land Management 1979a:917).

A later U.S. Army Corps of Engineers (1954:130) river survey report states, *"Egegik River at the outlet of the lake has been improved to allow passage of boats with 3 feet draft."*

A daily log kept at the **Egegik River** weir includes descriptions of river and weather conditions in June, 1952. During this time, river ice went out, new construction began for the 690 foot-long wooden weir, and materials were delivered to the weir site from downriver.

> *"June 3* [1952]... *Weather cold with rain squalls. Ice floating down the river and at the head of small lagoon.*
>
> *"June 4... Weather somewhat warmer - still ice in the river.*
>
> *"June 5, weather clear with temperatures from 32° @ 6:30 a.m. to 50° @ 2:00 p.m.... Wind from the ESE started up slowly about 7 p.m.*
>
> *"June 6, wind blowing strong from the S.E. has forced a lot of ice out of the Becharof and lined it up all along the river bank. Doubt that they can get the barge up today. River is way down and bars and rocks showing. Ice practically across river.*
>
> *"June 7, wind still blowing, though with less force. Ice is gone but the river is still low. Don't believe they can get up from the lagoon with the barge today either. Rain squalls...*
>
> *"June 8, wind has changed direction but is still blowing strong. Coming from the S.W. with frequent rain squalls. Temperature in the low 40's. River is back up almost to normal. Guess the boat in the lagoon is on a bar... Some ice in the river, but the wind kept it bunched on the far side of the river.*
>
> *"June 9, day dawned bright and clear. River smooth and way up. Temperature even up to 60° in the afternoon.... Wind just starting up from the S.E. They left again about 5:30, wind blowing pretty hard and a regular current of ice starting to come down the rapids....*

"June 10, S.E. wind whistling, plus rain, and a lot of ice going down the river. Slacked off in afternoon about 3:30 and then a slight breeze from the S.W....

"June 11, day cloudy, bright with a wind from the west. Exceptionally high tide this morning and it floated off one of the big timbers. Water came up to the grass line on the beaches....

"June 12, day calm, slight wind from west. Another high tide....

"June 13, one barrel of gas floated from the beach this morning during high tide. It was retrieved with the weir skiff. The wind was moderate from the north. Partly cloudy. We sawed 2 X 6's for a cat-walk brace and uncrated the Evinrude 25 H.P. motor..." (Anonymous 1952).

The 1957 supervisor for the Service's salmon counting weir below the rapids commented on river water levels and high winds during July (Strictland 1957). He noted a problem with broken boat propellers and stated on July 17, *"The water has dropped very low and brought a lot of new rocks into play."* On July 19 Strictland noted, *"The water has been exceptionally low here the past week and the fish are moving further out in the channel."*

The 1994 National Oceanic and Atmospheric Administration *Coast Pilot* mentions river obstruction by boulders in 1970. The boulders presumably were deposited by ice action. Egegik resident Jack Abalama (pers.com. 1995) stated the boulders at the rapids were too big to be moved by ice action. He felt previous blasting at the rapids moved the boulders, increasing the difficulty to navigate the rapids by obstructing the original channel.

Three BLM navigability reports include comments regarding **Shosky Creek**. Jackie Myers of Naknek mentioned that only one beaver dam requires crossing when ascending Shosky Creek (Leskosky 1987a:2). Other local residents familiar with this stream deny or do not mention obstructions (Leskosky 1987b:1). Don Albright of Egegik stated in 1983 that Shosky Creek was about 50 feet wide at its mouth and had a depth of about 3 feet at low tide (Arndorfer 1983:2). Albright further observed that high tides in the area could raise the water level of Shosky Creek 8-10 feet, and tidal effects extended at least 10 miles upstream from the mouth.

d. Pre-statehood use

The **Egegik River** is a prehistoric, proto-historic and historic place of activity and travel. Activities along the river to 1959 evolved over time, changing with the economy, politics, and technology of the time. Phases of subsistence activity, Russian fur trade, commercial fishing, scientific investigation, and U.S. Federal agency activity occurred prior to Alaska statehood.

Archaeologist Don Dumond (1987) positively identified seven prehistoric habitation sites along the Egegik River by aerial reconnaissance. The sites consist of 2 to 10 rounded, house-sized depressions each. He excavated only one site, situated on the river's south side, about one mile below the head of Egegik River. This 1,000 year old site, of the "*Norton horizon of culture,*" is located within Becharof NWR, apparently near the mouth of Myers Creek at RM 33. Dumond summarized his findings, comparing this site to four adjacent sites along the southwest coast of Becharof Lake, with the following statements.

> *"Summary. The materials made use of and the few diagnostic implements visible in these five sites are such as to suggest that they pertain to people of essentially the same culture. The presence of a notched pebble sinker at the Egegik River site suggests that fishing was possibly more important there than at the much smaller streams directly tributary to Becharof Lake; the presence of pottery at the same site, and the clear presence of a broader range artifactual materials in greater quantity, seem to say that the site was a relatively settled one, and it seems unlikely that the sand of the bluff by the river covers what once had been one or more habitations of a relatively permanent nature. The camps at the small streams, on the other hand, are more likely to have represented seasonal use of the lakeshore, for either hunting or, late in the salmon migration, the taking of spawning salmon in the actual spawning streams."* (Dumond 1987:141).

The Russian "*pilot*" and navigator I.A. Bocharov, with his party of perhaps 30 men, are the earliest documented travelers of **Egegik River** identified during this research. En route to Kodiak from Siberia, Bocharov shipwrecked at Unalaska in 1790. His ship destroyed, Bocharov remained there for an 8-months stay until three large baidaras were constructed during the winter of 1790-91. Traveling in two baidaras along the north side of the Alaska Peninsula, his party explored the upper Bristol Bay coastline in the summer of 1791. They traveled up the Egegik River, crossed Becharof Lake, portaged to Shelikof Strait, and arrived on Kodiak Island July 27, 1791 (Tikhmenev 1861/1863a:29; Josephson 1974:16; Yefimov 1964). Bocharov's 1791 map of the Alaska Peninsula

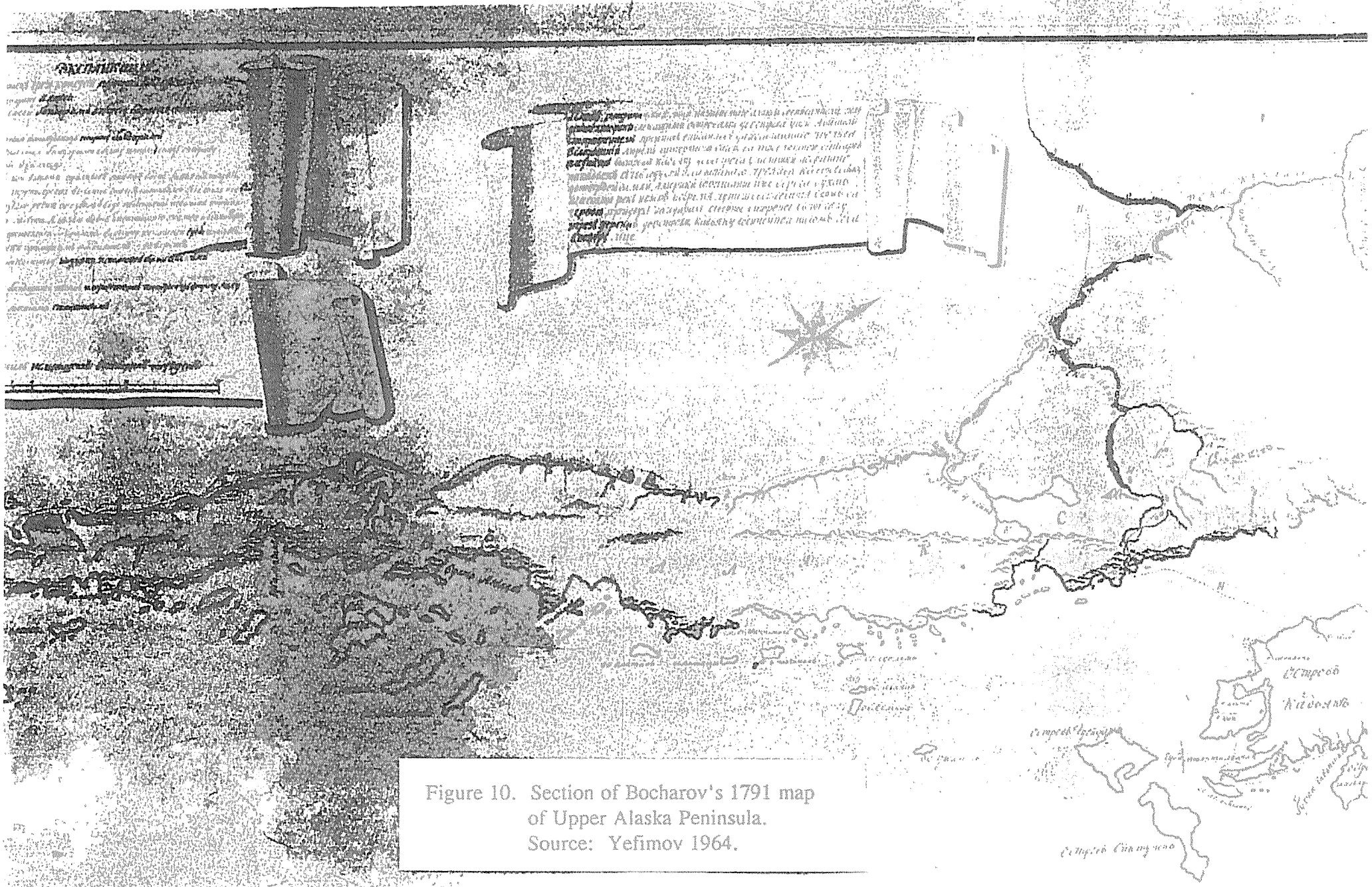


Figure 10. Section of Bocharov's 1791 map of Upper Alaska Peninsula. Source: Yefimov 1964.

(Figure 5), which he drew after arriving Kodiak, shows several dwellings at the present Egegik village site, and at a site on the opposite north bank (Yefimov 1964).

The impetus for Bocharov's route of travel along the north side of the Alaska Peninsula and across it, was the order by merchants Shelikhov and Baranov. As owners and managers of the fur trading company that evolved into the Russian-American Company, they wanted the north coast of the peninsula explored to expand fur commerce. According to Tikhmeneff, Shelikhov further instructed that information be obtained regarding the shortest path of communication *"over the isthmus, giving a detailed description of the route and of its adaptability for transporting goods and provisions in case of attacks on the Company* [Shelikhov-Golikov Company] *by hostile tribes."* (Hussey 1971:102-103).

Though the baidaras used by Bocharov were not described specifically, baidaras of this era are described by early European travelers. Large skin boats of the time were capable of holding 40-50 men, according to Joseph Billings, an English seaman working as a Russian naval officer in the 1780s and 1790s (Sauer 1972:171). G.I. Davydov, another Russian naval officer, observed Russian and Alaska Native baidaras of the era in his 1803 travel accounts in Kodiak.

> *"They are rowed by means of short, single-bladed paddles, and the rowers sit facing the bow of the baidara, two to a seat.... The framework of the baidara consists of thin wales pressed into the keel and joined to each other with thin ribbing. When they are building these boats the Russians and Americans [Alaska Natives] use no iron; everything is lashed together with split and scraped whalebone. When the wooden skeleton of the baidara is complete then a sewn-to-measure leather skin is pulled over it and this takes the place of planking. As I have already said sea-lion skins, dressed and smoked beforehand, are considered the most suitable for this. Sometimes the Koniagas make sails for these dugouts out of bast-matting or of the very thinnest leather."* (Davydov n.d.:202).

Finnish traveler H.J. Holmberg (1855-1863:44-45) made these 1850 observations of baidaras.

> *"... the so called baidara (Koniag, angiak) which differ from the former* [baidarka] *in both size and style. An almost identical gratelike skeleton gives the boat its form, but it is not wholly covered with leather; rather, it is open on top like European boats. The baidara is very large, being able to accommodate 30-40 people,... Used in these were the same baidarka*

> *paddles and, sometimes, braided sails when sufficient wind was available. The Russians now build boats of the same design, though differing in the use of European oars and rudder. They are used for long hauls and are thought useful in that they can land where the surf makes landing impossible for a keeled boat."* (Holmberg 1855-1863:44-45).

Another very early Russian traveler, Petr Korsakovskiy, was dispatched by the Russian-America Company on Kodiak Island in 1818 to explore Bristol Bay and open new areas of fur trade. Aside from Bocharov's 1791 map, Korsakovskiy's brief journal account of travel of the 28-29 man party down **Egegik River** via *"baydarkas"* [kayaks] provides the first detailed description of Becharof Lake and Egegik River. He makes little reference to the expedition's watercraft other than calling them *"sealskin baydarkas"* (Figure 11). At least two of the boats were three-hatch kayaks but it is not known whether the remainder were one-hatch, two-hatch, or three-hatch kayaks. The kayaks carried heavy loads. Korsakovskiy commented,

> *"I was obliged to load those baydarkas with provisions, some with clothing for the voyage, various trade goods, presents, and weapons for defense. All these things exceeded our load allowance, and we could hardly fit them into the baydarkas,"* (VanStone 1988:22).

[Note: Three publications (Dyson 1986; Lubischer 1988; Zimmerly 1986) offer considerable insight into the history, evolution, and construction of Alaska kayaks/bidarkas.]

Portions of Korsakovskiy's **Egegik River** travel narrative follow.

> *"May 30* [1818] *Early in the morning we left this locality* [mouth of Kejulik River]. *We proceeded 35 miles westward along the lake. We approached the rapids and the mouth of the Igysk [Egegik] River. My companions and I went around it along the shore while the baydarkas passed safely straight between the rocks. The width at that place is 13 sazhens* [84 feet]. *We got back into the baydarkas and proceeded on the same course to cover five miles with the current. We landed and pitched our tents. The huntsmen killed four geese and two ducks....*
>
> *"May 31 At six in the morning, leaving this place, we set out on yesterday's course and went downstream. As the sea tide increased, we were forced to go ashore. Here we killed two caribou. When the tide began to go out, we*

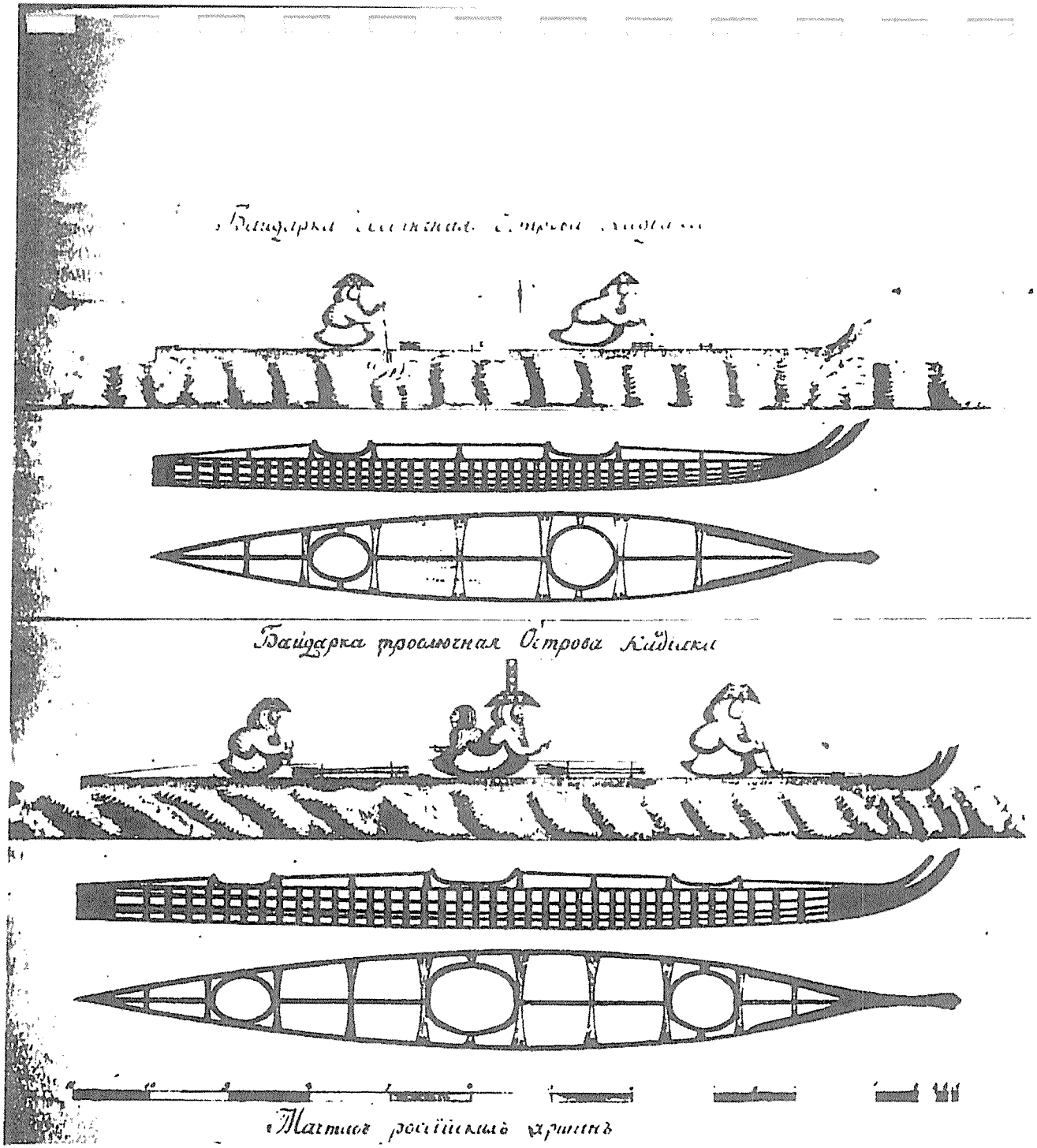


Figure 11. Two-hatch and three-hatch bidarkas from Kodiak Islands, circa 1798.

> *renewed our journey with the current, making 20 miles. We went ashore at the left bank, at the very mouth of the river, on the sea* [vicinity of present-day Egegik village]. *There the shores are high and low without trees, width one and one-half mile, and [nowhere] less than one [mile], depth from two to six feet. The water is turbid. There are no berry patches. Inland there are so many lakes and marshes that it is difficult to find a dry spot....*
>
> *"June 1 At six o'clock we left this place, traveling along the river mouth for a mile to the west, then by sea near the shore for 15 miles to the NW..."* (VanStone 1988:25-29).

Two years after Korsakovskiy's travel along this route, the Russian-American Company established a fur trading post, Aleksandrovski Redoubt, at the mouth of Nushagak River in upper Bristol Bay. The Russian-American Company further explored and extended their sphere of commerce to southwest Alaska from Nushagak, staging some expeditions from Kodiak, the company's district headquarters. Company explorer Vasil'ev, in 1829 and again in 1830, began explorations from Kodiak and crossed the Alaska Peninsula to Nushagak (Tikhmenev 1861 & 1863a:180-181). Though his travel route is undetermined, Vasil'ev's expeditions reflect the spread of Russian influence and increased travel between Kodiak and the outlying trading post at Nushagak in the 1820s and 1830s.
K.T. Khlebnikov describes the two primary routes of communication and travel between Kodiak and Nushagak in the translation of his *Notes on Russian America...* (Khlebnikov n.d.:63). One is the Katmai-Naknek route, the other is a summer route via Becharof Lake and Egegik River. Khlebnikov wrote,

> *"The second route goes southwest from Katmai ten hours on baidarkas to a neck of land known as Studenaia Bay, an estimated distance of 45 versts* [30 miles]. *In the summer it goes across the neck of land and lake [Lake Ugazha, the present Lake Bocharov], then again by river [the Ugazha River]* [Egegik River] *a day's travel - 75 versts* [50 miles] - *thence, to Nushagak by sea for two days...."* (Khlebnikov n.d.:63).

Though no specific information was found regarding mid-nineteenth century travel along the route via Becharof Lake and Egegik River, it is logical to infer that such travel occurred and was related to the Russian-American Company and the fur trade. The location of coastal "*Studenaia Bay*" and the portage route to Becharof Lake is undetermined. An 1849 navigational chart showing the coastline of the Alaska Peninsula (Figure 12) strongly supports the suggestion of Russian familiarity with the route. The

chart is one of more than thirty in a Russian atlas that maps Russian territorial coastline of the era, a coastline that ranged from northern California to southern Siberia. Chart XXII's (Figure 12) inclusion of named inland features (Egegik River and Becharof Lake) is a notable exception to the other atlas' charts showing no inland features.

Early historic and prehistoric patterns of subsistence and settlement in the vicinity of the upper Alaska Peninsula are described by VanStone (1967) and Dumond (1987). One pattern illustrates the seasonal movement of people from permanent settlements on important salmon rivers. In March or April, camps were established on smaller tributary streams of higher elevations where people sought spring caribou, birds and eggs as available, and resident fish. About mid-June, people returned to permanent settlements or big fish camps until August, fishing for salmon. Near the end of August groups again moved to higher country for the fall caribou hunt that lasted until about October. Returning to permanent villages, subsistence activities essentially ceased by December.

J.M. Morris (1987:18) similarly describes coastal peoples' subsistence patterns. She wrote, "*Using a series of established seasonal camps, these people followed a transhumance pattern of resource harvesting.*" Maritime oriented people followed a different subsistence cycle but it often included the harvest of caribou and inland salmon taking also. Morris examined subsistence in Egegik and other communities on the Alaska Peninsula. She noted on-going historical change, but change that included the continuing importance of subsistence fishing, hunting, and gathering activities in post-contact history. According to a BIA ANCSA report, the Becharof Lake area is important for ancient and contemporary subsistence activities (U.S. Bureau of Indian Affairs 1991a:5). Taped oral histories by several Egegik area residents indicate widespread and diverse subsistence activities throughout the Becharof Lake region prior to 1959 (Abalama 1990; White and Kelly 1990; Nelson and Nelson 1990; Boskoffsky, Tretikoff, and Kelly 1990). Like Becharof Lake and Island Arm, Egegik River was, and is, a water body of major subsistence harvest activity. The river is a long standing place of subsistence and is a water route to the important adjacent locations of subsistence in the Becharof Lake watershed. There is an implicit understanding that water routes and boat travel have been integral to nearly all subsistence activities.

Ivan Petroff, special agent for the 1880 census in Alaska, briefly commented on Egegik village in his report on the population and resources of Alaska (U.S. Dept. of the Interior 1881:45). He notes the significance of the **Egegik River** as a trans-peninsula travel route.

> *"From this point we turn immediately down the coast as far as Igagik, where we find a settlement of 118 souls, living in the customary manner, and*

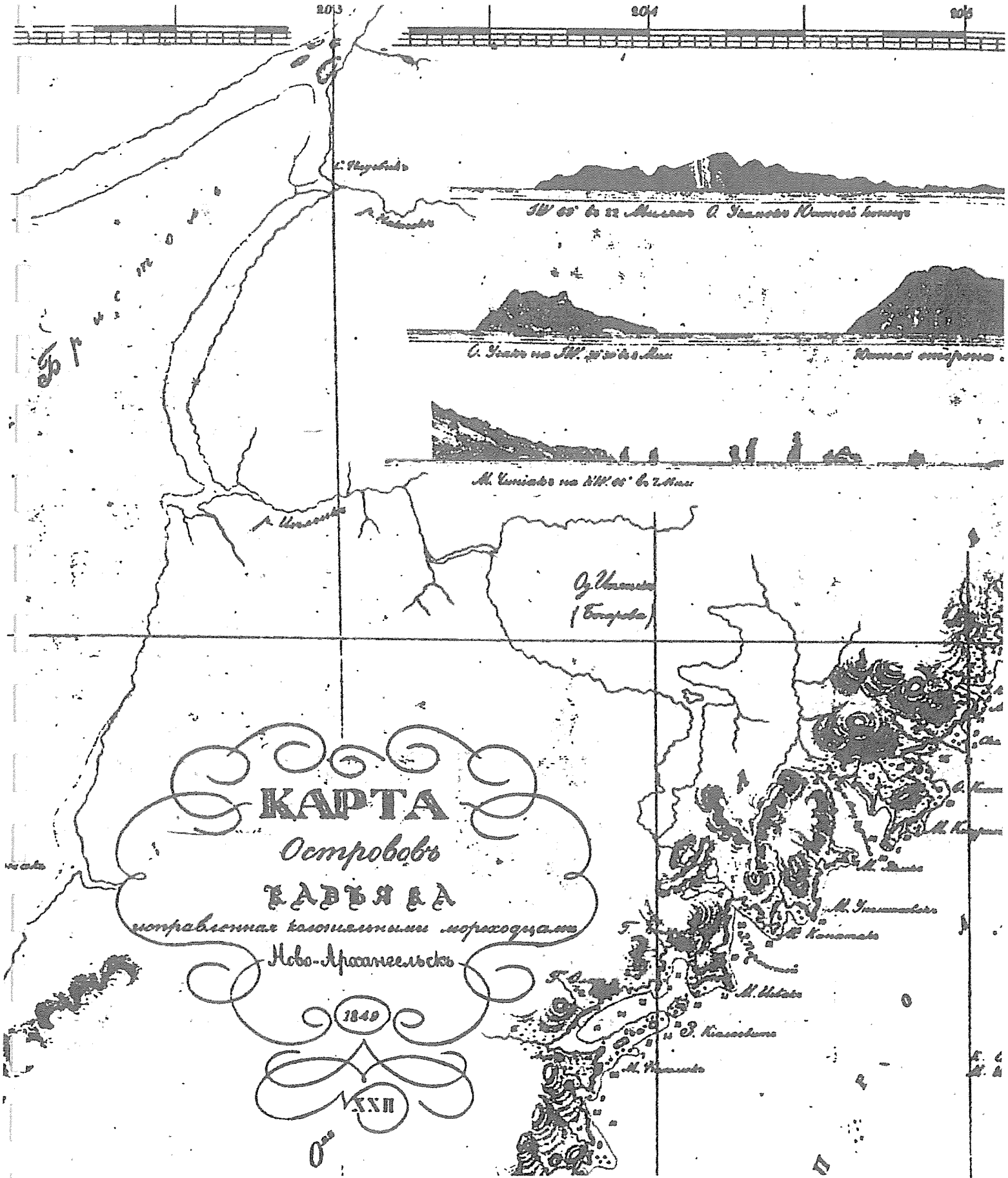


Figure 12. Section of Teben'kov's 1849 Coastal Chart of Alaska Peninsula, showing Becharof Lake and Egegik River.
Source: Teben'kov 1852.

> *principally devoted to the chase of walrus, at the mouth of the Igagik River, which is the principal route of portage across the peninsula, where the travelers are heavily burdened. They also have a chapel here."*
> (U.S. Dept. of the Interior 1881:45).

Ales Hrdlicka (1943) made archaeological excavations near Egegik in 1931. He very briefly surveyed the mouth of the **Egegik River**, excavating one or more grave sites. He noted the local resident made many references to earlier internecine warfare between Egegik inhabitants and Aleuts, Togiak Eskimos, and "*Kulukak*" Eskimos. Hrdlicka's diary includes comments on Egegik village.

> *"Egigik must have once been a large native village. It covered most of a point projecting from the left bank of the river into the bight, while smaller settlements are said to have strung out for three miles along the stream, and there was also a line of small settlements across the river. The last of these, remembered by several, was depopulated by the flu of 1919. There were so many dead lying hereabout at that time that they had to be gathered and burnt by Coast Guard sailors....*
>
> *"A 'dead site' about 2/5 of a mile from cannery--people lived there till that dire 1919. Nothing further to Coffee Point, three miles...."*
> (Hrdlicka 1943:384-385).

The **Egegik River** provides a migratory route for a remarkably large population of anadromous fish. The Egegik River has the second largest sockeye salmon run in Bristol Bay. Its river systems provide the spawning habitat for one-half of the sockeye salmon living on earth (J.H. Clark 1977:1). The first documented commercial fishing activity on Egegik River commenced in 1895 (Moser 1902:212-213). A saltery began operation at the mouth of the Egegik River in 1895, and the Alaska Packers Association opened the Egegik Packing Company (a cannery) adjacent to the present Egegik village townsite in 1900. The cannery owned or charted several vessels to support their operations. Those boats included 5 lighters, 7 skiffs, 19 flat-bottom gill-net boats, one pile-driver, the 5-ton launch *Llewellyn*, the 5-ton launch *Corrine*, and two small sailing ships, the 1,014-ton bark *Charles B. Kenney* and the 554-ton bark *Will W. Case*. The cannery also owned fish traps, secured in the riverbed with pilings, in the vicinity of the river's mouth.

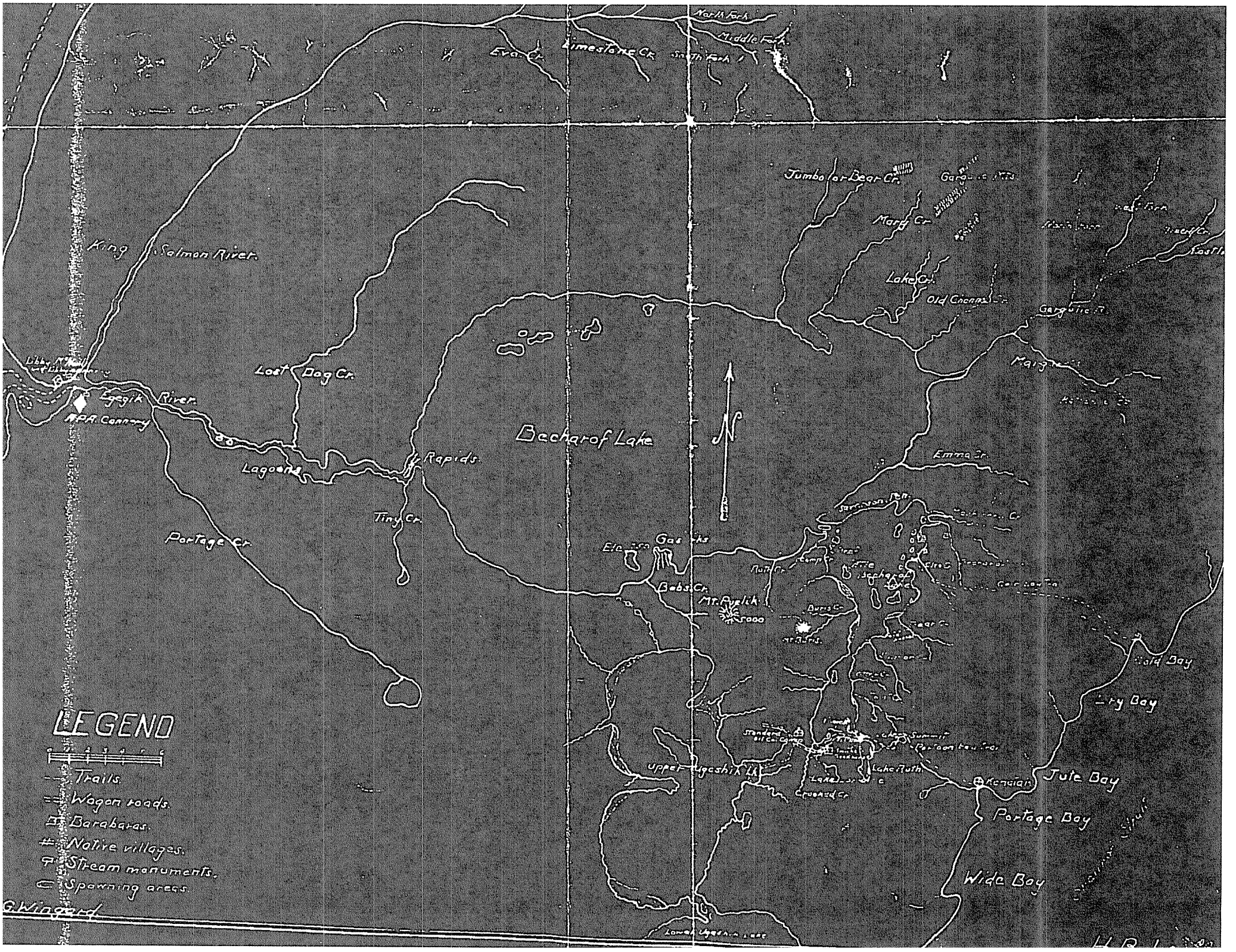
While inspecting Bristol Bay salmon fisheries in 1906, government inspector John Cobb (1906:6) noted the presence of another cannery on the river, North Alaska Salmon

A salmon counting weir on the **Egegik River** was established for one year in 1932, and re-established in the same place from 1952 to 1957 (Winn 1932; Anonymous 1952). The site was located upstream from the lagoon and downstream from the rapids, approximate RM 32. Daily weir logs and seasonal reports record hydrological, meteorological, and river travel information of varying details.

The 1932 weir operated from June 23 to August 11, under the supervision of William E. Sullivan (Winn 1932:7). The weir was 790 feet long, built of wood, and constructed with "*tripod and picket*" design. The weir's boat gate allowed passage of 24 boats during the 7 weeks of weir operation. Deepest water depth at the time of construction was 5.5 feet, though the "*river raised about 3 feet*" over the course of the season.

In 1952, weir construction materials were transported upriver to the weir site via a "*large scow,*" a "*small weir scow,*" and a "*weir power skiff.*" These boats and a 40-foot pile driver were towed to the Lower Lagoon, approximate RM 26, by the *FWS Sockeye*. A portion of the 1952 **Egegik River** weir report chronicles weir related activities on the river.

> *"Inclement weather delayed our arrival at the Egegik Lagoon and it was not until June 2 that the first small scow load was towed to the Egegik weir site, loaded with camp stove, camp equipment and food supplies and the weir cabin set up for occupancy.*
>
> *"Transhipping of all materials from the large scow to a smaller one was necessary due to the shallow water encountered in the Egegik Lagoon. Because of this fact, we were compelled to anchor the large scow at the junction of the Egegik River with the Lower lagoon and transport the material on a small scow for the remainder of the distance to the weir site approximately 15 miles.*
>
> *"Daily tries were made with the small scow and weir skiff until the large scow was unloaded on June 12. In the meantime, the weir crew was flown into the weir, moved into the cabin which had previously been readied for occupancy, and made preparation for actual weir construction in addition to assisting in the transporting of materials from the Lower Lagoon to the weir site.*



North Fork
Middle Fork
Limestone Cr.
Eva Cr.
Jumbo or Bear Cr.
Mary Cr.
Lake Cr.
Old Channel Cr.
King Salmon River
Lost Dog Cr.
Egegik River
Becharof Lake
Rapids
Lagoons
Tiny Cr.
Portage Cr.
Emma Cr.
Bobs Cr.
Mt. Puelik
Upper Ugashik Lk.
Lake Ruth
Jute Bay
Portage Bay
Wide Bay
LEGEND
Trails.
Wagon roads.
Barabaras.
Native villages.
Stream monuments.
Spawning areas.
G. Wingard

> *"On June 12 departure was made from the Egegik Lagoon aboard the Sockeye towing the big scow, arriving at King Salmon on June 13. On June 15 we left King Salmon again aboard the Sockeye, towing the pile driver and the new weir tender. Upon arrival at the Egegik Lagoon on June 16 we anchored the Sockeye and proceeded on across the lagoons with the new weir tender towing the pile driver. This remaining 15 miles took 6 hours to traverse.*
>
> *"Leaving the pile driver at the weir site we again departed aboard the Sockeye for King Salmon, arriving there on June 19. During the interim between June 15 and June 19, base crew had loaded the big scow with remaining Egegik materials. Hence, on June 21 departure was again made from King Salmon with Sockeye towing the big scow. Arrival at the Lower Lagoon was made on June 23 where the new weir tender met us and towed the big scow on up to the weir site. Both pile driver and the scow remained at the weir site all summer and were towed back to King Salmon in the fall."* (Anonymous 1952).

During the following years, the 24-foot patrol vessel *Ronquil* supplied the weir site (USFWS 1955:93, 119). The weir logs also show an amphibious Grumman Goose "781" frequently landed in the river near the weir during 1950s operations. Other amphibious aircraft and helicopters landed nearby as well.

The 1950s weir logs give some indication of boat traffic up and down the river. The August 7, 1953, weir log entry reads, *"Pete Boskoffsky and his family passed around the weir en route home, about 2:30. Came in for coffee. Told us to look for a larger boat coming upriver to fish."* (Anonymous 1953b). The 1955 log shows a weir "*boat gate*" allowing vessel passage through the weir was installed on June 21 and removed on September 2. During this 11-week period the weir log's keeper noted 21 boats passing through the weir. Twelve boats traveled upstream, seven boats traveled downstream, and no direction of travel was noted for two boats (Anonymous 1955). The type and size of watercraft passing through the weir in 1955 was not recorded. However, a boat noted in the July 21-22 entry is described as a cannery boat looking over the "*fish situation*" on Becharof Lake. The August 3 entry states, "*Three boats of natives went upriver today.*"

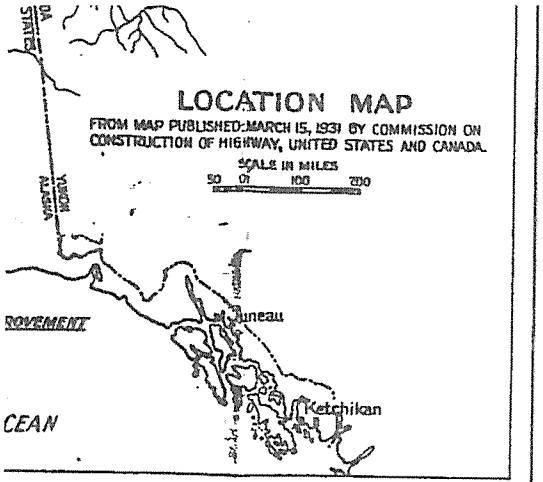
Egegik resident Frank Tretikoff (pers.com. 1995) recalled the weir of the 1950s, remembering a weir gate that had to be opened by an attendant at the weir's center to allow boat passage. He recounted one nighttime incident of inadvertently striking the weir when traveling downstream, breaking off the boat's running lights and exhaust.

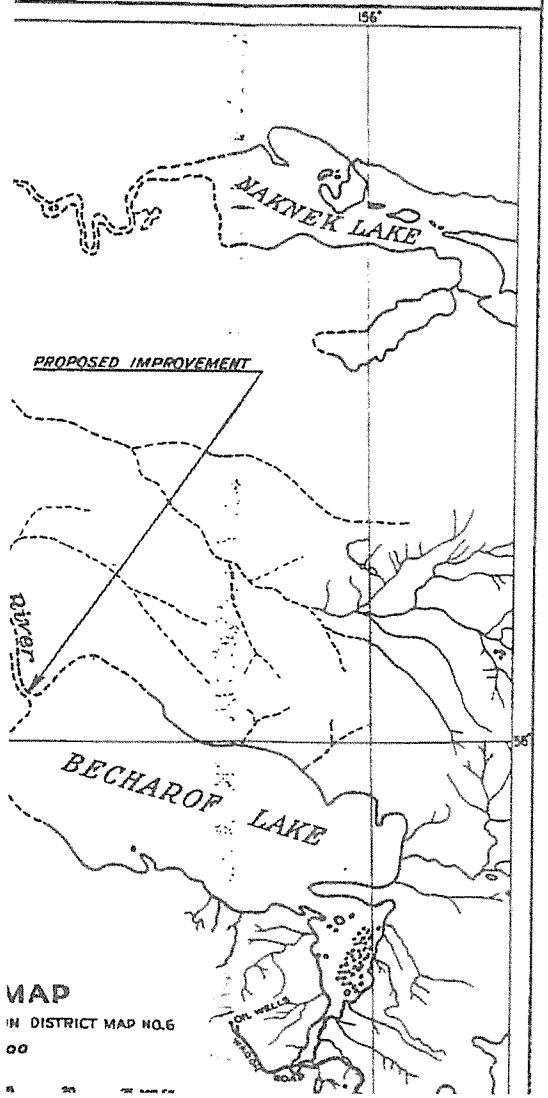
Another federal agency playing a role on the river was the U.S. Army Corps of Engineers. District Engineer C.L. Sturdevant wrote a 1932 report regarding the **Egegik River**, its rapids (Figure 14), and a proposal for channel improvements. An excerpt from his survey report describes boat traffic on the river and hazards of travel through the rapids.

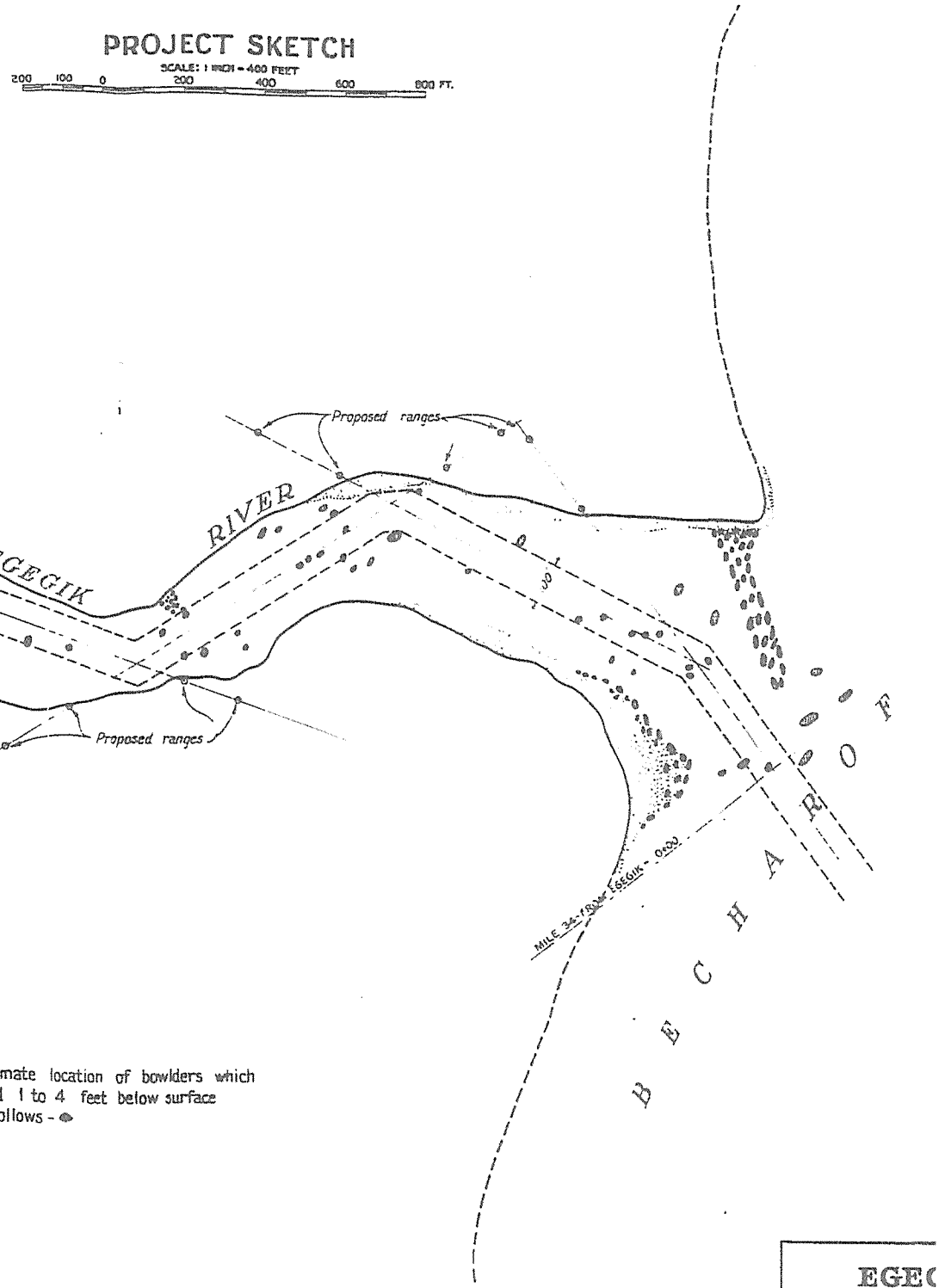
> *"18. Vessel traffic.--There are now 24 small gas boats varying from 26 to 32 feet in length and about 20 additional sailboats of similar size operating on the river. These boats draw from 2 to 4 feet loaded. The United States Bureau of Fisheries maintains one small gas boat on this waterway, in connection with its fish patrol duties.*
>
> *"19. Difficulties attending navigation.--The downstream passage of Egegik Rapids is particularly dangerous, since a boat speed of at least 4 miles per hour is required for steerageway and this in addition to the velocity of the current results in a speed of 10 miles per hour on a tortuous course between boulders. Little difficulty is experienced on the upstream passage, as the majority of gas boats are powered to 8 knots in still water and are therefore able to stem the current at about 2 miles per hour with full control. The small sailboats are even more exposed to danger on the downstream journey than are the gas boats, as a lack of power prevents sufficient steerageway to avoid the boulders.*
>
> *"20. There have been numerous accidents on this reach of the river, and one life has been lost in the past 3 years. There are usually several accidents every year, each resulting in the loss or damage of the entire boat load of supplies and household effects. While the value of these cargoes is quite small, it often represents the entire possessions of one or more Indian families."* (Hurley 1932:20).

Another District Engineer with the Corps, L.E. Atkins, wrote of lining boats through the rapids and accidents that occurred there.

> *"Several boats have been broken up during the past 3 years. A power boat belonging to H.N. Evans sank in September 1931. This was the boat employed on this examination* [Egegik Rapids survey]. *The boulders along the bank greatly hamper lining operations which are necessary for practically all of the boats ascending or descending the river. Only three of the power boats now in use traverse the rapids under their own power."* (Hurley 1932:8-9).







Note:
Approximate location of bowlders which are submerged 1 to 4 feet below surface indicated as follows - ●

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A

In one sheet

Comments in an abstract of Corps of Engineers, Alaska District documents, describe boats carrying passengers and freight between Egegik and Kanatak, and a Bureau of Fisheries boat.

> *"The U.S. Bureau of Fisheries has a representative stationed at Becharof Lake which necessitates much traffic over the rapids.... The document includes a list of boat owners and boats operating on the Egegik* [river]. *They range in length from 24-30 ft, 2 1/2-4 ft draft, Palmer or Redwing* [outboard] *engines and 6-24 hp. The majority of boats have 7-12 hp. Most boats make 2 trips per season. 6 boats make 4 or more per year. One boat makes 2 trips per month. The savings incurred by using the Egegik* [versus traveling around the Alaska Peninsula] *are $50 per passenger and $30 per ton. The U.S. Fisheries boat was 23 ft long, 6 1/2 ft wide, drawing 18 inches with 10 hp Red Wing engine. It was decked with a tent and used for transporting 2 men and supplies to fish counting weir."* (Stirling 1985:Appndx.4, p.54).

Nick Abalama (1990; pers.com. 1995) indicated bidarkas were used as a means of travel in the Becharof Lake area perhaps as late as the 1930s. He stated "*white man canoes,*" constructed of wood and canvas, appeared in the 1930s. Greater stability and the ability to carry more freight were two attributes of the new canoes. Nick recounted river and lake travel with wooden, double-ender sailboats, the most common means of water travel during his young adulthood. These usually were pulled or pushed through the rapids when ascending the **Egegik River**, but could be sailed upstream through the rapids with southwest or northwest winds, when the winds were "*just right.*" Some people lined the sailboats through the rapids with dogs pulling from the shore. According to Mr. Abalama, converted sailboats with 9 h.p. kickers could slowly negotiate the rapids. The largest boat he recalled traveling the length of Egegik River was a big, double-end commercial boat with a V-hull and shallow draft. The boat, piloted by Paul Boskoffsky, dragged bottom while ascending the rapids.

Frank Chick kept a field diary during a 1942 "*road reconnaissance*" trip up the **Egegik River**. Mr. Chick stated the Egegik rapids are deep enough for small barges. He also stated, *"The rapids are swift and even small boats with experienced operators often swamp in rapids."* (Stirling 1985:Appndx.4, p.51).

Jay Hammond (pers.com. 1995) stated he ascended **Egegik River** without difficulty in 1957 or 1958. Destined for the Kejulik River, he traveled via an 18-foot flat-bottomed jon boat with outboard engine and a lift.

The **Egegik River** was used as a winter mail route for most of the first half of this century. Prior to transport of mail by air carriers, winter mail was hauled by dog team. Mail destined for Bristol Bay and southwest Alaska was delivered by steamer to Cold Bay [Puale Bay] or Kanatak (See Figure 5), and followed a route that included travel on or alongside Egegik River (Vick 1983:221-222; Dickerson 1989; U.S. Alaska Road Commission 1922-1931; Smith and Baker 1924:163; Alaska Geographic Society 1994:57; Campbell 1995:80).

A 1942 reference was made to **Swampy River** by Frank Chick in his road reconnaissance trip up the Egegik River (Stirling 1985:Appndx.4, p.370). On October 2, 1942, he wrote, "*A Native boy of Egegik said that he had taken his small gas boat about 30 mi up Swampy River.*" No additional information regarding this solitary statement was found.

Virginia White (pers.com 1996) recalled riding in a 2-hatch kayak on **High Bluff Creek** as a child. She stated she was born near "*High Bluff.*"

Shosky Creek (Whitefish Creek) was cited as a travel route by Nick Abalama (1990; pers.com. 1995). He referred to "*those old time Natives with kayaks*" who used to go to Whitefish lakes in the fall to obtain lake-bottom clay. The clay was mixed with seal oil in the spring, smeared over kayaks, turned white after drying, and the camouflaged kayaks were then used for spring seal hunts in the ice pack waters of Bristol Bay. Mr. Abalama non-specifically indicated several lakes in the general area of T. 23 S., R. 46 W., S.M., as Whitefish lakes.

e. Post-statehood use

Post-Statehood subsistence activities on the **Egegik River** and its tributaries are well documented. Steven Behnke (1978:151-156) described areas of harvest activity near Egegik in a study of resource use and subsistence. This mid-1970s era assessment of subsistence activity parallels earlier descriptions and indicates the significance of waterways as access routes and places of subsistence harvest.

> *"The Egegik River, its tributaries, and Becherof Lake are areas of major significance for these* [wildlife harvest] *activities although snowmobiles provide winter access to areas away from the waterways.*
>
> *"Moose are occasionally taken by Egegik residents hunting by boat during the fall...*
>
> *"Most Egegik residents take caribou rather than moose, however, since they are relatively abundant, easily hunted, and easily transported....*
>
> *"During September, caribou reach the Egegik River in their annual migration north from their calving areas. Hunters take skiffs or larger boats up the Egegik River about half-way to Becherof lake. In this area, a series of low ridges followed by the caribou are intersected by the river and caribou can be spotted and killed close to the river. Sometimes a tent or tarp is rigged in the boat and people spend the night upriver.*
>
> *"By the early part of the New Year, there is a southward tendency and many caribou follow the western shore of Becherof Lake south, crossing the Egegik River in the vicinity of the rapids near the outlet of Becherof Lake. Hunters sometimes take snowmobiles up the Egegik River to the rapids area and near the shore of Becherof Lake to hunt caribou. In the warm winter of 1976-77, a few people took boats upriver and killed caribou in the rapids area in late January and early February.*
>
> *"Hook and line fishing is conducted during the fall up the King Salmon River and in the rapids area of the Egegik River where there are several cabins utilized by Egegik people.... People fish for smelt along the Egegik River from in front of the village to several miles upriver.*

"When ducks and geese arrive, trips are made up King Salmon and Egegik Rivers to hunt them. Ducks are particularly sought in the mouths of creeks and sloughs off the main rivers, while geese are found in flats along the Egegik River....

"Ptarmigan and Arctic hare are hunted throughout the winter, and contribute significantly to the larders of many families. Ptarmigan are found in the willow patches scattered across the rolling tundra behind Egegik and along the rivers....

"The main furbearers trapped in the vicinity of Egegik are fox, mink, land otter, and beaver. Wolves, wolverine, and lynx are occasionally taken as well. The innumerable tundra lakes and creeks of the lowlands around Egegik support quantities of small fish and are good mink and otter habitat. There is not a lot of trapping effort by Egegik residents, although this varies from year to year....

"People spend considerable time during the fall in the Egegik rapids area fishing, berry-picking, and caribou hunting. The upper Egegik River, and in some years, the northwestern shore of Becharof Lake, are important for caribou hunting in fall and winter. Moose are also occasionally sought in these areas." (Behnke 1978:151-156).

Judith Morris wrote a 1987 assessment of fish and wildlife use by Egegik residents. She generally concurs with Behnke's assessment above, and makes additional comments. Her assessment of resource use spans a 20-year period, 1962-1982, and shows the significance of mainstem rivers.

"Skiffs were used [in late summer] *to run up the Egegik or King Salmon rivers where grayling, rainbow trout, and silver salmon were targeted....*

"During late September and early October some local residents traveled up the Egegik River near the outlet of Becharof Lake and harvested small quantities of spawned out sockeyes....

"Salmon were taken with set gill nets in the Egegik River and Egegik Bay near the community. Beaches immediately adjacent to the town are located within the commercial district and could be fished only when the commercial fishery was open. It was necessary to go to Egg Island, approximately a

mile above the confluence of the Egegik and King Salmon rivers, in order to place a subsistence gill net outside the commercial fishing district." (Morris 1987:82-93).

Pete Olsen (pers.com. 1995) is a young Native Egegik resident and contemporary user of the **Egegik River**. He made approximately 20 trips from Egegik to Becharof Lake in 1995, primarily for subsistence hunting and fishing. He travels the river via skiff when the river is open, and via Honda 4-wheeler or snowmachine during winter months. He owns a 22-foot skiff with a 70 horsepower Johnson outboard motor, and a 20-foot skiff with a 65 horsepower Evinrude outboard motor. Mr. Olsen stated he never had a problem going through the Egegik rapids by boat, but many times had to wait below the rapids for high winds to subside. Olsen also said he had travelled by boat up **Swampy Creek**, 6 or 7 miles upstream from the mouth of Swampy Creek. He also has traveled partway up **Shosky Creek** but could not ascend the stream too far due to shallow spots. According to Olsen, very high tides increase stream depth and allow boat passage "*all the way up the creek.*" When winter weather and river ice conditions are favorable he stated he could travel from Egegik village to the rapids in 25 minutes using "*shortcuts.*" Olsen also said he had ridden snowmachines up the entire length of Swampy Creek and Shosky Creek.

A notable contemporary example of **Egegik River** use as a transportation route by scientists occurred in the mid-1970s. The ADF&G's research vessel *Illiaska* made a single passage from Egegik to Becharof Lake in 1975, descending Egegik River 2 years later. It likely is the largest vessel to enter Becharof Lake. This 32-foot fiberglass boat had a 10-foot beam and drew three feet of water. The reportedly bow-heavy boat was first used for commercial guiding and fishing activities on Lake Iliamna and Bristol Bay before being used as a research vessel on Becharof Lake.

Former Egegik resident Paul Boskoffsky piloted the *Illiaska* up **Egegik River** and through the rapids. The boat experienced considerable damage to the bow after striking a boulder in the rapids. Though hired to pilot the boat both up and down the river, Mr. Boskoffsky declined to pilot the boat downstream from the lake at a later time. Following repair to the damaged hull and two seasons of research work on Becharof Lake, the *R/V Illiaska* made the return trip down the Egegik River. Anticipating difficulties before descending the river, boat crew-members made an aerial reconnaissance of the rapids, mapped the rapids, made preparatory water reconnaissance trips through the rapids via skiff, marked the channel with buoys, and unloaded gear and equipment from the *Illiaska* to improve draft. Led by a pilot skiff through the rapids, the *Illiaska* traveled downstream at full speed, an estimated 8-9 knots. While maneuvering to avoid the pilot skiff which became entangled in a buoy line, the boat struck a rock which damaged the hull and possibly the rudder. The

flybridge steering wheel broke under forceful use during the descent. The boat successfully negotiated the remaining rapids and then was parked just below the rapids for several days for damage assessment. It later made an uneventful journey to Egegik, and was barged to Juneau where repairs were made again. The *Illiaska* has seen continuing use as an ADF&G vessel since its 1977 descent of Egegik River. It presently operates in Southeastern Alaska. (pers.com. Lehman 1995; pers.com. Rowell 1995; pers.com. O'Hara 1995; pers.com. Russell 1995b; pers.com. J. Abalama 1995).

The **Egegik River** drainage is a popular guided sport fishing destination according to a recent sport fishing assessment in the Becharof NWR (USFWS 1994c:23). The popularity of sport fishing at the Becharof Lake outlet has increased fishing pressure there in recent years. The extent of subsistence and sport fishing at the Becharof Lake outlet is examined in a 1996 Service report (Medeiros and Larson 1996). Sport fishermen primarily accessed this fishery by float plane; some subsistence fishermen accessed this area by boat.

Service personnel travel the **Egegik River** by boat. En route to Becharof Lake, Service fisheries biologist Dewey Eaton ascended the Egegik River by boat in the summers of 1991-92. Alert for sandbars, he ran the river on high tide and reached Becharof Lake without difficulty (pers.com. Eaton 1995).

Service fisheries biologist Jeff Adams (pers.com. 1995) traveled up **Shosky Creek** and **Swampy Creek** in July 1994. Using a motorized Mark II sport boat, powered by a 25 or 30 horsepower outboard, he went approximately 5 miles up each stream. Adams felt he could have traveled further due to ample water in the streams, but turned around because of time constraints. He also felt he traveled above the area of tidal influence.

f. Navigability status

Egegik River is navigable for purposes of conveyance according to BLM. The river also is listed as a navigable water body by the Corps of Engineers.

The "*Fact Sheet*" of Alaska navigable waters by the U.S. Army Corps of Engineers, Alaska District (1994) lists the **Egegik River** as one of 36 Alaska waterways that have been determined navigable. The list indicates that the river is navigable its entire length. Attempts to discover the date of the navigability determination and the criteria used for the determination by the Corps of Engineers have been unsuccessful. Reports or case files regarding the navigability of Egegik River and Becharof Lake were not locatable according to Steve Penaluna (pers.com. 1996), a current Alaska District employee. He indicated such records may exist on microfiche, may have been archived, or may have been lost. The Corps issued 17 or 18 permits for regulated "*Section 10*" activities on the Egegik River since 1948.

Navigability recommendations and determinations, for conveyance purposes only, have been made by the Bureau of Land Management for the Egegik River and its tributaries. In 1979, **Egegik River** was declared navigable from its mouth to its source in Becharof Lake in a BLM determination. A 1982 summary of the BLM's decision follows.

> *"The Egegik River already has been determined navigable to Becharof Lake in conjunction with BLM's conveyance of land to Egegik village. The Bureau of Land Management first examined its navigability in 1975 when Russ Sorenson of the ADO filled in a 'Navigability Field Report' stating that barges and commercial fishing vessels were used near Egegik and 'smaller craft' upriver. He wrote that tidal influence extended about fifteen miles, which is well into if not all the way through the present State selection. Alaska's Department of Fish and Game, in 1974 proposed easements along the river through the village selection stating that the river was used to travel to hunting, fishing, and trapping areas and was popular for float trips. On July 22, 1976, the Easement and Navigability Task Force of BLM recommended the Egegik River be considered navigable. It was the only stream so considered in the conveyance area. The State Director concurred with this decision on May 16, 1979 in the Final Easements for the village of Egegik because the tidal influence from its mouth to Becharof Lake. The decision was also reflected in BLM's Decision to Issue Conveyance and Interim Conveyance to Becharof Corporation (Egegik) dated June 8, 1979 and September 10, 1979, respectively."* (Ducker 1982:2).

It should be noted that the tidal effect on the **Egegik River** does not extend to the Becharof Lake outlet as stated in the above decision summary. Tidal effect extends to an area on the river above the lagoon and below the rapids, approximate RM 32 (Hurley 1932:16; U.S. NOAA 1994:275).

Swampy River, Shosky Creek, and **Swampy Creek** are three tributaries of the Egegik River that have been subjects of BLM reports and navigability determinations since 1982. The navigability reports can be confusing and somewhat contradictory due to multiple authors, reports that span a 10 year period, some differences between report "*recommendations*" and later "*determinations,*" revisions made to initial determinations, negotiations between the BLM and the Bristol Bay Native Corporation (BBNC), and streams which meander back and forth across section lines that border lands selected for conveyance. Photocopies of these navigability reports are included in the file that supplements this report. A chronological overview of BLM reports and correspondence regarding Egegik River tributaries follows. The references cited usually address more than one stream.

The author of a **1982** recommendation (Lockard 1982:10) listed **Swampy River** and three other streams as being too small and too shallow to be navigable. He also reported that an absence of commercial use made them not suitable as highways of commerce. Lockard also referred to all unnamed lakes in the Egegik River drainage as "*Non-navigable Water Bodies.*" He qualified his comments on lakes with the following statement.

> *"Although some of the remaining lakes are physically capable of accommodating boats capable of carrying small commercial type loads, the absence of actual commercial use coupled with the various other physical characteristics (location of the waterbody, no apparent external drainage, undevelopable shoreline, leads this author to believe that these unnamed lakes are not navigable based on available information and current Departmental criteria."* (Lockard 1982:10)

In **1983** the BLM determined that the portion of **Shosky Creek** (Whitefish Creek) situated in T. 23 S., R. 47 W., S.M., was navigable (Arndorfer 1983:3). This section of the creek extends from a point approximately one mile upstream from the mouth of Shosky Creek to the Becharof NWR boundary, approximately 6 miles further upstream.

In **1986**, the navigability of **Swampy River**, along with many other water bodies in the Bristol Bay region, was an issue between the BBNC and the State of Alaska. The State of

Alaska listed 1.5 to 2 miles of Swampy River, on land conveyed to Native corporation, as navigable (Hawkins 1986a). The BBNC disagreed with the State's listing of Swampy River as navigable, and determined Swampy River was "*non navigable*" after using BLM navigability criteria and input provided by village corporations (Moores 1986). In August 1986, the State and BBNC negotiated the navigability status of several waterways, including Swampy River. In an attachment to correspondence dated November 18, 1986, the State agreed Swampy River was "*Non-navigable.*"

> "*We agree that Swampy River is not navigable. Use of the river is marginal and is limited to the first mile or so.*" (Hawkins 1986b).

In 1987, the Anchorage District Office of the BLM conducted interviews regarding the navigability of **Swampy River, Shosky Creek** (Whitefish Creek), and **Swampy Creek** (Leskosky 1987a; Leskosky 1987b). The BLM, in a determination written by Robert W. Arndorfer (1987:2-4) stated that portions of all three streams were navigable. **Swampy River** was determined to be navigable for approximately 6 miles, from its mouth to the southern township boundary in Sec. 35, T. 23 S., R. 49 W., S.M. The river passes through an approximately one mile square, unnamed lake, in Section 36 of the same township. The extent of **Shosky Creek**'s navigability was determined again, duplicating the 1983 determination described in the preceding paragraph. The **Swampy Creek** navigability determination only declared the creek navigable when lying within the boundaries of two townships, T. 24 S., R. 47 W., S.M., and T. 25 S., R. 47 W., S.M. Since Swampy Creek crosses township lines at seven or more points, the navigability of three segments of the stream was not addressed. In effect, BLM's determination declared Swampy Creek intermittently navigable from its mouth, to a point where it crosses a township line approximately 11 miles upstream at Sec. 32,T. 25 S., R. 47 W., S.M. Excerpts of the BLM determination pertaining to use of these three waterways and to the extent of their navigability follow.

> "*Three persons described their boat trips up Swampy River. All three have taken boats to the lake in Sec. 36, T 23 S., R. 49 W., SM (river mile 6.0). Nelson said that he has taken his skiff to river mile 9.5, which is 3.5 miles beyond the report area, and could have gone further. He remarked, 'Everybody in Egegik goes up Swampy River to hunt caribou.' Jackie Myers stated a person can take a canoe two or three miles above the lake without any problem. Chmiel said that he boated three miles upstream of the lake. He knows of others who have done the same....*

"I determine Swampy River navigable through T. 23 S., R. 49 W., SM. Nelson, Myers and Chmiel have boated the river to the lake, and two of them went beyond the lake. Nelson has taken his skiff three and one-half miles beyond the lake; Chmiel went three miles. Others reportedly have gone beyond the lake. Nelson and Myers said many Egegik residents boat up Swampy River and beyond to caribou hunt." (Arndorfer 1987:2-3).

"Mostly hunters use this stream **[Shosky Creek]**. *Some float down in rafts and some take skiffs up. Russell said he knows caribou hunters who have floated it for twelve miles. Tibbets has flown hunters with rafts in about twenty miles upstream. Kabalana has gone up Shosky Creek for sixteen miles in his skiff. Myers stated that one could use about twenty miles of the creek in a canoe or raft.*

"I determine Shosky Creek navigable in T. 24 S., R. 47 W., SM. The creek has a continuous, slow-moving, and sufficiently deep channel for canoe and inflatable raft navigation. Individuals have floated as much as twenty miles of the stream." (Arndorfer 1987:3).

"Local residents stated that this creek **[Swampy Creek]** *is navigable for canoes and rafts and small skiffs for most of its length. Chuck Nelson has taken his skiff to river mile 14.5, which is beyond the report area. Myers said a skiff can go up fifteen miles and a canoe or raft further. He has not boated up the creek, but has walked its banks while running a trapline in the area. Tibbets said a person can go up it for about ten miles. Russell, Nelson and Kabalana said a person can float it from the cluster of lakes in T. 26 S., R. 47 W., SM (river mile 15.0). Russell and Tibbets have flown over the creek on one or more occasions. Most informants estimated the creek to be twenty to thirty feet wide and three to five feet deep.*

"I determine Swampy Creek navigable in Tps. 24 and 25 S., R. 47 W. SM. The creek has a continuous deep channel for canoe and inflatable raft navigation. A trapper used the creek for access to his cabin. One person said one can canoe or raft the creek for eleven miles; three said it can be traveled for fifteen miles." (Arndorfer 1987:4).

In the navigability determination cited above, Arndorfer also addressed other water bodies that included lakes and an unnamed tributary of Egegik River. He apparently was referring to **Abalama Creek** (Figure 15), the only stream in

Sec. 10, T. 24 S., R. 47 W., S.M., though he described the stream as entering Egegik River from the west rather than the east. He wrote,

> *"I determine the remaining rivers and streams less than 198 feet wide and lakes less than fifty acres in size within the survey group area nonnavigable. The lakes are small and drained by shallow creeks. Many are landlocked. The streams are shallow or narrow for boat use. Both Russell and Myers reported that the creek emptying into the Egegik from the west in Sec. 10, T. 24 S., R. 47 W., SM, is too shallow and narrow for rafts, canoes, and larger crafts. A few streams do not connect to navigable water bodies; some are blocked with such dense vegetation that people would have to effect a portage of a mile or more to reach former channels that are now linear landlocked lakes."* (Arndorfer 1987:4).

In 1991, the BLM revised their determinations of **Swampy River, Shosky Creek**, and **Swampy Creek** (Hassett 1991). The BLM Deputy State Director for Conveyance Management wrote a January 4, 1991, memorandum to BLM Deputy State Director for Cadastral Survey explaining that revision. The essential text of that memorandum follows below.

> *"In 1987, we issued a number of reports containing navigability determinations for water bodies on lands interim-conveyed to ANCSA corporations. Late that year, it was found that, in accordance with statutory provisions for correcting conveyances, redeterminations of navigability on interim-conveyed lands may be done only when the BLM receives requests from the affected corporations.*
>
> *"My November 17, 1987, report of navigable waters within Survey Group 313 in the Egegik area listed Shosky Creek and Swampy Creek in T. 24 S., R. 47 W., SM, and Swampy River in T. 23 S., R. 49 W., SM, as navigable within ICs 231 and 232. By memo dated March 8, 1990, the Navigability Section notified you* [BLM Deputy Director for Cadastral Survey] *that since the Native Corporations had not requested a redetermination, Swampy Creek should not be segregated in the IC'd township. Since requests have not been received from Becharof and Bristol Bay corporations for reconsideration of any streams, Shosky Creek in T. 24 S., R. 47 W., SM, and Swampy River in T. 23 S., R. 49 W., SM, also should not be segregated as navigable water bodies."* (Hassett 1991:1).

The State of Alaska's 1990 *Bristol Bay Easement Atlas*, cited in the bibliography, indicates some navigable waterbodies in the **Egegik River** drainage as "*Federally Determined Navigable*" or "*State Determined Navigable.*" Atlas maps show the Egegik River as "*Federally Determined Navigable*" from RM 8 to RM 13, and from RM 22.5 to its outlet at Becharof Lake. The river is shown as "*State Determined Navigable*" from RM 13 to RM 22.5.

The easement atlas also shows segments of three Egegik River tributaries as navigable. **Swampy River** is shown as "*State Determined Navigable*" from its mouth to approximately 5 miles where it is the outlet for the unnamed lake in Sec. 36, T. 23 S., R. 49 W., S.M. The unnamed lake is not marked as navigable.

The easement atlas depicts **Shosky Creek** as "*State Determined Navigable*" from its mouth to a point approximately one mile upstream from the mouth. There is no navigability status indicated for the remainder of Shosky Creek.

Three maps from the easement atlas indicate **Swampy Creek** is mostly navigable from its mouth to its source, an unnamed lake in Sec. 13, T. 27 S., R. 46 W., S.M. The lower extent of the stream passes through interim conveyed lands for approximately 4 river miles and is designated as "*State Determined Navigable.*" Continuing upstream, the next approximate 7 miles passes through State lands and Native Selected lands and is designated "*Federally Determined Navigable.*" Continuing upstream, the atlas shows the next 3 to 4 miles passing through State Lands and Native Selected Lands and not indicated as being classified as navigable by either the State or Federal governments. Continuing further upstream, Swampy Creek is shown as "*State Determined Navigable*" from Sec. 4, T. 26 S., R. 47 W., S.M., to its head at the 2-mile long, unnamed lake in Sec. 13, T. 27 S., R. 46 W., S.M. The two unnamed lakes in Secs. 10, 11, 13, 14, and 24, T. 27 S., R. 46 W., S.M., are designated as "*State Determined Navigable*" and lie within the Alaska Peninsula NWR.

Becharof Lake and its Tributaries

B. Egegik River and Becharof Lake Watershed Unit

2. Becharof Lake and its tributaries

This section of the report addresses the lake and its tributaries with two significant exceptions. The tributaries and lake waters in southeast Becharof Lake, known as Island Arm, are examined in a later report section. Also excluded is the lake's largest tributary, the Kejulik River, and its tributaries. It is also examined in a separate section. A succession of early government fishery workers mapped Becharof Lake and organized its tributaries in a manner to facilitate their management and research activities (Wingard n.d.; USFWS 1956:4; Adams, et al. 1962; McCurdy 1973). The lake's morphology and the basin topography resulted in the development of a map showing all tributaries, with each tributary numbered with the distance from the lake's outlet in Lake Miles (LM). Beginning at the outlet of Becharof Lake and proceeding in a clockwise direction, Lake Miles were determined by measuring the distance between tributaries along the meandering shoreline (See Figure 15). The Becharof Lake and Island Arm sections of this report use the LMs established by J.R. Adams, et al. (1962) and used again by M.L. McCurdy (1973) in their compilations of stream survey data. Several small streams identified and mapped by Adams, et al. and McCurdy have been omitted from Figure 16 and from the descriptions that follow. The small, low flow streams omitted from this report can be identified easily by referencing McCurdy's Becharof Lake map (McCurdy 1973:6) and USGS topographic maps. The extremely diminutive physical characteristics of these streams prompts their exclusion here.

a. Summary

Becharof Lake is Alaska's second largest lake, covering more than 400 square miles. This clearwater lake is approximately 40 miles long and 15 miles wide. Excluding the Kejulik River and many tributaries of the Island Arm embayment, most streams that discharge into Becharof Lake are shallow, low flow tributaries that extend less than 5 miles inland from lakeshore. High winds and high waves frequently hinder travel on the lake.

Travel on Becharof Lake before and after statehood is very well documented and mirrors that of adjacent Egegik River and Island Arm. Boats used on the lake prior to statehood range in size from single hatch, skin-covered bidarkas to motorized, wooden, double-ender conversions. Though sites along Becharof Lake's shoreline have been travel destinations for subsistence or commerce, the lake was often used as the large middle segment of the trans-peninsular waterway route between Shelikof Strait and Bristol Bay. During the first half of this century, fishermen and other workers associated with Bristol Bay canneries traveled by wooden double-ender sailboats and other boats between Fish Village on Island Arm and the village of Egegik.

Local Natives continued their customary hunting, fishing, and trapping activities on Becharof Lake after statehood. Boats used by Egegik residents include 32-foot inboard fishing boats, outboard powered aluminum skiffs, and flat-bottomed river boats. Tug and barge operations associated with oil development by Mobil Oil Company occurred briefly in 1959 and 1960. The Service recently used a 22-foot jetboat and Kofelt boat powered by a 225 horsepower outboard to cross Becharof Lake during research activities.

The physical characteristics of Becharof Lake tributaries have limited their suitability for boat travel.

b. Names and Locations

Becharof Lake takes its English language name from the Russian navigator D.I. Bocharov, the first European explorer of the upper Alaska Peninsula and Becharof Lake. "*Nanvartuqaq*" is the Yup'ik term for Becharof Lake, translating as '*one that has/is a large lake*' (Abalama 1990). Though the lake was unnamed on Bocharov's 1791 map (Figure 10), he apparently referred to the lake in the map's inscribed text as, "*Lake, from which the*[y] *portaged by baidara and all goods to the south side of the Aliaksa Peninsula*" (pers.com. Bland 1995). In 1818 Korsakovskiy did not refer to the lake by name, calling it only "*a large lake*" (VanStone 1988:24). Khlebnikov (n.d.:63) later referred to it as "*Lake Ugazha.*" Russian hydrographers published the name "*Oz[ero] Ugashek*" (Lake Ugashik) in 1852, but Teben'kov's Chart number 22 (See Figure 12) also showed the lake's sub-titled name as "*Becharova*", or Becharof (Teben'kov 1852:Map 22). W.H. Dall of the U.S. Coast and Geodetic Survey named the lake Becharof Lake in 1868 (Orth 1971:120). Other variations of the lake's name and spelling include Becharoff Lake, Betchareff Lake, Bocharof Lake, Botcharoff Lake, Igiaguik, Tugat, Lac Nanouan Toughat, Lake Bochonoff, Lake Ugiagwik, Niniua-Tugat, Rochanoff Lake, and Big Lake. Bureau of Fisheries personnel in the 1930s made a distinction between "*Big Becharof Lake*" and "*Upper Becharof Lake.*" "*Upper Becharof Lake*" referred to the southernmost area of Becharof Lake that lays south of the "*Little Narrows*" (Bower 1931:21). Bureau of Fisheries Assistant Agent Fred Lucas used other Becharof Lake placenames in a monthly report. In 1932 he wrote,

> *"Becharof Lake is divided into three parts by natural formations known as the First Narrows* [Big Narrows] *and Second Narrows* [Little Narrows]. *The three parts are locally known as the Big Lake* [main body of lake], *Island Lake* [Island Arm north of Little Narrows], *and Fish Lake* [Island Arm south of Little Narrows] *respectively.*" (Lucas 1936b:2)

In 1962 the Service described **Becharof Lake** as follows:

> *"This large lake, the source of the Egegik River, is bordered by tundra and swamp on the west shores, and by the mountains and long river valleys on the east shores where the important spawning streams occur.*
>
> *"The lake is geographically divided into several portions for convenience, with the main portion north and west of the Severson Peninsula referred to as the 'Big Lake,' and the portion south of the peninsula called 'Island Lake' [Island Arm].*" (Adams, et al. 1962).

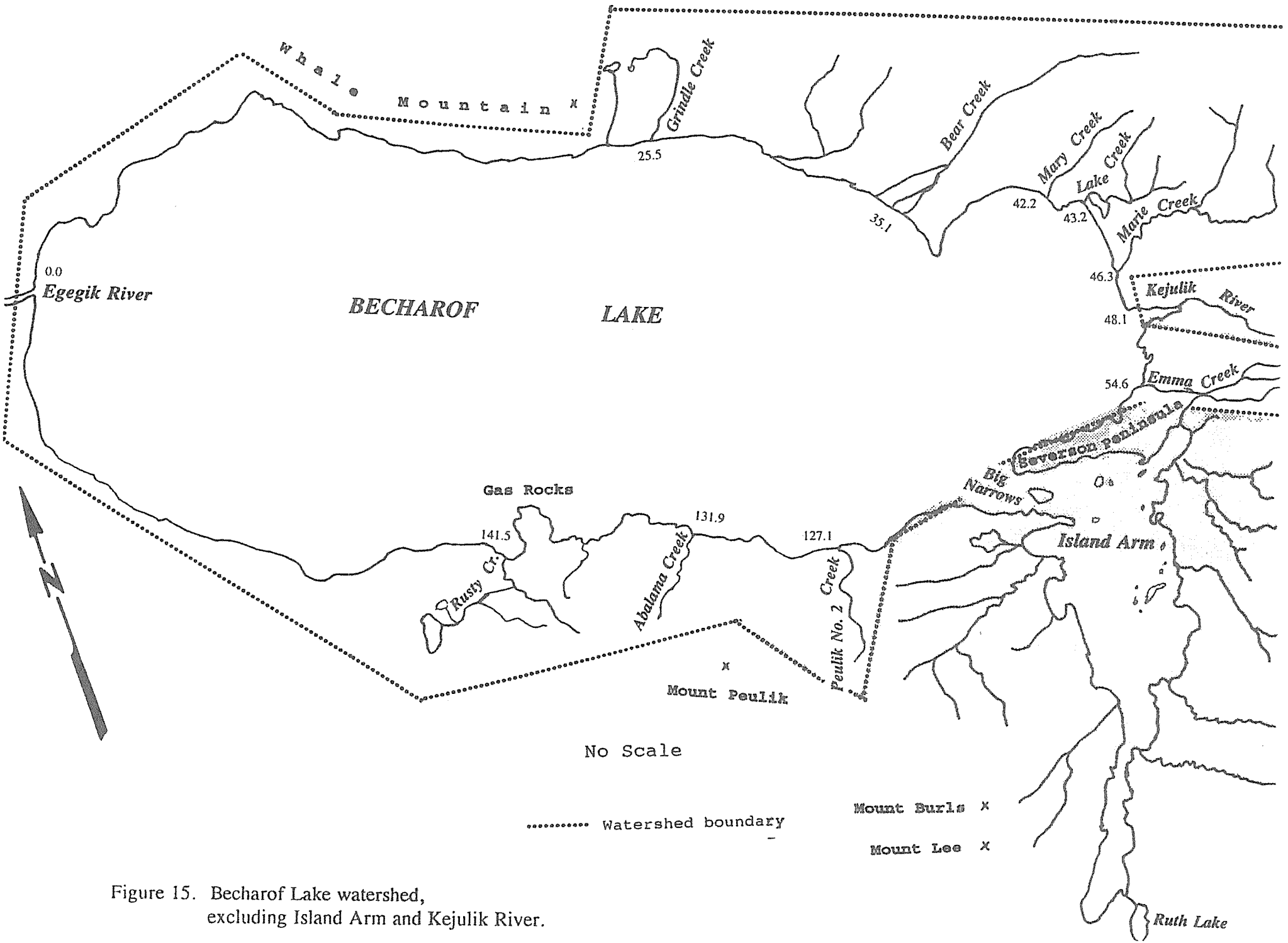


Figure 15. Becharof Lake watershed, excluding Island Arm and Kejulik River.

IV. Main Water Bodies
Becharof Lake

Becharof Lake lies near the center of the upper Alaska Peninsula. It is the dominant geographic feature of the Egegik River/Becharof Lake Watershed and this region of the peninsula. Measuring approximately 40 miles wide, Becharof Lake stretches across half the width of the 80 mile-wide peninsula. Mountains of the Aleutian Range, including the Kejulik Mountains, flank the lake's eastern borders. The north slopes of Mount Peulik, an active volcano, and the slopes of smaller volcanos extend to the lake's southern shores. The elongated bluff-like face of Whale Mountain parallels a portion of the lake's north side. Egegik River drains Becharof Lake through the lake's low-elevation end moraines at the eastern shores that give way to tundra lowlands (Wahrhaftig 1965:34).

This section of the report will show names and locations of the most significant Becharof Lake tributaries, though all but Marie Creek lack recognition by the USGS. Many small Becharof Lake tributaries are omitted from this report. The streams that follow below warrant description due to their size, their status as locally named streams, their significance as salmon spawning streams, their available hydrological data, and their use. They are ordered by location that begins at the lake outlet [Egegik River] at LM 0.0 and proceeds clockwise around the lake, omitting Island Arm tributaries. (See Figure 15). The common or local names of these tributaries are used when known. For tributaries lacking a local name or having an undetermined local name, an historic name from McCurdy's 1973 compilation is used. ADF&G anadromous stream catalog numbers follow the name of each stream listed below.

Egegik River, 322-10-10080, is Becharof Lake's outlet at LM 0.0 [See the preceding section for description of Egegik River].

Grindle Creek, 322-10-10080-0020-2179, flows into Becharof Lake at LM 25.5, located in Sec. 11, T. 25 S., R. 43 W., S.M. The stream drains the eastern slope of Whale Mountain on the lake's north shore. This stream was identified as Grindle Creek in 1936 by Adams, et al. (1962), McCurdy (1973), and the USFWS (1956), apparently named after lake resident Fred Grindle. Grindle Creek heads in a small mountain lake, elevation 1000 feet, in Sec. 34, T. 24 S., R. 43 W., S.M.

Bear Creek has several channels on the lower 2 miles of the stream. The ADF&G anadromous fish catalogue numbers are 322-10-10080-2209, 322-10-10080-0020-2213, 322-10-10080-0020-2217, and 322-10-10080-0020-2219. The multi-channeled mouth, located in Secs. 11 and 13, T. 26 S., R. 42 W., S.M., is placed at LM 35.1 by McCurdy (1973) and Adams, et al. (1962). The stream's channels discharge along a 1-mile stretch

of shoreline according to the most recently published USGS topographic map. Bear Creek lies on the lake's northern shore and drains a narrow valley of the western Kejulik Mountains. The stream heads in Sec. 11, T. 25 S., R. 45 W., S.M., at a 1,900 foot elevation.

Several Egegik and Naknek residents made a distinction between "*3rd Bear Creek*" (northern channel), "*2nd Bear Creek*" (middle channel), and "*1st Bear Creek*" (southern channel). The precise lake discharge point for each channel is unclear due to conflicting accounts of place-names. All local informants agreed the channel has changed. The present channel with the greatest flow is referred to as "*2nd Bear Creek*" or "*3rd Bear Creek*"; it is apparently in the vicinity of the northernmost channel of Sec. 13, T. 26 S., R. 42 W., S.M.

This report uses McCurdy's (1973:73) place designation of LM 35.1 for the mouth of Bear Creek. The stream is often referred to as "*Bible Creek*" by some locals, pilots, and Service personnel, in reference to a "*Bible camp*" constructed in this vicinity in the late 1960s and early 1970s (pers.com. Kelly and Clark 1995). Other earlier place-names for Bear Creek include "*B*" Creek ["*B*" for Bear], "*Jumble Creek,*" and "*Jumbo Creek.*"

Mr. Abalama (1990) refers to Bear Creek as "*Tarunguat,*" meaning "*human figures.*" When speaking about historic subsistence use at Bear Creek in a Yup'ik dialect, Mr. Abalama stated, in translation,

> "*They call it Tarunguat.... Yes, that mountain there used to have human figures. The earthquake caused some of them to roll down and disappear.... When you see these from a distance they look like people standing... rocks...after earthquake was not too many left... They were standing. The stone figures standing, just like people, you know. This mountain here, yaa.*" [He indicates site on map in Kejulik Mountains]. (Abalama 1990).

Mary Creek, 322-10-10080-0020-2231, discharges into Becharof Lake at LM 42.2, located in Sec. 15, T. 26 S., R. 41 W., S.M., on the lake's north shore. The stream heads at the 2000 foot elevation of a small mountain valley in Sec. 5, T. 26 S., R. 40 W., S.M.

Lake Creek, 322-10-10080-0020-2235, flows into Becharof Lake at LM 43.2, located in Sec. 23, T. 26 S., R. 41 W., S.M. Initially named Lake Creek in 1923, the stream also was called "*Dan's Lagoon*" in 1936 (McCurdy 1973:86). Two large water bodies immediately upstream from the mouth, having an approximate surface area of 300 acres, probably relate to its place-names' origins. Lake Creek drains mountain slopes and a low

lying swampy area. The stream heads in Sec. 8, T. 26 S., R. 40 W., S.M., and discharges at the lake's northeastern shore.

Marie Creek, 322-10-10080-2239, discharges into eastern Becharof Lake at LM 46.3. According to USGS topographic maps of the area, Marie Creek is the only officially named tributary of Becharof Lake in this section of the report. It enters the lake approximately one mile north of the Kejulik River at Sec. 2, T. 27 S., R. 41 W., S.M. It heads in a narrow valley of the Kejulik Mountains in Sec. 36, T. 25 S., R. 40 W., S.M. The stream's name was first reported by topographer R.H. Sargent in 1923 (Orth 1971:622). At one time it was called "*Old Channel Creek*" (Adams, et al. 1962; Wingard n.d.).

Kejulik River, LM 48.1, is described at length later in this chapter (Section D.1.) because it is considered as a distinct watershed unit in the Egegik River/Becharof Lake Watershed.

Emma Creek, 322-10-10080-0020-2247, discharges into Becharof Lake at LM 54.6, located in Sec. 23, T. 27 S., R. 41 W., S.M. This mouth of the stream is situated just north of the base of the Severson Peninsula. Emma Creek also discharges into the lake at LM 71.3 (322-10-10080-0020-2253) and LM 71.6 in Sec. 35, T. 27 S., R. 41 W., S.M., 17 shoreline miles from its northern mouth. The southernmost channel flows into a small bay of Island Arm which lies south of the Severson Peninsula. As shown on USGS topographic maps, Emma Creek's mainstem bifurcates approximately 2 miles upstream from each mouth. The stream was called "*Deep Creek*" in 1940, but it is depicted as Emma Creek in Wingard's (n.d.) U.S. Bureau of Fisheries map circa 1923.

Peulik No. 2 Creek, 322-10-10080-0020-2180, flows into Becharof Lake at LM 127.1 (McCurdy 1973:227), located in Sec. 35, T. 27 S., R. 43 W., S.M. Wingard's (n.d.) map of the 1920s shows the stream as "*Ruth Creek.*" This stream discharges along the lake's south shore and heads in Sec. 23, T. 28 S., R. 43 W., S.M., on the northeast slope of Mount Peulik.

Abalama Creek, 322-10-10080-0020-2148, discharges into Becharof Lake at LM 131.9, located in Sec. 19, T. 27 S., R. 43 W., S.M. The stream heads in Sec. 12, T. 28 S., R. 44 W., S.M., on the north slope of Mount Peulik. This stream has several place-names. The Yup'ik term for this stream is "*Maqeryagaq,*" which apparently translates as "*fish camp creek*" (Abalama 1990). Nick Abalama's earliest childhood memories are of this Abalama Creek fish camp. Mr. Abalama (pers.com. 1995) stated the stream was, and is, called Abalama Creek, though some younger people may refer to it as "*Anassima Creek*"

(Onecema Creek). Anassima refers to Anassima Chenikoff, a Kanatak man who had a cabin approximately 1-2 miles east of the mouth of Abalama Creek. The Becharof Lake place-name map compiled by Service refuge personnel (pers.com. Terrel-Wagner 1995) shows "*Onecema Creek*" 2-3 miles east of Abalama Creek, both inaccurately located too far to the west.

Another stream name for **Abalama Creek** was "*Peulik No. 12 Creek,*" named in 1956. Also, the University of Washington's Fisheries Research Institute referred to the creek as "*No. 16*" in 1960 (McCurdy 1973:247).

Rusty Creek, 322-10-10080-0020-2122, discharges into Becharof Lake at LM 141.5, Sec. 17, T. 27 S., R. 44 W., S.M. It is shown as "*Bob's Creek*" on Wingard's (n.d.) 1920s era map. Other names listed by McCurdy (1973:259) are "*Gas Rocks Creek*" and "*No. 15 Creek.*" Rusty Creek heads on the northwest slope of Mount Peulik, Sec. 10, T. 28 S., R. 44 W., S.M. The stream lays on the lake's south shore immediately west of the Gas Rocks.

c. Physical characteristics

Becharof Lake lacks a substantive hydrologic appraisal. A bathymetric map of Becharof Lake was published for the first time recently. Most hydrologic and hydrographic data, which are sketchy and rudimentary, come from diverse oral and written sources.

Physiographer Clyde Wahrhaftig (1965) described the predominant glacial features on the western slope of Alaska Peninsula's Aleutian Range. The following general portrayal of the area describes the Becharof Lake setting.

> *"Along the north side of the range are many large lakes, partly held in by end moraines. Most of them extend well below sea level.*
>
> *"A moraine- and outwash-mantled lowland having local relief of 50-250 feet rises from sea level to a high altitude of 300-500 feet at its inner margins....*
>
> *"The lowland is dotted with morainal and thaw lakes. Large lakes occupy ice-scoured basins along the margins of the lowland."* (Wahrhaftig 1965).

Becharof Lake, including Island Arm, has a surface area of 117,000 hectares (290,000 acres). (See Figure 15). The lake is approximately 40 miles long and about 15 miles across, consisting of one major basin and a shallower island arm basin (J.H. Clark 1977:1). The Service described the lake in 1962 as having a surface area of 417.3 square miles and a total shoreline length of 164.2 miles (Adams, et al. 1962). Among Alaska lakes, only Lake Iliamna surpasses Becharof Lake in size.

The Egegik River is the **Becharof Lake** outlet. Though the flow at the outlet is undetermined, the lake's large size stabilizes Egegik River streamflow (USFWS 1994c:7). Becharof Lake lies at an elevation of about 20 feet according to an ADF&G report (J.H. Clark 1976:3), but the most recent USGS topographic quadrangles, published in 1951 with revisions in the early 1970s, show a lake elevation of 14 feet. Becharof Lake's tributaries lay in a centripetal drainage pattern, with larger streams predominant on the eastern half of the lake basin. (See Figure 15). The glacial Kejulik River is the largest stream major discharging into Becharof Lake. McCurdy (1973) lists over 100 tributaries discharging into the lake; only 8 are longer than 10 miles, and most are under 5 miles.

The Severson Peninsula is a 7-mile long, one mile wide land feature that extends westerly from Becharof Lake's east shore. Other notable topographic features in and around the lake are the north shore's Whale Mountain, the peninsular Gas Rocks on the south shore,

and the adjacent volcano Mount Peulik. Ukinrek Maars, near the Gas Rocks, erupted in 1977.

A recently completed hydrographic study of Becharof Lake resulted in a bathymetric map (See Figure 16) showing lake bottom contours of 10 meter bathymetric intervals (Mathisen 1996). The map shows a rather deep and complicated depth structure with several very deep depressions. Becharof Lake's greatest depth exceeds 180 meters near the center of the lake. Other very recently completed studies by Mathisen and others (Mathisen, Farley, and Goering 1996, Mathisen, Goering and Russell 1996) report on water chemistry, zooplankton biomass, and sockeye salmon production in Becharof Lake.

An on-going investigation by Alaska Volcano Observatory scientists and others, regards seeps and springs in the vicinity of Gas Rocks and Ukinrek Maars in 1995 (Symonds et al. 1995:18). Several individuals (pers.com. J. Abalama 1995; pers.com. Tretikoff 1995; pers.com. Russell 1995b; pers.com. Kelly and Clark 1995) gave the opinion that the lake bed in the vicinity of Gas Rocks uplifted following the 1977 Ukinrek Maars eruption. Eddie Clark, Charlie Kelly, and Jack Abalama mentioned a lagoon that existed behind Gas Rocks prior to the 1977 eruption, but subsequently drained following elevation of the lake bottom. Patricia Neal (pers.com. 1996), a USGS volcanologist familiar with Ukinrek Maars, suggested that wetland changes in the vicinity of Gas Rocks resulted from ashfall and filling rather than uplift and drainage.

Charlie Kelly and Eddie Clark (pers.com. Kelly and Clark 1995) asserted the existence of a lake tide in **Becharof Lake**. With no wind blowing, they estimated an average 4-inch change in lake water level that is easily observable. They further stated that tidal currents exist and, while flying over the lake in a small aircraft, they have observed a "*tide rip line*" near the middle of Becharof Lake that ran east and west.

Several individuals recounted experiences with high seas on **Becharof Lake**, some people indicating that southeast winds cause the most hazardous wave conditions. While doing fishery research in the 1970s, ADF&G biologist Kathy Rowell (pers.com. 1995) experienced a severe episode of seasickness. Jack Abalama (pers.com. 1995) stated a strong southeast wind produces huge waves near the Egégik River outlet. He also reported seeing and experiencing higher seas in Becharof Lake than he had over many years of commercial fishing in Bristol Bay. W.H. Osgood (1904:19) spent several days above the Egegik River rapids waiting for winds to subside before continuing canoe travel across Becharof Lake. He described a strong surf caused by high winds breaking along the beaches. Pete Olsen (pers.com. 1995) observed "*30 foot waves at the mouth of the lake*" when a 60 m.p.h. wind blew. Charlie Kelly described experiencing 12-foot lake waves

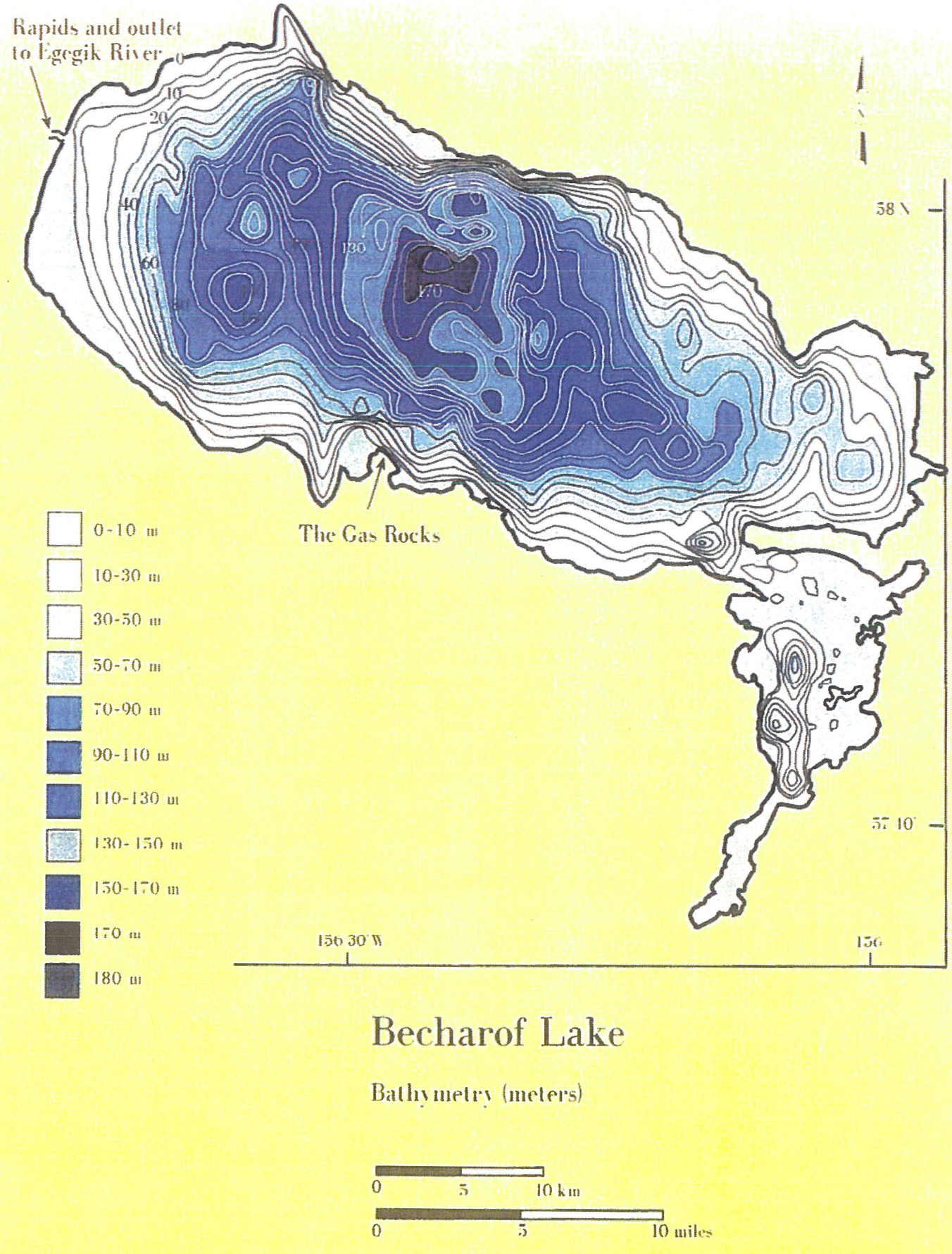


Figure 16. Bathymetric map of Becharof Lake.
Source: Mathisen 1996.

that were more dangerous than similar height ocean waves because of their short wavelengths and steep sides. Service biologist Dewey Eaton (pers.com. 1995) has observed 12-15 foot waves on Becharof Lake.

Data assembled by Richard Russell give an indication of ice cover in **Becharof Lake** over the past 20 years. His ice cover table shows average winter ice cover lasting 114 days. The average date of freeze up is February 9, and the average date of break up is April 24 (Russell 1995). Nick Abalama (pers.com. 1995) stated freeze-up usually occurs in late December, with break-up occurring in late April or early May. Mr. Abalama also said that winds delay lake freeze-up, but the entire lake can freeze up overnight with calm weather. The 1932 district engineer for the Corps of Engineers stated **Becharof Lake** was frozen over during a period from October to May (Hurley 1932:16). Contrary to the above statements, Becharof NWR's first refuge manager, John Taylor, stated the lake remained ice free during most winters (USFWS 1982:24). Pete Olsen (pers.com. 1995) stated periods of high winds during the winter can cause very large piles of slab ice on the lake surface. Charlie Kelly (pers.com. Kelly and Clark 1995) displayed a framed color photograph of extremely large, rectangular blocks of ice piled haphazardly on the lake surface.

Ice action at the lake's outlet possibly caused numerous boulders to obstruct Egegik River in 1970 (U.S. National Oceanic and Atmospheric Administration 1994:276).
Frank Chick's field diary from his 1942 road reconnaissance records a conversation he had with a Native man named Gregory. He told Mr. Chick that **Becharof Lake** seldom freezes until late December, and that the center of the lake often remains open all winter (Stirling 1985:Appndx.4, p.19). Charlie Kelly and Eddie Clark (pers.com. 1995) characterized the winters of 1993-94 as very mild, resulting in minimal ice cover. They also suggested a correlation between mild winters and larger than usual salmon returns to Becharof Lake some years later.

As in the preceding section regarding place names and locations, several relatively short Becharof Lake tributaries with low stream flow are omitted from the Becharof Lake map (Figure 15) and the following descriptions. Maps and some very coarse and sketchy hydrologic data for these omitted tributaries can be found in the compilations by McCurdy (1973) and Adams, et al. (1962).

The 4.5 mile long **Grindle Creek** drains a 6.6 square mile area (McCurdy 1973:52). This steep gradient stream heads at a 1000 foot elevation lake on Whale Mountain. ADF&G salmon survey records from 1963 and 1965 describe the stream as "*muddy*" (McCurdy 1973:54). Other physical characteristics of this stream are undetermined.

Bear Creek is a 15.6 mile long stream that drains a 40.7 square mile area. The channel currently used by Egegik residents for subsistence purposes (2nd or 3rd Bear Creek) has an extremely small protective lagoon at the mouth that can accommodate a few small boats (pers.com. Olsen 1995; pers.com. N. Abalama 1995). Dan O'Hara (pers.com. 1995) described 3rd Bear Creek as being "*fairly deep*" for 50-60 yards. Local subsistence users uniformly state the mouth's main channel, or the channel with greatest flow, has changed over time. The only remarks found among 1930-1970s stream survey records regarding physical characteristics of Bear Creek state the stream was "*muddy*" in 1965, and "*turbid*" in 1966 (McCurdy 1973:75; Adams, et al. 1962). Other hydrologic characteristics of this stream are undetermined.

The 5.2 mile long **Mary Creek** drains a 4.5 square mile area (McCurdy 1973:84). It has a steep gradient and drains a mountain slope. Other physical characteristics of this stream are undetermined.

Lake Creek is 5.5 miles long and drains a 10.2 square mile area (McCurdy 1973:86). It has a mountain source, but drains approximately 2 square miles of low swampy ground. A large lake, or lagoon, is situated immediately above Lake Creek's mouth.

The 11.9 mile long **Marie Creek** drains 28.3 square miles (McCurdy 1973:90). The stream heads in a steep-walled narrow valley of the Kejulik Mountains. It also drains several square miles of lowlands. The University of Washington's Fisheries Research Institute stream survey in 1960 remarked that it was a "*bog creek, little spawning gravel*" (McCurdy 1973:92). Other physical characteristics of this stream are undetermined.

The lower half of 14-mile long **Emma Creek** drains an estimated 7 square mile area (McCurdy 1973:104), and the upper reaches drain the gentle sloping area to the east. This stream was reported to be bifurcated in 1940, and USGS topographic maps depict it as discharging into Becharof Lake north and south of Severson Peninsula. It is undetermined whether or not Emma Creek continues to maintain its bifurcated character. The stream is described in the following 1940 stream survey.

> *"This moderate size, swampy stream has two mouths, one on the south side and one on the north side of the Severson Peninsula, which come together about two miles upstream. The lower miles are very deep, meandering, and slow with a sandy bottom."* (McCurdy 1973:104).

Peulik No. 2 is 7.3 miles long and drains 6.7 square miles. A stream flow of 29 cfs was recorded on August 15, 1956 (McCurdy 1973:227). A 1964 ADF&G stream surveyor

referred to the stream as "*brushy.*" Other physical characteristics of Peulik No. 2 are undetermined.

Abalama Creek is 5.8 miles long and drains 5.5 square miles. A stream flow of 24 cfs was recorded on August 19, 1956 (McCurdy 1973). Bishop (1974:7) reported a discharge of 4.5 cfs and a water temperature of 5.6°C, one mile above the stream's mouth on September 30, 1974, at 1645 hours.

Rusty Creek is 8 miles long and drains 18.3 square miles. In 1974 ADF&G hired a water resource consulting firm to assess a few Becharof Lake tributaries, including Rusty Creek (Bishop 1974). Though the firm's hydrologist omitted stream dimensions in his report, all his observations are included here since scarce hydrologic information exists regarding Becharof Lake tributaries, and, because Rusty Creek has unique thermal characteristics and potential salmon rearing significance.

Bishop made streamflow measurements with a "*velocity headrod.*" He observed a March streamflow of 19.5 cfs and a September streamflow of 55 cfs on Rusty Creek. Stream dimensions and other cross-sectional measurements are not included in this interim report. Further observations made in September and October 1974, follow.

> "*Gradient and pattern: first ½ mile of stream is low gradient, meandering strongly in a ponded flat area confined behind the lake's beachline. Old lakeshore lines are evident ½ mile back from the beach. Upstream from the ponded area the stream picks up gradient to around ½ percent. The west, lake-fed fork branching off about 1 mile up flows at lower gradient and is partially regulated by beaver dams. The east fork was not investigated, but rises gradually onto Mt. Peulik.*
>
> "*Streambed, bedload: volcanic gravel, cobbles, and occasionally boulders make up the streambed. Streambars indicate some bedload but it is not large. A rich flora and fauna are apparent on and in the streambottom.*
>
> "*Bedrock: Knobs amongst the lowland portions of this drainage are volcanic.*
>
> "*Suspended sediment: stream has an amber color and also carries some colloidal sediment. This sediment load, and probably the organic coloring were traced to the west (lake-fed) fork. The beaver activity also contributes to the sediment load.*

"Flow: on 9/29/74 Rusty Creek was flowing about 55 cfs, which, using the ADF&G drainage area of 18.3 sq. mi., indicates an area runoff of 2.84 cfs/sq.mi. This value is much lower than for all but one of the other streams where a reasonable drainage area figure is available. (See Table 1) [Not included]. *I estimated that on 10/1/74 the west fork of Rusty Creek was providing 40-50% of the streams flow and the east fork was providing 50-60%.*

"It is quite possible that Rusty Creek near Becharof Lake is influent into the adjoining sediments when the lake and ground water levels are low.

"Observed temperatures: Rusty Cr., near mouth, 9/29/74 at 1740 -- 8.2°C, air temperature -- 10.0°C, 10/1/74 AM west fork -- 3.9°C, east fork -- "3.0°C, small springhole, 1/4 mile up from lake, 9/29/74 9.0°C, (contains heavy aquatic growth - looks like bacterial action) tributary stream entering lower Rusty Creek from the west .10/1/74 AM 5.0°C". (Bishop 1974:2-3).

d. Pre-statehood use

The long prehistoric occupation of the Alaska Peninsula is detailed in depth by Don Dumond (1987). He identifies six successive phases, or cultural traditions, of human occupation in the region over the past nine millennia. The oldest dated cultural material for the entire peninsula, about 8,000 years BP, was located at the Ugashik Narrows, only 20 miles south of **Becharof Lake**. Dumond briefly examined five sites along Becharof Lake's southwest shore in 1986 for evidence of prehistoric human occupation. He found the sites along wind-eroded lakeshore bluffs that suggested the presence of prehistoric seasonal hunting or fishing camps. These four lakeshore sites were located approximately between LM 148 and LM 160. He concluded,

> "... *The camps at the small streams, on the other hand, are more likely to have represented seasonal use of the lakeshore, for either hunting or, late in the salmon migration, the taking of spawning salmon in the actual spawning streams.*
>
> *"It is rather striking, on the other hand, that none of the sites discovered suggests the presence of people of the later, slate-grinding tradition that became dominant after about AD 1000. That is, the pattern represented at these lakeside sites seems to have belonged to people other than the most immediate ancestors of the Eskimo-speaking people who are known historically."* (Dumond 1987:141).

General patterns and histories of **Becharof Lake** area subsistence activities are addressed by Dumond (1985), Behnke (1978), and Morris (1987). [See this report's General Background chapter and this chapter's Egegik River section for further Becharof Lake subsistence information].

Bocharov's 1791 map of the Alaska Peninsula (Figure 10) clearly delineates **Becharof Lake** and his route across it via two baidara. The map's partially missing key contains an incomplete written reference to a lake, undoubtedly Becharof Lake. That translated inscription says, "... *Lake, from which the*[y] *portaged by baidara and all goods to the south side of the Aliaksa Peninsula.*" (pers.com. Bland 1995).

During May 1818, Petr Korsakovskiy and his party camped 4 days on the shores of **Becharof Lake** at the mouth of the Kejulik River (VanStone 1988:24-25). They continued their exploratory journey across the peninsula by continuing their bidarka travel westward, crossing the lake in less than a day and establishing their next camp 5 miles below the

Egegik River rapids. Korsakovskiy's only comment regarding the crossing merely states, *"We proceeded 35 miles westward along the lake. We approached the rapids and the mouth of the Igysk [Egegik] River."* (VanStone 1988:25-26).

In an 1898 reconnaissance of southwest Alaska for the Department of the Interior, Josiah Spurr (1900:100) commented on routes across the Alaska Peninsula. He cited three important routes utilized during the Russian era, describing the route via **Becharof Lake** as "*better known and easier in summer.*" Spurr planned to cross the peninsula via Becharof Lake but traveled the Naknek to Katmai route instead. Though he never traveled the Becharof Lake route, his comments show the relative importance of this route for summer travel at the turn of the century. He wrote,

> *"The original plan was to cross the peninsula by way of Becharof Lake, from which there is a short, low portage to the southeastern side of the peninsula, but the natives* [eight Nushagak men with four, three-hatch bidarkas] *were afraid, on account of the lateness of the season* [early October], *of being caught in the ice of the lakes and rivers of this route before they could return, and so proposed to go by way of Naknek River and Lake."*
> (Spurr 1900:59).

The final leg of Naturalist W.H. Osgood's 3-month biological survey of the upper Alaska Peninsula in 1902 included a 3-day traverse of **Becharof Lake** by "*canoe.*" He did not include a detailed description of his watercraft(s), merely used the term "*canoe.*" His two traveling companions were his assistant Alfred Maddren and his camphand Walter Fleming. Excerpts of his journal describing Becharof Lake follow.

> *"The country around the lower end of the lake is very desolate. A stretch nearly a mile in width immediately bordering the shore consists of sandy, wind-swept dunes almost devoid of vegetation except for thin irregular mats here and there on protected slopes. Farther back plant growth is more continuous, but very depauperate. The chief woody plants are Empetrum and several small species of Salix.*
>
> *"On October 4, during a temporary lull of the wind, the canoe was lined up the rapids and the journey continued around the end of the lake to the south shore. After a long day of rowing, camp was made in a little bay near the northeast base of the volcano called by the natives Smoky Mountain. The lake is bordered by an almost continuous gravel beach, back of which are bluff-like hills clothed with tundra vegetation.... Continuing on the second*

> *day around the base of the mountain, we passed several stretches of high bluffs and rounded two or three rocky points and made camp on a narrow peninsula on the west side of the mouth of the long southern arm of the lake.... The course up Becharof Lake was along the south shore, and at no time was it more than half a mile from the beach. Along this route the water is seldom more than 15 feet in depth. It is very clear and cold, and the bowlder-strewn bottom is easily visible all the way."* (Osgood 1904:19-20).

Osgood's assistant, geologist A.G. Maddren, remained in the vicinity of **Becharof Lake** for the winter of 1902-03 and compiled a geologic map of the area that shows several portage routes (Figure 17).

In 1904 USGS geologist George Martin (1905b), assessing the "*Cold Bay Petroleum Field*" situated between Becharof Lake and the Shelikof Strait coast, commented on Alaska Peninsula's hydrography and use of waterways. Referring to Bristol Bay drainages, Martin wrote,

> *"Lake Becharof, the head of which is situated about 15 miles from the landing at Cold Bay* [Puale Bay], *is one of the largest. The presence of such lakes and rivers throughout almost the entire area of the peninsula makes navigation in canoes or other small boats very easy, and almost all travel is accomplished this way."* (Martin 1905b:50).

T.V. Calkins, superintendent for the Southwest District of the Alaska School, Medical, and Reindeer Services, briefly recorded his March 1925 Alaska Peninsula dogsled travels. The following excerpt from a monthly report discusses the **Becharof Lake** area and shows his late winter route of travel across the peninsula.

> *"1. Places visited: Kaskanak, Lievelok, Koggiung, Naknek, Egegik, Becharoff Fish Camp, Kanatak, Seward, Anchorage, and Seattle....*
>
> *"2. Itinerary, giving dates, manner of travel, and distances: All travel as far as Kanatak by dog team.... Left Egegik on the 11th at 9:00am, arrived Gas Rock Camp at 4:50pm, 44 miles. Mar 12, left camp at 7:00am and arrived Kanatak at 3:00 PM. 33 miles....*
>
> *"Attitude of people throughout the district is very good and the natives in most places are quite receptive. Need schools at Ugashik, Egegik and*

Figure 17. Section of *Geologic Map of Alaska Peninsula*, 1903.
Source: Maddren 1903

> *Clarkes Lake. Should be a nurse at Naknek or Egegik. Great need of thoro organization."* (Calkins 1925).

Virginia Abalama, spouse of Nick Abalama (pers.com. 1995), recalled long bidarka travels around **Becharof Lake** as a young child during the 1930s. She recounted travels in her father's one-hatch and two-hatch skin bidarkas, visiting friends and relatives at various fishing and hunting sites. She remembered her father taking only tea, salt, and sugar for supplies, obtaining food from the land as needed while en route their destinations. Virginia also recalled riding for extended periods of time in the storage area of the one-hatch bidarka while her father paddled. She recounted one trip as a seven or eight year old girl when her father took her from Egegik to Fish Village, then on to Kanatak.

As previously mentioned, Nick Abalama (pers.com. 1995) recalled skin-covered bidarkas being used until the 1930's. Canvas covered bidarkas and wood and canvas "*white-man canoes*" began to appear in the area during the 1930s. He also recalled sail-rigged, Bristol Bay double-enders being used in the 1920s and 1930s. His father owned one, and Nick recalled occasionally traveling across **Becharof Lake** by sailboat from Gas Rocks to Bear Creek. He also remembered his travel via double-ender to Fish Village on Island Arm. According to Nick, his uncle owned and operated the first motorized double-ender on Becharof Lake about 1928. His uncle's boat was powered by a 12- horsepower Redwing engine. Nick laughingly recounted one childhood event of riding in his uncle's boat that carried two sailboats alongside, taking them from the Egegik River outlet to Gas Rocks. In an oral interview, Nick also related his acquisition of a "*speedboat*" that he ordered in the late 1940s.

> "Warren: *You said your speedboat, what kind of boat was that?*
> "Nick: *Kinda 16 footer. I ordered that from Outside, 1948, '49.*
> "Warren: *What kind of an engine?*
> "Nick: *Nine horse. Them days, used to be fast. It was powerful, it was fast. Now, they don't use 'em no more, too slow. They use a 75, 100, 150. I used to pull a sailboat, push the sailboat up with a 9 horse kicker. Skiff behind."* (pers.com. Abalama 1995).

In 1927, the U.S. Alaska Road Commission (1927:67-68) brushed out and staked a permanent winter trail (Figures 22 and 23) along the south side of **Becharof Lake**. The trail, designated as Route 92-K, connected Egegik to Kanatak. The same year, a $250, 10'x12' frame shelter cabin was constructed along the trail at "*Lower End Becharof Lake,*" 21 miles from Egegik (Figure 8). The following year, another shelter cabin of the same dimensions and cost was constructed along the trail "*on Becharof Lake, one mile east of*

Gas Rock" (U.S. Alaska Road Commission 1927:67). Dogteams hauled U.S. mail over the winter trail connecting Kanatak and Egegik after 1922 and prior to scheduled airmail service between Anchorage and Bristol Bay. The reported frequency of mail transport varied from two or three times a winter to monthly. Individuals who hauled winter mail include Tom Gardener and Martin Olsen (pers.com Hammond 1995), "Glass-Eye" Billy Barton (Moore 1995:95), and Jack Lee (Campbell 1995).

As a small child, Anchorage resident Robert Dodd (pers.com. 1995) briefly resided in Kanatak and Egegik during the early 1930s. He has a faint recollection of traveling across **Becharof Lake** in a small boat, perhaps a 16-footer, powered by a small motor.

A beached and rotting Bristol Bay double-ender near the **Becharof Lake** shoreline (Figure 18), photographed by Becharof NWR Manager Ronald Hood, supports the many accounts of these watercrafts' early use on the lake (Alaska Geographic Society 1989:41).

C.L. Sturdevant, District Engineer for the Corps of Engineers in the early 1930s, surveyed the Egegik River in 1931 (Hurley 1932). He wrote a report the following year suggesting improvements for the river. Some **Becharof Lake**-specific comments from that report follow.

> *"The lake* [Becharof Lake] *is navigable its entire length of 43 miles and, together with Egegik River and a wagon road extending from the lake to the village of Kanatak on Portage Bay, forms a through trade route between the Pacific Ocean and the Bering Sea....*
>
> *"The fishing industry in the vicinity of Egegik employs between 400 and 600 people. All skilled labor and a small percentage of unskilled labor is imported on cannery steamers. The additional labor required is secured locally from Egegik, Kanatak, and other points in the vicinity, and represents about 40 percent of the total employment. About one half of the total native labor comes from the east coast* [of the Alaska Peninsula]. *The Indian laborers generally move their families with them, and as a result about 100 local people cross the peninsula each spring and return in early fall. Transportation over the intervening section between the head of navigation on Becharof Lake* [near the mouth of Ruth River] *and Portage Bay on the east coast has been provided for by the Alaska Road Commission....*

Figure 18. Rotting double-ender sailboat on Becharof Lake shore.
Photograph by Ronald Hood, USFWS.
Source: Campbell 1995.

> *"It is claimed that travel across the Alaska Peninsula by means of Egegik River and Becharof Lake has shown a steady increase over the past few years and that it has become an established route in spite of the dangers encountered in Egegik Rapids. The only definite claim that commerce would be increased comes from the operators of the salmon-salting station at Egegik, who request that the improvement be made to enable them to export that portion of their product packed after the close of navigation in Bristol Bay....*
>
> *"No figures are available on the tonnage of freight which is transported over the lake and river route by way of the Egegik River, but it is believed that fully 90 percent of the total consists of household effects and winter supplies of the Indian families as they transport all their possessions with them on each move. As this route is sometimes open before the first call of the steamer into Bristol Bay ports in the spring, and is generally open for 30 to 45 days after the close of navigation in Bristol Bay in the fall, there is a small amount of freight handled from Kanatak to Egegik during the spring and fall months. Also, there are occasional small rush shipments during the summer to supply an immediate local demand. The passenger traffic of Indian families and their household goods is estimated at about 200 trips annually. In addition, there is considerable travel over this route by nonresidents, amounting to about 200 trips per year. This is accounted for by the fact that the trip across the peninsula can be accomplished in 1 day at a cost of $15 whereas a trip by steamer over 880 miles of open water around the peninsula requires 7 or 8 days, costs $65, and is the only usually traveled alternative route. This steamer makes only one round trip per month."* (Hurley 1932:17-19).

In one illustration of unique winter lake travel, Nick Abalama (pers.com. 1995) recalled a time when ice conditions allowed Moses Tianoakak (spelling uncertain) to ice skate from the Kejulik River, across **Becharof Lake**, to Ugashik Lake. Moses recounted his late 1930s ice skating story to Nick Abalama and his brother in 1940. Nida Nelson (pers.com. 1996) also recalled ice-skating with her father in Island Arm.

Bureau of Fisheries personnel traveled across and around **Becharof Lake** many times in the early 1920s in an effort to destroy Dolly Varden and enhance salmon populations. Excerpts from a 1922 report show some of their activities on the lake. They concentrated "*trout operations*" on the lakeshore and tributaries of Island Arm, but some activity also occurred on "*Big Becharof Lake*" and on the Egegik River. In addition to the quotation

that follows, other excerpts are cited in the Egegik River and Island Arm sections of this chapter.

> *"Three small launches of the Columbia River trolling-boat type, purchased by the packers for the bureau's operations, were used for trout work and stream patrol. As some repairs were necessary of two of the launches it was late before they could be placed in commission, but they were all especially useful in patrol work....*
>
> *"Various difficulties and accidents, such as Evinrude trouble, storms, in which one of the loaded dories capsized, and sickness of one of the men, caused some delay. Camp was eventually established at the outlet of the lake* [Becharof Lake] *on June 1. Fishing with seines and set nets at this point produced fair returns. Great schools of young salmon were noted migrating on June 6, and large numbers of terns were in evidence working on the young salmon and moving downstream.*
>
> *"All islands in the vicinity* [perhaps islands west of Gas Rocks] *were visited and considerable numbers of tern eggs destroyed. As soon as it became apparent that possibilities at this point were limited camp was moved to the upper end of the lake at Little Becharof* [Island Arm near mouth of Ruth River] *on June 12, where good results were obtained throughout the remainder of the season....*
>
> *"The north shore of the main lake was investigated, but conditions were not found to be conducive to extensive spawning. Some salmon were noted near the mouth of several streams, but in much smaller numbers than in the Little Becharof section. All trout were given to local natives, who dried them for food."* (Bower 1923:26-28).

In 1956, the Service investigated salmon spawning areas around **Becharof Lake** (USFWS 1956). Guided by Pete Boskoffsky, Fishery Aides Richard Rowland, John Biscoe, John Black, and Allan Blackett observed salmon in tributaries between Big Narrows and Gas Rocks between August 10 and August 20. They used a "*Bristol Bay gill net boat*" for transportation to survey streams and for overnight quarters (USFWS 1956:3,10).

e. Post-statehood use

In the summer of 1959, complaints from Alaska Packers Association and others prompted the Service and ADF&G to intervene in overland freighting practices by Mobil Oil Company (Baltzo 1959; Kaydas 1959; Paddock 1960; Paddock 1968). The oil company had constructed a road from a drill site near the head of Island Arm's Bear Creek, across the Little Narrows, along Becharof Lake's south shore to a point west of Gas Rocks, to another drill site at Dago Lake. The degradation of Bear Creek, Featherly Creek, and other salmon rearing streams by heavy equipment made barging an alternative to mitigate the untoward effects of road haul across Becharof Lake tributaries. A tug with barge transported oil drilling equipment and related materials across **Becharof Lake** for the oil company. Details regarding the tug and barge vessels are undetermined, but it appears they were fueled at a site 150 yards north of the mouth of Bear Creek, Island Arm (Noerenberg 1959:3). (See Figure 24). The terminuses for the tug and barge route were the mouth of Bear Creek and an undetermined point on Becharof Lake several miles west of Gas Rocks.

> *"...The equipment for this work* [oil drilling] *was transported from Humble Oil's Bear Creek site and from Jute Bay on the eastern shore of the Alaska Peninsula. Most of this transportation has been accomplished by the use of (1) crawler-type tractors pulling various types of trailers, or (2) large trucks. During a portion of the year, however, some freighting was done by tug and barge between the mouth of Bear Creek and a terminus on the southwest shore of Lake Becharof."* (Paddock 1960a:1).

State and Federal correspondence refers to the overland oil route and several **Becharof Lake** and Island Arm tributaries. The following correspondence excerpt generally describes that route. Further oil road information can be found in the Post-statehood Use of this chapter's Island Arm section.

> *"At that time* [1959] *they* [Mobil Oil Company] *made an agreement with Humble for the use of their Jute Bay terminal and road to Humble's hole on the top of the pass between Jute Creek and Bear Creek. They extended this road down the "Narrows", and thence more or less along the lakeshore to a point about mid-way between Gas Rocks and the southwest corner of the lake, at which point they took off across the tundra."* (Paddock 1968).

Charlie Kelly and Eddie Clark (1995) said a 32-foot boat with a large barge, specifically built for the construction of a Bible Camp, transported building materials across **Becharof Lake** in the late 1960s and early 1970s.

The *R/V Iliaska*, the 32-foot ADF&G boat described in the previous Egegik River section, spent two seasons of scientific salmon research operations on **Becharof Lake**. The research team, which worked during the 1974-76 seasons, also used two Boston Whaler skiffs to supplement the work of the larger vessel (pers.com. Rowell 1995). During September 1974, the *R/V Iliaska* made zig-zag, shore-to-shore transects across the lake while doing hydroacoustic fish stock surveys (Lemberg and Mathisen 1975:1-2).

Service personnel have used various boats on **Becharof Lake** since 1959. Examples of recent Service watercraft include a 22-foot Woolridge jet boat, a 24-foot Koffler with a 225 horsepower outboard prop and a 50 horsepower kicker, and a 12-foot Redshank Avon (pers.com. Adams 1995).

In a study of resource use and subsistence, Steven Behnke (1978:141-142) shows **Becharof Lake** as a zone of wildlife harvest by Alaska Peninsula residents and others. He characterized many local families as having boats of various kinds, *"... ranging from inboard powered 32' fishing boats, to outboard powered skiffs and flat-bottomed river boats."* He wrote that all boat types were used for personal-use fish and wildlife harvests. See Figure 19 for one example of subsistence boat use on Becharof Lake.

Lifelong Egegik resident Pete Olsen (pers.com. 1995) began frequenting **Becharof Lake** as a young child in the 1970s. He has traveled the Egegik River/Becharof Lake watershed extensively for hunting and fishing purposes, and likely travels this area more frequently than any other current Egegik resident. He has two skiffs; a 22-footer with a 70 horsepower Johnson outboard, and a smaller 20-footer with a 65 horsepower Evinrude. Mr. Olsen estimated making 20 trips from Egegik to Becharof Lake from during 1995. Also, riding on near shore lake ice and the shoreline, he circumnavigated the lake's entire perimeter on a four-wheeler in one winter's day in 1990.

Naknek resident Dan O'Hara (pers.com. 1995) commented on subsistence versus sport hunting and fishing on **Becharof Lake**. He stated that **Bear Creek** has experienced increasingly heavy sport fishing pressure, and feared an unhealthy impact on fish abundance. He described **Bear Creek** as an especially important stream for subsistence use, utilized primarily by Egegik residents for the taking of "*red fish*" and Dolly Varden. Subsistence users tie their boats off on the bank of the "*beautiful little harbor*" that can accommodate 3 or 4 skiffs.

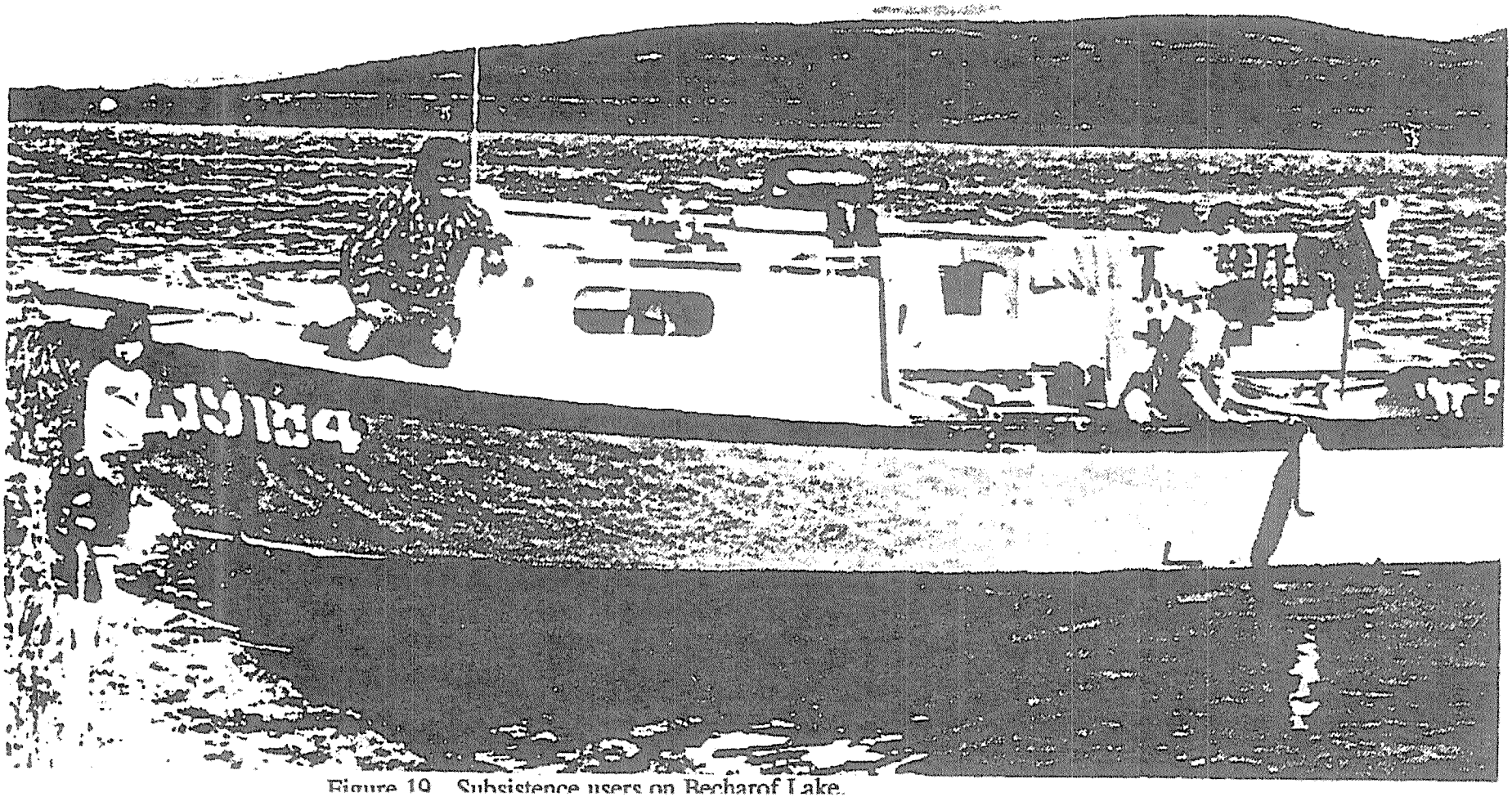


Figure 10 Subsistence users on Becharof Lake.

O'Hara further noted that caribou commonly migrate along the **Severson Peninsula**, crossing between the tip of the peninsula and the lakeshore to the south. Egegik residents anticipate the caribou arrival and camp on the peninsula, waiting to intercept the animals.

f. Navigability status

The 1994 edition of the *United States Coast Pilot 9, Pacific and Arctic Coasts Alaska...* (U.S. NOAA 1994:276) states, *"Egegik River is navigable to small boats for its entire length into and across Becharof Lake."*

A "*Fact Sheet*" of Alaska Navigable Waters by the U.S. Army Corps of Engineers, Alaska District (1994) lists Becharof Lake as one of 36 Alaskan waterways with a "*Navigability Determination.*" It lists Becharof Lake's navigable length as 43.0 miles, presumably from the outlet at Egegik River to the southern extreme of Island Arm. Attempts to ascertain the date and criteria of the navigability determination by the Corps of Engineers for Becharof Lake, like the Egegik River, have been unsuccessful. According to Steve Penaluna (pers.com. 1996), a Corps of Engineers employee, there is no record of the Corps having issued permits for "*Section 10*" activities for Becharof Lake, in contrast to the numerous permits issued for Egegik River since 1948. He also indicated any records concerning the navigability of Becharof Lake may have been misplaced, microfiched, or archived, and are not now "*readily accessible.*"

The BLM made a 1984 navigability determination for conveyance purposes that included a portion of **Becharof Lake** (Arndorfer 1984). The determination declared Becharof Lake navigable, but it is unclear whether the BLM established navigability for all or parts of Becharof Lake. Becharof Lake-specific interviews which support that navigability determination follow. In addition, a portion of this determination's conclusion can be found in the Island Arm report section that follows this Becharof Lake section.

> *"Interviewed by Dot Tideman on December 7, 1983, Warren Seybert (243-7701), pilot and owner of Peninsula Airways, stated that he had flown over the report area extensively, and that the local Natives of Egegik have traditionally used skiffs and fishing boats on Becharof Lake to travel to trappers' cabins around the lake. He added that the Natives still use Becharof Lake today for access to trapping, hunting, and salmon fishing areas.*
>
> *"Aleck Griechen (243-7877), a resident of Pilot Point for 60 years, a board member of the Fish and Game Advisory Committee for the Lower Bristol Bay, related to Dot Tideman on December 8, 1983 that trappers, hunters, and fishermen ascended Egegik River, crossed Becharof Lake to Bellim Bay, and then ascended Ruth River to Ruth Lake. Thirty-two foot boats were the largest used by the trappers and sport fishermen on Becharof Lake before*

1959. Billy Nekeferofs, an old trapper, had a trapping cabin on the northeast end of Becharof Lake; local trappers have reported him as missing. Today, according to Mr. Griechen, the State Department of Fish and Game no longer allows commercial fishing on the lake or beyond the lagoon on Egegik River. Although the oil companies did not use Becharof Lake for transporting equipment in the 1920's, one company used a barge on Becharof Lake in the late 1950's and 1960's for transporting heavy equipment and supplies.

"In a telephone conversation with Dot Tideman on December 6, 1983 Jerry Yeiter (246-4277), general manager for Paug-vik Inc., a registered Alaska hunting and fishing guide and pilot, owner of Mount Pewlik Lodge on Lower Ugashik Lake, and a former BLM trespass officer, stated that he has traveled the report area extensively. He said the he has seen boats on Becharof Lake. In the fall of 1983 he saw a good-sized wooden fishing boat, about 28 feet in length, on the lake.

"Mike Joseph (246-3430), a commercial fisherman from Egegik, informed Dot Tideman on December 7, 1983, that Becharof Lake is now off limits to commercial fishing; however, it is used for sport fishing. Years ago the lake was used in the spring and fall by Native trappers as a route of boat travel to cabins on the lake. In the winter they used dog teams. The boats and skiffs were 16 to 18 feet in length.

"On behalf of Tideman, Janice Ball, a resident of Pilot Point and the telephone operator for the village of Pilot Point (797-8001), interviewed and translated for an elder of the village, Nefotie Naketa. According to Ms. Ball, Mr. Neketa said that 28 foot double-ended, wooden boats and skiffs were used on Becharof Lake to transport people to what he believed to be Ruth Lake in the Kanatak Pass area. These people trapped as well as fished for trout, silvers and reds. Ms. Ball added that these types of boats are still in use in the Pilot Point area.

"Dick Russell (246-3340), the Egegik/Ugashik Area Division Biologist for State Fish and Game at King Salmon, noted in a telephone conversation with Dot Tideman on December 7, 1983, that Becharof Lake is the second largest lake in Alaska. He said that Fish and Game took a 32-foot Bristol Bay gillnetter up the Egegik River and onto the lake for research purposes. Trappers used boats on the lake to access their cabins. A famous

trapper named Billy Nekeferofs, now deceased had a cabin on the east end of the lake. Billy also claimed a trapping cabin on Featherly Creek, on the southeast end of Becharof Lake. Former Governor Jay Hammond also has a cabin where Kejulik River enters Becharof Lake. Mr. Russell mentioned numerous trappers' cabins and owners who claimed these cabins, some of which are at the mouth of Ruth River, and the mouth of Cleo Creek (Jake Gregory's, deceased, a former member of the Board of Fisheries). The State Fish and Game built a cabin near Cleo Creek. A Bible camp is located north of Severson Peninsula, and a cabin is west of Gas Rock Creek."

"Interviewed by Tideman on December 7, 1983, Randy Wilk, Biological Technician for the U.S. Fish and Wildlife (246-3339), said that the villagers from Egegik use Becharof Lake in the summer and fall for recreation (fishing and photographing). Commercial guides use the lake for sport fishing and hunting.

"John Merrick, Realty Specialist for BLM (271-3573), said in an interview with Tideman on December 6, 1983, that he has flown over the area several times. He was familiar with the old portage road from Portage Bay to Becharof Lake, but described it as now overgrown with alders and little used. The town of Kanatak was abandoned about 1975. He did not know of anyone living there from 1965 to 1975." (Arndorfer 1984:3-5).

No navigability reports or determinations were located for any tributaries of Becharof Lake.

The State of Alaska's *Bristol Bay Easement Atlas* (Alaska Dept. of Natural Resources, Div. of Land and Water Management 1990:170,231) includes two maps of westernmost **Becharof Lake**. The map showing southwestern Becharof Lake indicates the lake is navigable, as administratively determined by the State of Alaska. The map showing northwest Becharof Lake indicates the lake is navigable, as determined by the Federal Government. The remainder of Becharof Lake is omitted from the easement atlas.

Island Arm and its Tributaries

(Includes Ruth Lake and Ruth River)

B. Egegik River and Becharof Lake Watershed Unit

3. Island Arm and its tributaries

a. Summary

Island Arm is a 30 square mile embayment of southeastern Becharof Lake. Numerous small islands occupy Island Arm and several relatively large and salmon rich streams flow into this water body. Notable tributaries include Featherly Creek, Salmon Creek, Bear Creek, and Becharof Creek. Ruth River, draining Ruth Lake, discharges into the Arm near its southernmost shore. Like Becharof Lake proper, Island Arm is subject to high winds and resultant high waves, though wave height and the impact on travel is less severe. Some areas of Island Arm are reported to have shallow waters.

Travel on Island Arm before and after statehood is well documented and is very similar to the activity on Becharof Lake and the Egegik River. The types of watercraft, purposes of boat travel, and the patterns of boat use reflect that of Becharof Lake. Additionally, Island Arm is the easternmost water segment of the historic trans-peninsular route between Kanatak and Egegik. The area contains significant natural resources that include remarkably rich salmon spawning and rearing grounds, an abundance of furbearers and large mammals, and indications of oil and gas deposits.

Documentation of boat use on some Island Arm tributaries exists. Most evidence of stream travel occurred after statehood. Travel usually was accomplished by small motorized boats or jetboats that ascended the lower reaches of the streams from their mouths. In some instances, boats were pushed by hand upstream by individuals wading in streams. Instances of boat use occurred on Ruth River, Featherly Creek, Becharof Creek, and Salmon Creek.

b. Names and locations

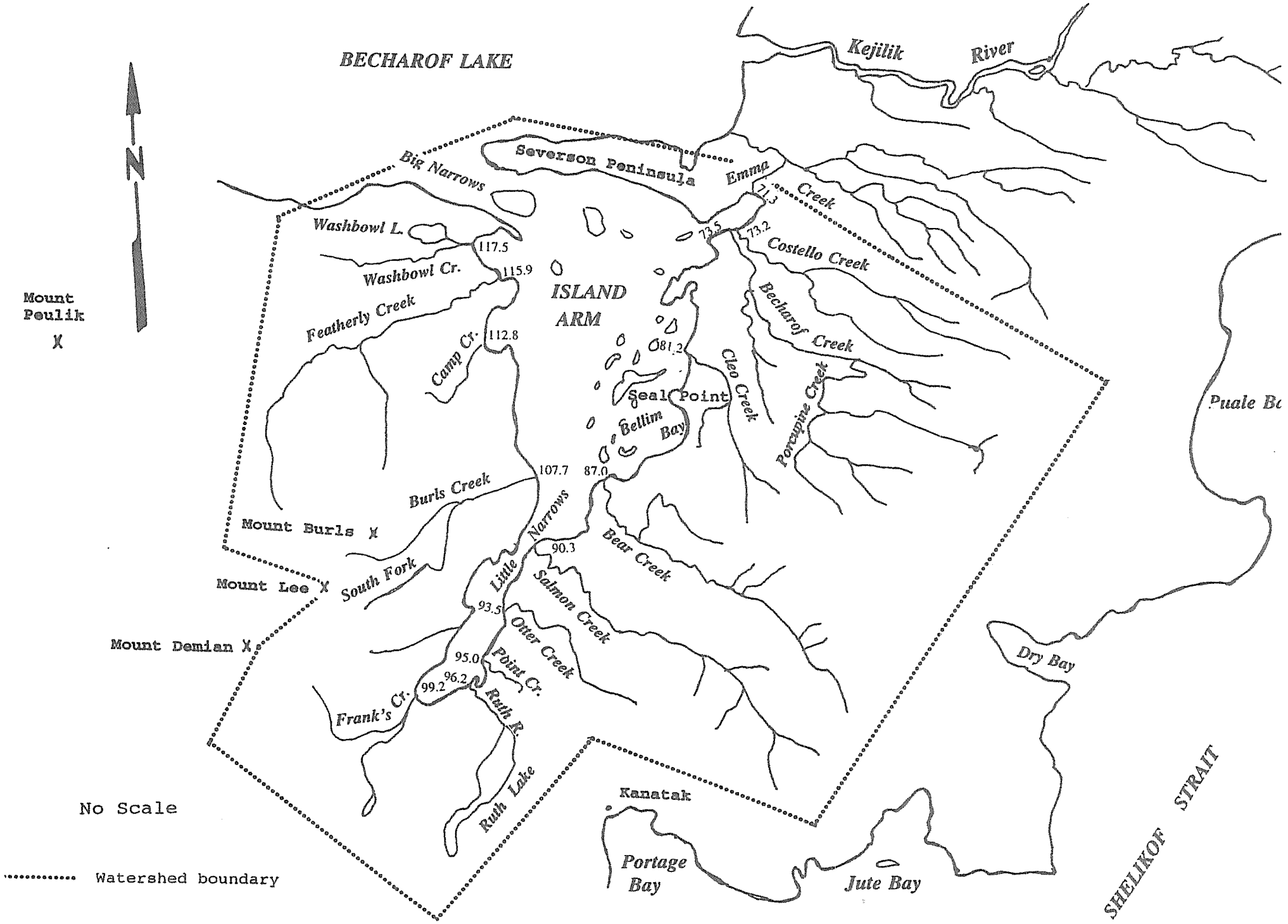
The **Island Arm** section of this report addresses the area south of the Severson Peninsula. (See Figure 20). As in the previous Becharof Lake section, specific mention of several small, very low flow tributaries has been omitted because of their diminutive size. Those streams can be identified and located easily by referencing USGS topographic maps and maps by McCurdy (1973:6).

Island Arm is a common name for the large body of water that comprises the southeast region of Becharof Lake. This water body also has been called "*Island Lake*" (Adams et al. 1962; McCurdy 1973:9,10) and "*Little Becharof Lake*" (Wingard n.d.). A Bureau of Fisheries agent surveyed salmon spawning grounds in 1930 and differentiated between "*Island Lake*" [northern body of Island Arm] and "*Upper Becharof Lake*" [Island Arm south of the Little Narrows] (Bower 1931:21).

Separated from the main lake body by the **Severson Peninsula**, a 1 mile wide narrows connects the 30 square mile Island Arm embayment with Becharof Lake proper. (See Figure 20). The passage between the tip of the Severson Peninsula and the opposite lake shore is commonly known as the **Big Narrows**. Nick Abalama (1990) differentiates between the two passages around the island situated in this narrows. He refers to the northern channel as "*Quuqerpak*" (the '*big narrows*', or the '*big narrow one*') and to the southern channel as "*Quuqayagaq*" (the '*little narrows', or* the '*little narrow one*').

The estimated length of shoreline for Island Arm is 65 miles. The eastern half of Island Arm contains numerous small islands, with many islands lying off an eastern shoreline bight named **Bellim Bay**. The southern portion of Island Arm, referred to in earlier times as "*Fish Lake*" (McCurdy 1973:10,272), is a five mile long, nearly one mile wide water body connected to the larger body of Island Arm by the **Little Narrows** in Sec. 21, T. 29 S., R. 42 W., S.M. **Ruth Lake** empties into this southernmost region of Island Arm via the short **Ruth River**.

Bellim Bay is a bight on the eastern shore of Island Arm. Orth (1971) described it as 2.5 miles across and lying south of **Seal Point**, a point one mile southwest of the mouth of Cleo Creek. The southern extent of Bellim Bay is undefined. These place-names were reported in 1902 by J.L. MacPherson, a mineral surveyor. The term Bellim Bay is found rarely in printed materials, and no one interviewed for this report ever used the term. This apparent scarcity of use suggests the term Bellim Bay is not in common use and, perhaps, never was used extensively. The place name is reported here because it is shown on USGS


BECHAROF LAKE
Kejilik River
Severson Peninsula
Big Narrows
Emma Creek
Washbowl L.
Washbowl Cr.
Featherly Creek
Camp Cr.
ISLAND ARM
Costello Creek
Becharof Creek
Cleo Creek
Porcupine Creek
Seal Point
Bellim Bay
Puale Bay
Burls Creek
Mount Burls
Mount Lee
South Fork
Little Narrows
Bear Creek
Salmon Creek
Otter Creek
Point Cr.
Ruth R.
Frank's Cr.
Ruth Lake
Mount Peulik
Mount Demian
Dry Bay
Kanatak
Portage Bay
Jute Bay
SHELIKOF STRAIT
117.5
115.9
112.8
81.2
107.7
87.0
90.3
93.5
95.0
96.2
99.2
73.5
73.2
71.3
N
No Scale
Watershed boundary

topographic maps. The term Seal Point also is found on USGS topographic maps and the use of this place name continues.

The streams that follow below are ordered by location that begins at the Severson Peninsula with Emma Creek (LM 71.3) and proceeds clockwise around Island Arm. The ADF&G anadromous fish stream catalog numbers follow the name of each stream.

Emma Creek, as described in the previous Becharof Lake section, is shown as a bifurcated stream with two mouths on the 1951 (minor revisions 1988) USGS topographic map *Karluk (D-6) Quadrangle* (scale 1:63,360). The map and McCurdy's (1973:104) earlier cited comment indicate one mouth is north and one mouth is south of the base of the Severson Peninsula.

Costello Creek, 322-10-10080-0020-2259, discharges into Island Arm at LM 73.2, Sec. 2, T. 28 S., R. 41 W., S.M. The stream heads in Sec. 26, T. 28 S., R. 40 W., S.M., at the 1,000 foot elevation of a mountain valley. Costello Creek also has been known as *"Machinery Creek," "Deep Creek,"* and *"Kemosaby Creek"* (McCurdy 1973:108).

Becharof Creek, 322-10-10080-0020-2261, flows into Island Arm at LM 73.5, Sec. 2, T. 28 S., R. 41 W., S.M. The stream enters Island Arm at a small unnamed bay at the base of the Severson Peninsula. Several named tributaries that head in mountain valleys feed Becharof Creek. This stream was named in 1903 by J.L. McPherson of Iliamna, and noted in a 1904 report by G.C. Martin (Orth 1971:120).

> **Preston Creek**, 322-10-10080-0020-2261-3004, discharges into Becharof Creek three miles upstream from the Becharof Creek mouth at Island Arm (Sec. 14, T. 28 S., R. 41 W., S.M.).
>
> **North Fork**, 322-10-10080-0020-2261-3007, flows into Becharof Creek seven miles upstream from the Becharof Creek mouth at Island Arm (Sec. 19, T. 28 S., R. 40 W., S.M.).
>
> **Porcupine Creek**, 322-10-10080-0020-2261-3010, discharges into Becharof Creek 10 miles upstream from the Becharof Creek mouth at Island Arm (Sec. 31, T. 28 S., R. 40 W., S.M.). Beginning at mile 10, minor discrepancies of place-names and place-name locations exist between recent USGS topographic maps and the watershed descriptions of McCurdy (1973:110) and Adams, et al. (1964).

Porcupine Creek was a local place-name reported by S.R. Capps in 1921, but was also recorded as *"Arvesta Creek"* by G.C. Martin the same year (Orth 1971:768).

Sulphur Creek, 322-10080-0020-2261-3010-4003, flows into Porcupine Creek one mile upstream from the Porcupine Creek/Becharof Creek confluence. This stream was called *"Machinery Creek"* in the 1930s and 1940s. It also has been called *"Porcupine Creek"* (Orth 1971:927).

Cleo Creek, 322-10-10080-0020-2269, discharges into Island Arm at LM 81.2, Sec. 22, T. 28 S., R. 41 W., S.M. The stream heads in a narrow valley in Sec. 16, T. 29 S., R. 41 W., S.M. Cleo Creek was known as *"Bob's Creek"* from 1939-55. It was first reported as Cleo Creek by G.C. Martin, who obtained the local name from J.L. McPherson of Iliamna (Orth 1971:224).

Bear Creek, 322-10-10080-0020-2295, flows into Island Arm at LM 87.0, Sec. 2, T. 29 S., R. 42 W., S.M. The stream heads at a mountain elevation of 1,300 feet in Sec. 5, T. 30 S., R. 40 W., S.M. Bear Creek was named by prospectors in 1901 (Orth 1971:113).

Salmon Creek, 322-10-10080-0020-2301, discharges into Island Arm at LM 90.3, Sec. 15, T. 29 S., R. 42 W., S.M. The stream heads at the 450 foot elevation of a mountain pass in Sec. 14, T. 30 S., R. 41 W., S.M. Salmon Creek is a local name first reported in 1903 (Orth 1971:830).

Otter Creek, 322-10-10080-0020-2311, flows into Island Arm at LM 93.5, Sec. 28, T. 29 S., R. 42 W., S.M. The stream heads on mountain slopes in Sec. 12, T. 30 S., R. 42 W., S.M. Otter Creek is a local name first reported in 1902 (Orth 1971:730). It also previously was called *"Road Creek"* and *"Onsungukwuk Creek"* (McCurdy 1973:150).

Point Creek, 322-10-10080-0020-2317, discharges into Island Arm at LM 95.0, Sec. 5, T. 30 S., R. 42 W., S.M. The stream heads at ponds in Secs. 3 and 4, T. 30 S., R. 42 W., S.M. McCurdy (1973:156) notes it was first called *"Point Creek"* in the 1920s, but was later known as *"Fish Village Creek"* and *"Pete's Creek."*

Ruth River, 322-10-10080-0020-2319, flows into Island Arm at LM 96.2, Sec. 5, T. 30 S., R. 42 W., S.M. This 1.4 mile long stream is the outlet for Ruth Lake. The stream is commonly called Ruth River but other earlier names include *"Kanatak Creek"* (1921-1924), *"Fish Village Creek"* (1924-1935), and *"Ruth Lake Creek"* (1936-1939).

Ruth Lake, 322-10-10080-0020-2319-0010, has its outlet in Sec. 9, T. 30 S., R. 42 W., S.M. This lake flows into the extreme south end of Becharof Lake via Ruth River. Ruth Lake is the southernmost water body in the Egegik River/ Becharof Lake Watershed. J.L. McPherson of Iliamna first reported this local name in 1902. Twelve low flow, short streams discharge into Ruth Lake. Clockwise from the Ruth Lake outlet, they are '*Ruth Lake No.1 Creek*', '*Ruth Lake No.2 Creek*', etc. Adams, et al. (1964) and McCurdy (1973:164-187) list twelve named streams, the last named '*Ruth Lake No.12 Creek*'. The twelve streams are identified and mapped by McCurdy (1973:11). The streams are small enough that only four of the twelve appear as short, unnamed streams on current USGS topographic maps, scale 1:63,360.

Frank's Creek, 322-10-10080-0020-2322, discharges into the southern portion of Island Arm in Sec. 12, T. 30 S., R. 43 W., S.M. The multi-channeled stream is fed by many tributaries and two mountain lakes. Previous stream names include *"Crooked Creek"* (1921-1936), *"Wagon Road Creek"* (1920's), *"Febo Creek"* (1920's), and *"Roadhouse Creek"* (1937-1956) (Adams, et al. 1962).

Burls Creek, 322-10-10080-0020-2292, flows into Island Arm at LM 107.7, Sec. 9, T. 29 S., R. 42 W., S.M. The stream discharges at the west shore of Island Arm and heads near Burls Pass in Sec. 22, T. 29 S., R. 43 W., S.M. Burls Pass, elevation 1,600 feet, lays between Mt. Burls and Mt. Lee. Burls Creek was named by deputy U.S. Mineral Surveyor J.L. McPherson in 1902 after H.T. Burls, a London petroleum expert (Orth 1971:168).

South Fork Burls Creek, 322-10-10080-0020-2292-3005, discharges into Burl's Creek in Sec. 8, T. 29 S., R. 42 W., S.M., 2 miles above its mouth.

Camp Creek, 322-10-10080-0020-2278, discharges into Island Arm at LM 112.8, Sec. 22, T. 28 S., R. 42 W., S.M. The stream heads in Sec. 33, T. 28 S., R. 42 W., S.M.

Featherly Creek, 322-10-10080-0020-2264, flows into Island Arm at LM 115.9, Sec. 11, T. 28 S., R. 42 W., S.M. The stream heads in Sec. 15, T. 29 S., R. 43 W., S.M., on the western slopes of Mt. Burls near Featherly Pass. A 1920 USGS map shows the stream as West Branch Simeon Creek, but a 1924 USGS map shows it as Featherly Creek with a tributary called Simeon Creek (Orth 1971:330).

Simeon Creek heads on the slopes of Mt. Burls near Simeon Pass, and flows into Featherly Creek 7 miles above its mouth.

Washbowl Creek, 322-10-10080-0020-2254, discharges into Island Arm at LM 117.5, Sec. 10, T. 28 S., R. 42 W., S.M. The stream heads at the 300 acre Washbowl Lake (USFWS 1956:5) in Sec. 4, T. 28 S., R. 42 W., S.M., and on the northeast slopes of Mount Peulik in Sec. 14, T. 28 S., R. 43 W., S.M. This stream was indicated as *"Camp Creek"* on Wingard's 1920s era map, but was called Washbowl Creek in 1956 (McCurdy 1973:223).

Washbowl Lake, 322-10-10080-0020-2254-3002-0010, is a low lying 300 acre lake at an elevation of 30 feet. The lake's outlet is a short, 3000 foot long tributary that enters Washbowl Creek near its mouth. This otherwise unnamed lake is indicated as Washbowl Lake in a 1956 Service salmon investigation report (USFWS 1956:4).

c. Physical characteristics

Island Arm is situated in the southeast corner of Becharof Lake, and is the lake's principle embayment. Island Arm has a shoreline length of about 65 miles and a water surface area of 32 square miles (J.H. Clark 1977:29; Clark 1976:4). The Arm extends approximately 14 miles south of the Severson Peninsula and contains numerous islets. Island Arm reaches a width of 6 miles at its northern end, but tapers to a 1-mile width at its southern extremity. (See Figure 20).

An environmental consulting firm (Bishop 1974:7) made an incomplete hydrologic investigation of four Becharof Lake tributaries in 1974. The investigating hydrologist for that firm, Daniel A. Bishop, made some tentative streamflow conclusions in his interim report. Apparently, a final report was not written. A portion of his interim report contains a general assessment of runoff and streamflow for the area. He wrote,

> *"Streamflow:*
> *"Feulner, (1973) indicates mean annual runoff for S.E. Becharof Lake and Ugashik Lakes at nearly 4 cfs/sq mi. or about 54"/yr. He also indicates mean annual low monthly runoff is in the 1.0 cfs/sq mi. magnitude.*
>
> *"The data available at this time (Table 1)* [Not included] *suggest that with the exception of Cleo and Rusty Creeks at certain of the times measured, the mean annual low monthly runoff value of 1 cfs/sq mi. may often be exceeded for the streams examined....*
>
> *"Discharge measurements in Cleo Creek during Aug. of 1956 seem low compared with Bear Creek and could suggest that*
> 1. *the measurements were taken near the mouth of the stream and*
> 2. *the stream was losing water to the adjacent banks (influent) at this time.*
>
> *"I would not be surprised if this occurs frequently in lower reaches of Becharof and Ugashik streams during periods of low stream flow...."*
> (Bishop 1974:7).

It appears Bishop wrote in reference to annual runoff maps and tables created by USGS hydrologist Alvin Feulner (1973:17-22) that show the distribution of runoff for the entire Bristol Bay area.

Service fisheries biologist Dewey Eaton (pers.com. 1995) reported witnessing 6 foot seas in **Island Arm**, which is sheltered better from winds than is Becharof Lake. Eaton also commented on Island Arm's surprising water currents, which often changed or reversed direction of flow. He observed current direction changes by checking the direction of ribbon attached to submerged stakes. He speculatively suggested the currents may be wind generated and related to lake seiche. Regarding the Little Narrows, Eaton described a 60 foot wide channel, 6 to 10 feet deep, easily passable by boat with outboard.

Recently published bathymetric data (Mathisen 1996) show **Island Arm** is relatively shallow compared to Becharof Lake proper. Though depths reach more than 50 meters in two depressions, approximately three-quarters of Island Arm is less than 10 meters deep.

Commenting on **Island Arm** streams, Eaton generally characterized them as having shallow waters at their mouths with deeper water above the mouths. He also noted that the lower reaches of these streams typically had unstable banks that eroded easily in high water or flood events. He stated Becharof Creek's banks exhibited much greater stability than the banks of other streams.

Costello Creek is 10.0 miles long and drains an area of 11.1 square miles according to the 1956 salmon stream survey report cited by McCurdy (1973:108). The recorded stream flow by McCurdy for August 25, 1956, was 53 cfs. The 1956 salmon stream survey described the watershed as follows.

> *"This moderate size stream, shallow, wide and meandering in the lower area, has a sandy bottom with no spawning rubble in the lower three miles. Probably has spawning area above."* (McCurdy 1973:108).

Becharof Creek's size and importance as a salmon spawning stream yields richer historical hydrologic information than most streams of the Egegik River/Becharof Lake watershed. Salmon stream surveyors made coarse hydrologic observations in 1939, 1940, 1956 and 1975. A 1939-40 survey found in McCurdy's (1973:110) compilation, describes Becharof Creek as,

> *"a medium-sized clear stream, navigable for several miles or more. Slow and meandering until the three mile point* [measured from the mouth], *where Preston Creek, a slow and murky stream with limited spawning, enters on the left. The North Fork at mile seven is a steep swift tributary with spawning gravel up to a falls about one mile from the mouth. The second*

right fork at mile ten, also swift and clear, has good spawning up to the one-half mile point." (McCurdy 1973:110).

Becharof Creek is 16.3 miles long, drains 33 square miles, and on August 11, 1956, had an estimated streamflow of 150.0 cfs (McCurdy 1973:110; Adams, et al. 1964). Stream width and depth measurements were recorded in a 1940 stream survey (McCurdy 1973:110) and in 1975 ADF&G stream survey field notes (ADF&G, Div. Commercial Fisheries 1975). Some disparity exists between the two detailed accounts of stream dimensions and place-names. Verbatim descriptions and data from the 1940 and the 1975 surveys follow.

"AVERAGE WIDTH AND DEPTH: (1940 Survey)

Mile 2.0	*78' W x 0.4' D*
Mile 3.0	*54' W x 0.7' D (Mouth of Preston Cr.)*
Preston Creek at mouth	*75' W x 3.0' D*
Up 0.7 miles	*40' W x 1.1' D*
Mile 5.0	*47' W x 1.1' D*
Mile 7.0	*46' W x 0.8' D (Mouth of North Fork)*
North Fork	*9' W x 0.5' D*
Mile 10.0	*23' W x 1.1' D*
2nd Right Fork	*23' W x 0.4' D*
Up ½ mile	*21' W x 0.4' D*
Mile 11.0	*19' W x 0.4' D (Porcupine Cr.)*
Sulphur Creek	*19' W x 0.4' D"*

(McCurdy 1973:110)

A verbatim excerpt of handwritten 1975 ADF&G field notes for **Becharof Creek** follows.

"Becharof Creek (73.5) [Lake Mile 73.5] *8/16 - 8/17/75*

Stream Classification
Average width
Depth

[?]*ouths - 2 mile*
95% Slow 5% Pools
Average width: 40'
Depth: 1' - 6'

[?]*mile - Preston (1st trib on right)*
60% Pools, 35% Riffles, 5% Slow
Av. width: 20'
Depth: 1' - 4'

[?]*Preston - 5.4 mile*
60% Riffles, 30% Pools, 10% Slow
Av. width: 40'
Depth: 6" - 3'

5.4 mile - Lower Forks
75% Riffles 20% Pools 5% Slow
Av. Width: 40'
Depth: 6" - 3'

Lower North Fork
80% Riffles 20% Pools
Av. Width: 15'
Depth: 3" - 1'

2nd Tributary (on SF) on Left; above Lower North Fork
90% Riffles, 10% Slow
Av. Width: 30'
Depth: 3" - 1'6"

Lower South Fork - Junction of Porcupine
80% Riffles, 20% Slow
Av. Width: 25'
Depth: 3" - 4'

Porcupine to Mile 1.5
90% Riffles, 10% Pools
Av. Width: 15'
Depth: 3" - 3'

South Fork - Junction with Porcupine - Mile .5
80% Riffles, 20% Pools
Av. Width: 10' - 12'

Depth: *3" - 1'6"*
(ADF&G, Div. Commercial Fisheries 1975).

Stream bottom characteristics, water temperatures, water color and turbidity observations also may be found in both of the above referenced surveys. The 3-man survey team in 1975 used an Avon inflatable raft on **Becharof Creek** up to mile 2. They encountered 32 brown bear along Becharof Creek during their 2-day survey. They also observed much beaver activity on the lower stream, noting a beaver dam 0.1 miles up the first tributary on the left, and a 3-4 foot high beaver dam blocking Preston Creek
(ADF&G, Div. Commercial Fisheries 1975).

U.S. Bureau of Fisheries staff conducting salmon stream surveyors in 1940 described the **Cleo Creek** watershed.

> *"This small clear stream meanders through narrow banks thickly shaded with willows in the lower area. A small spring enters at 2 miles, and the creek forks at about 5 miles. A series of cascades about 4 miles from the mouth marks the end of the spawning migration."* (McCurdy 1973:118).

Cleo Creek is 6.4 miles long and drains 5.7 square miles. Five stream flow observations made during August of an undetermined year, showed Cleo Creek flowed 4.5 - 8.4 cfs (McCurdy 1973:118). These streamflow measurements contrast markedly with Bishop's flow observations of August 1974. Bishop (1974:2) measured 53.5 cfs. Channel dimensions recorded in a 1941 stream survey indicated the stream was 17.0 feet wide and 0.3 feet deep at the mouth and at 2.0 miles upstream from the mouth (McCurdy 1973:118). However, ADF&G field notes from 1975 record greater channel dimensions; 50-60 feet wide and 6 inches to two feet deep at the mouth (ADF&G, Div. Commercial Fisheries 1975).

Cleo Creek is one of two Island Arm streams examined by hydrologist Daniel A. Bishop (1974:1-2). His report on Cleo Creek for 9/27/74 follows.

> *"Gradient and pattern: first 1-2 miles above mouth have less than ½ percent gradient; even at 2 miles above mouth grade is not over ½ percent.*
>
> *"The lower 2-3 miles of stream show increasing degree of meander moving toward the mouth, indicating significant content of silt size and finer sediments in streambank deposits. Fine gravel and sand in the stream bottom. Numerous small tributary streams meander toward Cleo Creek from*

spring areas. At least some of these springs have their source in old stream channels.

"Bedload: sand and finer gravels derived from sandstones and shales. Streambars are not evident on the lower stream.

"Bedrock: none seen in the lower portion of the drainage. Sandstones and other bedded sediments were seen from a distance in the headwaters.

"Suspended sediments: a suspended load is undoubtedly carried by this stream during high flows but was not evident when visited.

"Flow: 9/27/74 53.5 cfs for the 5.7 sq. mi. drainage - 9.4 cfs/sq.mi.

"Springflows and tributaries: numerous small (2-3 ft. side) meandering tributaries fed by wet seep areas. These support some spawning salmon; small fish also seen; perhaps a significant wintering habitat.

"Observed temperatures: 9/27/74

Cleo Creek ½ mile above mouth --	*7.2°C*
air temp. --	*8.6°C*
2 miles above mouth --	*7.0°C*
spring, ½ mile above mainstream mouth	*7.0°C*
tributary stream abt. 2 mi. above mouth	*5.4°C*

"Installed two thermographs on Cleo Cr. on 9/28/74 at 2000 [8:00 p.m.]. *Water temperature - 7.5°C. Located on bed of stream about 80 paces (240 ft.) upstream from door of Jensen-Hammond cabin. Galv. retrieval line attached to old alder on south side of stream. Thermographs dropped into hole about 12 feet toward creek from the anchor tree and about 2 ft. downstream."* (Bishop 1974:1-2).

A relative abundance of historic hydrologic data from the 1940s and 1970s exist for **Bear Creek.** A 1941 stream survey described the watershed as follows.

"This medium size clear stream meanders regularly before entering the hills about three miles from the mouth. Many minor north side tributaries enter the stream from below the hills to the broad upper valley, and some south

side tributaries enter near the headwaters. The stream is accessible to salmon all the way to the headwaters." (McCurdy 1973:135).

Data compiled by Adams, et al. (1964) show a stream length of 13.8 miles and a drainage area of 17.7 square miles. Four streamflow measurements taken during August of an undetermined year [1956?] range from 34 cfs to 64 cfs. These flows contrast with Bishop's (1974:3) significantly higher streamflow of 173.4 cfs recorded on September 28, 1974. There is a consistent disparity between Bishop's 1974 flow measurements and earlier flow measurements for Cleo Creek and Bear Creek. Bishop measured stream flow with a "*velocity headrod.*" The methods of earlier observations are not recorded by the observers.

Bear Creek stream dimensions from 1941 follow.

"AVERAGE WIDTH AND DEPTH: (1941 Survey)

At mouth	*57 ft. wide x 0.5 ft. deep*
Mile 2	*41 ft. W x 1.0 ft. D*
Mile 4	*37 ft. W x 0.4 ft. D*
Mile 6	*40 ft. W x 0.4 ft. D*
Mile 8	*37 ft. W x 0.5 ft. D*
Mile 10	*North Fork 5 ft. W x 0.5' D*
	South Fork 16 ft. W x 0.4' D"

(Adams, et al. 1964).

Two ADF&G personnel measured physical characteristics of Bear Creek on August 20, 1975. They recorded water temperature, water turbidity, and stream bottom composition but did not report streamflows. They measured stream width and depth at nine sites, and drew a map of Bear Creek with tributaries and observation stations (ADF&G, Div. Commercial Fisheries 1975). An outline of their Bear Creek stream dimensions follows.

LOCATION	WIDTH	DEPTH
Station I (mouth of Bear Creek)		
Mouth A (middle mouth)	32 feet	0.5 - 1 feet
Mouth B (west mouth)	88 feet	0.5 - 3 feet
Mouth C (East mouth)	30 feet	0.5 - 3 feet
Station II (main stem; 0.5 mile)	50 feet	0.5 - 3 feet
Station III (2.0 mile)	40 feet	0.5 - 3 feet

Tributary 1	20 feet	0.5 - 2 feet
Station IV (4.0 mile)		
Tributary 2	10-15 feet	0.5 feet
Station V (8.2 mile)	30-40 feet	0.5 - 3 feet
Tributary 3	3 feet	0.5 feet

(ADF&G, Div. Commercial Fisheries 1975; field notes by Minard, Schreiber).

Bear Creek is one of two Island Arm streams reconnoitered in 1974 by Bishop (1974:2-3). The Bear Creek portion of his October 28 report follows.

> *"Gradient and pattern: first ½ mile above the mouth the grade is not more than ½ percent. By the middle basin, a couple of miles upstream from the mouth, the grade is ½ to 3/4 percent.*
>
> *"Pattern is sinuous and somewhat braided rather than strongly meandering as in Cleo Creek. Stream bars are evident, as are poorly developed pools on stream bends. This streambed contains some deposits of stream debris, largely brush.*
>
> *"Streambed and bedload: streambanks made of medium sized gravels with intermixture of sands and silts. This stream carries a coarser and larger bedload than Cleo Creek.*
>
> *"Bedrock: coarse, rotten sandstones, possibly calcareous, are much in evidence on the exposed ridges and some valley faces. Wind sculptured and blowout areas are common. Valley probably also contains shales: possible graywackes.*
>
> *"Suspended sediment: a suspended load was evident in this stream on 9/29/74. Suspended material appeared to be colloidal in size, and concentrations were just high enough to give the water a green-yellow cloudiness.*
>
> *"Flow: on 9/29/74 flow was 173.4 cfs. For this drainage of 17.7 sq. mi. a runoff of 9.8 cfs/sq. mi. was thus indicated. This is consistent with the Cleo Creek measurement.*

"Springflows and tributaries: occasional small springflows come at the base of the escarpment on the edge of the Bear Creek valley bottom. Tributaries in this valley are steeper than those seen in Cleo Cr. valley and often flow from seeps or ponds perched on the slopes.

"Observed temperatures: 9/28/74

Bear Cr. ½ mile above mouth at 1045 --	*7.4°C*
air temperature --	*9.4°C*
2/3 mile above mouth, middle basin --	*7.5°C*
air temperature --	*8.4°C*
springflow at base of escarpment --	*5.0°C*
small stream in lowlands NNE of Bear Cr. --	*7.2°C"*

(Bishop 1974:2-3).

Salmon Creek is a 12.3 mile long Island Arm tributary that drains 16.4 square miles. Stream survey data compiled by Adams, et al. (1964) indicate four streamflow observations were made in August of an unspecified year prior to 1964. Salmon Creek's flow varied from 13-27 cfs for those times mentioned. A 1941 salmon survey showed this stream's measured width only varied from 20 to 24 feet between the mouth and mile 6 of the stream. Depth measurements at 2 mile intervals showed a depth of 1.0 feet at the mouth, diminishing gradually to a depth of 0.5 feet at Mile 6. The Salmon Creek watershed description taken from the 1941 stream survey follows.

"This medium size clear stream is narrow, deep, and swift near the mouth with evidence of channel cutting. The hills are first encountered at 2 miles from the mouth, after which the creek flows through a wider valley before coming out of another rocky canyon at 5 miles. Numerous minor tributaries enter the main stream from 3 miles to the headwaters. The vegetation is grass interspersed with willow and alder patches for the entire stream." (McCurdy 1973:143).

Bureau of Fisheries Agent Fred Lucas (1938:3) made a reference to **Salmon Creek** streamflow in correspondence regarding stream pollution and oil drilling. Writing to the Federal Commissioner of Fisheries in Washington, D.C., Lucas estimated normal streamflow at the mouth to be 12 feet per second.

Service biologist Dewey Eaton (pers.com. 1995) conducted salmon research on **Salmon Creek** in 1991 and 1992. From one summer to the next, he noted a significant stream channel change 5 or 6 miles upstream from the mouth, and lesser changes

elsewhere. The upper Salmon Creek channel was displaced approximately one-quarter mile, with no water flowing in the previous channel. Mr. Eaton also stated, "*It was not uncommon to see twenty feet of bank disappear on a flood event.*"

Otter Creek is 7.3 miles long, drains 6.7 miles, and had a measured stream flow of 8 cfs on August 21, 1956. A 1940 stream survey shows Otter Creek is 42 feet wide and 1.1 feet deep at the mouth, and 14 feet wide and 0.4 feet deep at Mile 2. The 1940 survey further describes the stream as small, slow, deep, and sandy for the first 1.5 miles. A waterfall, dropping 80 feet in 100 feet, exists at mile 3.5. A trail to Kanatak follows the headwaters of Otter Creek above the falls. (McCurdy 1973:150-151).

Point Creek is a small stream 2.6 miles long and draining 2.8 square miles. A streamflow of 17 cfs was recorded for August 26, 1956, with no stream dimensions noted. Point Creek had good salmon spawning grounds for 4 miles upstream from the mouth in 1956. A series of beaver dams occupied the mainstem above mile 4 in that year. (McCurdy 1973:156).

A four person ADF&G, Division of Fisheries team [Minard, Schreiber, Haar, and Paddock] surveyed the **Ruth River** for salmon on August 23, 1975 (ADF&G, Div. Commercial Fisheries 1975). Their "*Stream Survey Form*" describes the stream as 1.4 miles long, had a 35 ft/mile gradient, was 160 feet wide at the mouth, averaged 60 feet wide, was 6 inches to 4 feet deep, and had clear water. They classified the stream as 50 percent fast pools, 40 percent riffles, and 10 percent slow water. Their field notes state,

> "*General Comments.*
> *1) Very wide river requires 4 men.*
> *2) Mouth is wide and braided, requires a good deal of time.*
> *3) Water is clear and excellent for counting conditions.*
> *4) Use of the Avon is very helpful and may be taken up .5 miles from mouth.*
> (ADF&G, Div. Commercial Fisheries 1975).

ADF&G biologist Richard Russell (1980) conducted a fish survey of Ruth Lake in early June 1980. His fish survey report of the lake includes the following **Ruth River** description.

> *"The Ruth River is approximately 50 feet wide at Ruth Lake's outlet, with a gravel bottom, depths to 8 feet, and flowing an estimated 3-4 fps. There is little cover in the river... a few boulders... and willows line the banks. The*

river is wadeable in hipboots about ½ mile below Ruth Lake. There it shallows out and remains shallow for most part for the next 3/4 mile. Some deeper holes occur in the lower 1/4 mile." (Russell 1980:3).

Pete Olsen (pers.com. 1995) described **Ruth River** as very shallow, eight inches deep, and shallower in some places. En route to Kanatak he has ascended the river "*almost halfway*" by outboard powered boat. He parked his boat at the river bank and proceeded along the trail to Kanatak.

A **Ruth Lake** description from McCurdy (1973:188) states the lake has a surface area of 1.7 square miles, has a shoreline length of 8.6 miles, and has a drainage area of 15 square miles.

A report following Richard Russell's 3-day fish survey of **Ruth Lake** in June, 1980, offers some information about the lake's physical characteristics.

"Inflated our Avon raft and made a trip around the lake. Low clouds obscured our view of most of the surrounding terrain. Gusty winds roughened the lake surface quickly on several occasions. The water surface would change from flat calm to waves up to 2-1/2 feet in a matter of seconds and then when the gust passed, go back to calm again.

"Numerous springs (some with associated ponds), waterfalls, islands, and shoals were noted. A water sample was taken from a depth of 4 meters just north of the 'narrows'.

Phenolpthalein alkalinity	*= 0 grains/gallon*
Total alkalinity	*= 1.2 grains/gallon*
Total hardness	*= 1 grain/gallon*
Dissolved oxygen	*= 12 ppm*
PH	*= 6.7 (3 repetitions)*
Secchi disc transparency	*= 40 feet*
Water temp	*= 43°F @ 1930 hrs.*

"... No trees around lake. Just willows. Ruth Lake and Ruth River both clear." (Russell 1980:1).

Twelve short streams of low flow discharge into **Ruth Lake**. Very sparse hydrologic data gathered in the 1940s and 1950s are recorded for eight of these streams in Adams, et al. (1964) and McCurdy (1973:164-187). Four of the streams, Ruth Lake No.5 Creek

through Ruth Lake No.8 Creek, have no documented data. The Service (USFWS 1956:5) surveyed all Ruth Lake streams for salmon in 1956. The following is the extent of data available from McCurdy (1973:164-187) for Ruth Lake Creeks.

Ruth Lake No.1 Creek:
Average width and depth - 3 feet by 0.5 feet (1941)
Streamflow - 2.7 cfs (1951)

Ruth Lake No.2 Creek:
Average width and depth - 4 feet by 0.3 feet (1941)
Streamflow - 1.5 cfs (August 14, 1951)

Ruth Lake No.3 Creek:
Average width and depth - 3 feet by 0.2 feet (1941)
Streamflow - 0.5 cfs (no date)

Ruth Lake No.4 Creek:
Streamflow - 12.0 cfs (August 31, 1956)

Ruth Lake No.9 Creek:
Watershed description - A small creek that splits up into numerous small tributaries which come off mountain sides; has no suitable spawning grounds (1941).
Average width and depth - 13 feet by 1.1 feet (1941)
Streamflow - 19.3 cfs (August 14, 1941)

Ruth Lake No.10 Creek:
Streamflow - 2.5 cfs (1956)

Ruth Lake No.11 Creek:
Streamflow - 0.8 cfs (August 31, 1956)

Ruth Lake No.12 Creek:
Width and depth at mouth - 10 feet by 0.5 feet (1940)
Width and depth 1.2 miles above mouth - 8 feet by 0.4 feet
Streamflow - 3.6 cfs (August 30, 1956).

Frank's Creek is 6.5 miles long and drains 29.2 square miles in the southernmost reaches of Island Arm (Figure 20). Streamflow ranged between 64 and 216 cfs during August of an unspecified year [1956?] prior to 1964 (Adams, et al. 1964). A watershed description and stream dimensions from a 1941 stream survey follow (McCurdy 1973:192).

"AVERAGE WIDTH AND DEPTH: (1941 Survey)

At mouth	*55' W x 1.5' D*
Mile 2.2	*28' W x 1.5' D*
Mile 3.7	*16' W x 1.2' D*

> *"... WATERSHED DESCRIPTION: (1941 Survey) This large clear stream forks at 3.7 miles, with a falls on either branch above the forks. The lower sections meander considerably, and contain many side channels, bypasses, and other tributaries. The banks are lined with alder and willows. A cabin at the mouth suggests probable fishing for winter use."*
> (McCurdy 1973:192).

Burls Creek is 8.2 miles long and drains 13.5 square miles. Observed streamflow on August 29, 1956, was 80.0 cfs. Some historic water temperature and stream bottom data are available in McCurdy's (1973:205) compilation. Stream dimensions and a watershed description from a 1940 stream survey follow.

> *"AVERAGE WIDTH AND DEPTH: (1940 Survey)*
> *At mouth — 29' W x 1.0' D*
> *2 miles — 27' W x 1.1' D*
> *2.2 miles at forks*
> *South Fork — 24' W x 0.8' D*

> *"... WATERSHED DESCRIPTION: (1940 Survey) This medium size, clear and rapid stream branches about two miles from the mouth into the South Fork and the main fork. Most of the spawning is confined to the area below the forks, although fish can ascend a mile or more beyond the forks. Fish racks at the mouth indicate an occasional fishery for dog food."*
> (McCurdy 1973:205).

Camp Creek is a small creek, 3.0 miles long and draining a 2.0 square mile area. The stream was described as "*very small*" by ADF&G in 1964. Camp Creek was blocked at the mouth by a beaver dam in 1964, and further described as having a muddy rather than gravel bottom (McCurdy 1973:214-215). Other physical characteristics of this tributary are undetermined.

A relatively substantial amount of coarse hydrologic data exist for **Featherly Creek**. Known observations were made by Service or ADF&G personnel in 1940, 1975, and 1995. The following statement described the Featherly Creek watershed in 1940.

> *"This clear stream meanders considerably for the lower 5 miles, but soon straightens when it runs between steep canyon walls. The stream is accessible to salmon to Simeon Creek, about 7 seven miles from the mouth,*

or possibly beyond. Fish racks for dog food at the mouth. Old Alaska Road Commission cabin about one-half mile east of mouth." (McCurdy 1973:218)

Featherly Creek is 13.2 miles long and drains 27.6 square miles. The streamflow recorded for August 12, 1956, is 54 cfs. Average width and depth measurements recorded from a 1940 stream survey show dimensions for the mouth as 45 feet wide and 1.5 feet deep, fpr mile 2 as 39 feet wide and 1.7 feet deep, and for mile 4 as 42 feet wide and 1.1 feet deep. Stream dimensions, water temperature, and streambed observations for Featherly Creek are recorded in McCurdy (1973:218) and Adams, et al. (1964).

Two ADF&G personnel surveyed **Featherly Creek** on August 16-18, 1975. Though their field report contains no stream flow estimates, it does have some stream dimension measurements and a crude hand-drawn map. Unfortunately, map and notes lack river mile estimates, an omission that hinders confident location of observation sites. Some excerpted text and data from their notes follow.

"Surveyed by Harr & Schreiber
Date...8-16, 17, 18 - 75
3 days & 2 nights

"General comments on stream and survey
1) Ideal stream to use AVON raft due to the high bank...

"MAIN MOUTH...
Width: 90 ft
Depth: 18"
Clear water, calm
sand and small gravel 20% to 80%...

"II Head of mouth to braid (2)
Small and med. gravel 60% to 40%
Width: 16 ft average
Depth: varies from 1" to 4'
Clear water generally clear except along cut bank water becomes murky
Remarks: Due to meandering stream, deep pools, high sides and a slight bit of erosion made counting difficult....

"IIA First braiding area & second braiding area
Small and med. gravel 55% to 45%

Width: varies from 10 ft to 24 ft
Depth: varies from 1 ft to 3 ft...

"III from Braid 2 to Falls
Small gravel 39%, med gravel 30%, large gravel 3%, sand 49%, boulders 1%, lava bottom 21%.
Width: varies from 5 ft to 28 ft
Depth: varies from ½ ft to 4 ft
Remarks: numerous redds [salmon spawning beds] *after rapids, water extremely faster* [sic], *there are schools of 100 or more salmon below the rapids, the water is clear and excellent for counting after the major set of rapids, at least one more hour of counting will place you next to the falls....*

"Recommend
Asking habitat to look into the falls area as a possible salmon ladder site. 80-85% before and after the falls were found to be ideal spawning grounds.

"Erosion: is found throughout the stream to be heavy along the high banks areas."
(ADF&G, Div. Commercial Fisheries 1975: Featherly field notes).

Service fisheries biologist Jeff Adams measured **Featherly Creek** streamflow in 1995. He made his observations 0.25 miles upstream from the mouth. He measured depth every five feet across the stream with a measuring tape, and estimated velocity by timing stick travel over 100 feet of stream with a stopwatch. Adams (pers.com. 1995) observed the Featherly Creek stream bottom was sandy, and recorded the following measurements.

"All measurements in feet

Date	*Average Depth*	*Width*	*Average Velocity*	*Discharge*
1 May	*1.2*	*92.5*	*2.2*	*244.2* [cfs]
20 June	*1.3*	*108*	*1.7*	*238.7* [cfs]
6 July	*1.1*	*102*	*1.5*	*168.3* [cfs]"

(pers.com. Adams 1995).

Washbowl Creek is 7.1 miles long and drains a 6.1 square mile area. The most recently published USGS 1:63,360 scale, topographic map of the area indicates the main stem bifurcates a few hundred feet upstream from the lake shore. The north fork is approximately 0.75 miles long and drains Washbowl. Other physical characteristics for Washbowl Creek are undetermined.

Washbowl Lake is a low lying, 300 acre lake, one-half mile from the Island Arm shoreline. The only references found regarding the lake comes from Adams, et al. (1964) and McCurdy (1973:224), who note signs of beach spawning during a 1956 stream survey. Washbowl Creek drains Washbowl Lake.

d. Pre-statehood uses

In a 1986 brief archaeological investigation, Don Dumond (1987:141-142) excavated a site on **Ruth Lake's** north shore. He found prehistoric materials similar to those found in the Naknek River drainage, the Ugashik River drainage, and the Pacific coast of the Katmai region. Dumond's work appears to be the single documented archaeological field investigation and excavation in the Island Arm watershed. Other archeological research cites human occupation in regions immediately north and south of Becharof Lake spanning the last 8,000 years (U.S. Bureau of Indian Affairs 1991a:5).

Bocharov's 1791 map (Figure 10) shows his expedition's route through **Island Arm** via baidara (Yefimov 1964). A dotted line on the map indicating Bocharov's route enters Island Arm at the Big Narrows. The travel line continues in a more or less straight line through the middle of Island Arm, passing through the Little Narrows, and continuing to the mouth of Ruth River. The map indicates Bocharov began his overland portage to Portage Bay at or near the mouth of **Ruth River**. The map's dotted travel line diverges from the mouth of Ruth River and continues to the coast. Bocharov's mapped travel route and Ruth Lake's absence on the map and suggests he did not proceed up Ruth River to Ruth Lake.

Petr Korsakovskiy (VanStone 1988:25) made a one paragraph entry in his travel journal of 1818 regarding **Island Arm**. While camped at the mouth of the Kejulik River for several days he sent two bidarkas to Island Arm. The two bidarkas returned the same day after reconnoitering and taking caribou and waterfowl for food. According to Korsakovskiy, the hunters described the southeast area of Becharof Lake as having numerous islands with shallow channels between the islands.

Naturalist W.H. Osgood (1904) made observations along the route of his 1-day canoe traversal of **Island Arm**. Coming to the end of his travels on the upper Alaska Peninsula, he wrote in 1902,

> *"On the following day, having threaded the small islands of the southern arm, we continued on to the head of the arm and up a stream* [Ruth River] *about one mile to a small subcircular lake* [Ruth Lake] *at the base of the coast mountains.... The region about the head of the arm is rather swampy and is characterized by a luxuriant growth of grass (Agrostis), which in many cases reaches to a man's shoulders. A small collection of native igloos or barabaras is located near the mouth of the stream. There is another on the little lake where we camped and made ready for the portage*

> *across the mountains.... The portage trail runs from the east side of the small lake across a half a mile of swamp, and thence up about 1,000 feet, traversing a rocky pass and continuing on down over more rocks to the native village of Kanatak,..."* (Osgood 1904:20).

Oil and gas seeps on the divide between **Island Arm** and the Shelikof Strait coastline brought oil exploration (See Figures 5, 6, & 8) to this region at the turn of the century (Bascle, et al. 1986:3-4). Unproductive oil drilling began near the headwaters of **Becharof Creek** in 1903 and continued until 1905 (Atwood 1909:147-148; Martin 1904:381). No further oil development activity occurred until 1920 when vigorous prospecting and exploration commenced again. A USGS geologist described travel routes in and around Island Arm in his report on the "*Cold Bay Mining District.*" Stephen Capps wrote in 1921,

> *'Within the district travel from place to place is fairly easy. There are many easy passes from the Pacific slope through the coastal mountains to the interior, and these passes and the large lakes and their outlets through sluggish rivers to Bristol Bay have long been used by natives in their journeys from the Pacific coast to the Bering Sea. From Cold Bay* [Puale Bay] *there are easy passes to the Kejulik (Garkulik) Valley, and a wagon road was built by way of Trail Creek to the well sites near the divide between Cold Bay and Becharof Lake* [near headwaters of Becharof Creek], *a distance of 7 or 8 miles. This road is now badly out of repair but can still be used for pack horses. From the end of the road an easy route is available to Becharof Lake. With the exception of the wagon road and a trail from Kanatak to a native fishing village on Becharof Lake, there were scarcely any discernable trails in the district in the spring of 1921. By fall, however, the pack trains and foot travelers had beaten out plain trails in many places. One trail could be followed continuously from Cold Bay to Portage Bay by way of Trail and Becharof creeks, across Bear and Salmon Creek valleys, and down Kanatak Creek to Kanatak. Another trail was broken from Kanatak around the head of Becharof Lake and thence across the hill to the head of Ugashik Creek and the West field* [Pearl Creek dome oil field]. *Passable routes are available from Oil Bay up Oil Creek to the head of Becharof Creek; from Dry Bay up Rex Creek to Arvest or Porcupine Creek; from Jute Bay into the valleys of both Bear and Salmon Creeks; from Portage Bay by two routes to Becharof Lake; and from Kialagvik Bay by half a dozen passes through the mountains to the Ugashik Lake drainage basin. Pack horses may be taken almost any place desired, and grass is sufficiently*

> *abundant everywhere during the summer to afford plentiful forage. There are few places in Alaska where land travel for horses and men is so easy.* (Capps 1923:88).

The following year, 1922, two other USGS geologists recorded the activity at **Kanatak** that quickly affected the **Island Arm** area. Their account describes the sudden emergence of a coastal boom town that significantly impacted the socio-economic, cultural, and physical environment of Kanatak and Island Arm. Road construction, building construction, and oil drilling occurred. Subsistence and wage income activities at Island Arm and in Bristol Bay canneries by Alaska Native residents of Kanatak are mentioned. Geologists Smith and Baker reported,

> *"In August, 1922, two steamers landed drilling equipment at Portage Bay, and soon the town of Kanatak, at the head of Portage Bay, was the center of great activity. During two or three weeks Kanatak changed from a town with a population of 10 or 15 to a typical boom town with a population of nearly 200 and tents, log cabins, and frame buildings numbering 100 or more. Work was immediately begun on a road connecting Kanatak and the site selected for drilling* [Pearl Creek dome], *which is 17 ½ miles northwest of Kanatak.*
>
> "... *In 1921 two frame buildings were erected there* [Kanatak] *for stores, and several smaller frame cabins were built. The post office and store were moved from Cold Bay* [Puale Bay] *to Kanatak. Building and preparation for building continued on a small scale commensurate with the gradual influx of people until August, 1922, when the drilling equipment for the oil companies arrived. ...tents and frame buildings of all descriptions were hastily erected to furnish accommodations for these people. A townsite was laid out, and an attempt was made to regulate the location of buildings so that a future readjustment would not be necessary. In the fall of 1922 people were still arriving at Kanatak on every boat, so that it is impossible to give an approximately accurate figure for the population....*
>
> *"There is a small native settlement in Kanatak which has a population that varies during the year. In the winter there are 40 or more natives huddled in their small sod houses (barabaras), but in the summer they scatter, some going to the Bristol Bay side of the peninsula to work in the canneries and others to the small native village at the head of Becharof Lake* [Fish Village, or Marraataq], *where they catch and dry salmon for winter food.... They*

> *are not a thrifty set of people, and their only source of income is hunting, trapping, and fishing, with occasional odd jobs for white men. Their main article of food is the dried salmon, which they put up in summer, when fish are very plentiful....*
>
> *"Travel within the district is fairly easy by foot or with a pack train, as many trails have been beaten out by the numerous parties that have moved around in the district during the past two years* [1920-22]. *There are numerous easy passes across the mountains into the interior lowland. Kanatak has been the headquarters of all the parties working in the district, and the trails radiate from that point. The wagon road under construction from Kanatak to the well sites* [at Pearl Creek dome] *will make the country around Mount Peulik easily accessible from Kanatak. A good trail for pack horses can be followed from Kanatak to Cold Bay...."* (Smith and Baker 1924:163-166).

The oil companies struck no commercial quantities of oil during the early 1920s, and they abandoned drilling activities in the area by 1926 (Bascle, et al. 1986). Another episode of oil exploration occurred briefly in 1938-39. A joint venture, that included Standard Oil and Humble Oil companies, drilled the Bear Creek Unit near the upper reaches of **Salmon Creek.** No commercial quantities of oil were located (Bascle et al. 1986:4). Correspondence from a Bureau of Fisheries agent to the Commissioner of Fisheries in Washington, D.C. in 1938 regarded the potential effects of drilling on Salmon Creek and reflected the Bureau of Fisheries' concern about oil industry impacts on spawning waters of Island Arm. Such concern indicates the on-going economic value of Salmon Creek and Island Arm as salmon spawning and nursery grounds to the U.S. Department of Commerce and local canneries. An excerpted note from 1938 Bureau of Fisheries correspondence follows.

> *"Salmon Creek is approximately 10 miles long and the drilling site is within one mile of the source. From previous observations, I have noticed that only the lower half of the stream is used for spawning salmon. Mr. Tom Barnaby of the local Fisheries Laboratory, coincided with my opinion the above p.m.* [500 p.m.] *is well on the safe side to protect salmon life at the point where the salt water enters the creek. In the four miles of the stream below the drilling operations to a point where the salmon spawning begins, there are four tributaries entering the stream, so at the first spawning point the salinity will be reduced."* (Lucas 1938:2).

The U.S. Alaska Road Commission (1922:42-43) first investigated road construction in this area in 1922. The following year the Commission's "*Engineer Officer*" made a reconnaissance of "*Route 95 - Kanatak,*" and road construction commenced in 1923. The 1924 Alaska Road Commission Annual Report (1924:119) recorded significant road construction activities between Kanatak and oil company drill sites (Pearl Creek dome). One portion of the road lay along **Ruth River**, the southern margin of **Becharof Lake**, and **Frank's Creek**. (See Figures 6, 13, & 20). The road apparently crossed Ruth River and Frank's Creek near their mouths.

> *"ROUTE 95--KANATAK-BECHAROF LAKE.....(8 MILES WAGON ROAD)*
>
> *"Progress in oil drillings resulted in construction of a road from the town of Kanatak at Portage Bay, Alaska Peninsula, to Becharof Lake, there connecting with road constructed by oil companies and leading to drilling operations on Pearl Creek dome, a total of 19 ½ miles. This work does away with the 25 per cent grades which had been used over Kanatak Hill where three tons with a 60 horsepower tractor was an average load.*
>
> *"Work the past season consisted of construction of new portions of road, eliminating steep grades and getting better location. The road built by the Oil Companies was used where practicable....*
>
> *"The road is now in fair condition for traffic passing over it.*
>
> *"The Standard and Associated Oil Companies expended on the 19 ½ miles between Kanatak and Pearl Creek Dome a total of $39,123.58.*
>
> *"Expenditure:*
>
> *Oil Companies.....$39,123.58*
> *Alaska Road Commission.....19,914.49*
>
> *Total.....$59,038.07"*
>
> (U.S. Alaska Road Commission 1924:119-120)

A 1920s era Bureau of Fisheries map shows a structure situated near **Island Arm**'s shoreline, approximately midway between Kanatak and Pearl Creek dome (Wingard n.d.). The map places "*Smith's Roadhouse*" beside the road and near the east-side mouth of Frank's Creek (Figure 13). Other sources corroborate a "*roadhouse*" in this vicinity (Boskoffsky, et al. 1990; U.S. Bureau of Indian Affairs, ANCSA Office 1991a).

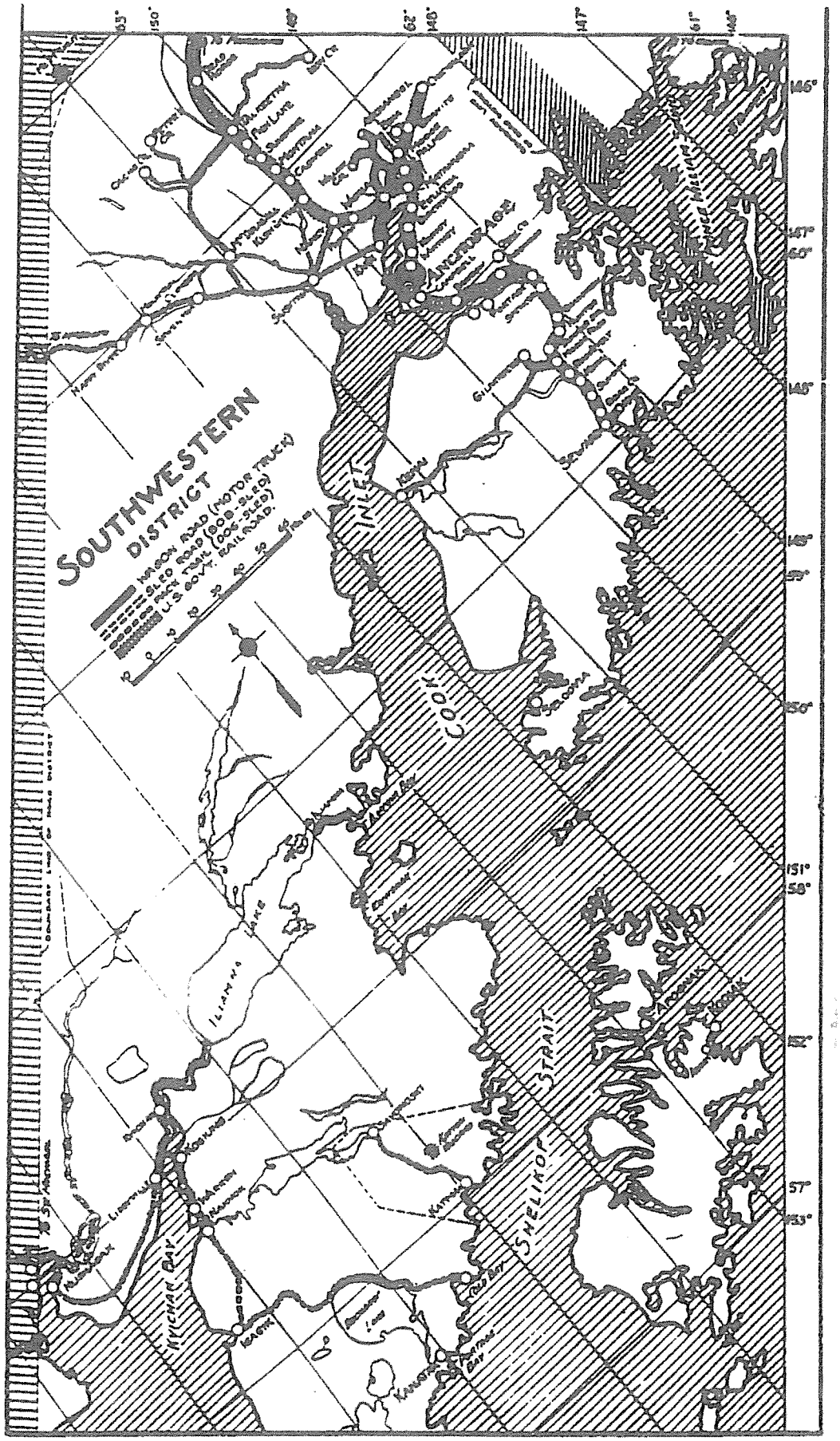


Figure 21. Section of 1923 Alaska Road Commission Map showing "Cold Bay - Igagik" pack trail along north side of Becharof Lake
Source: U.S. Alaska Road Commission 1923.

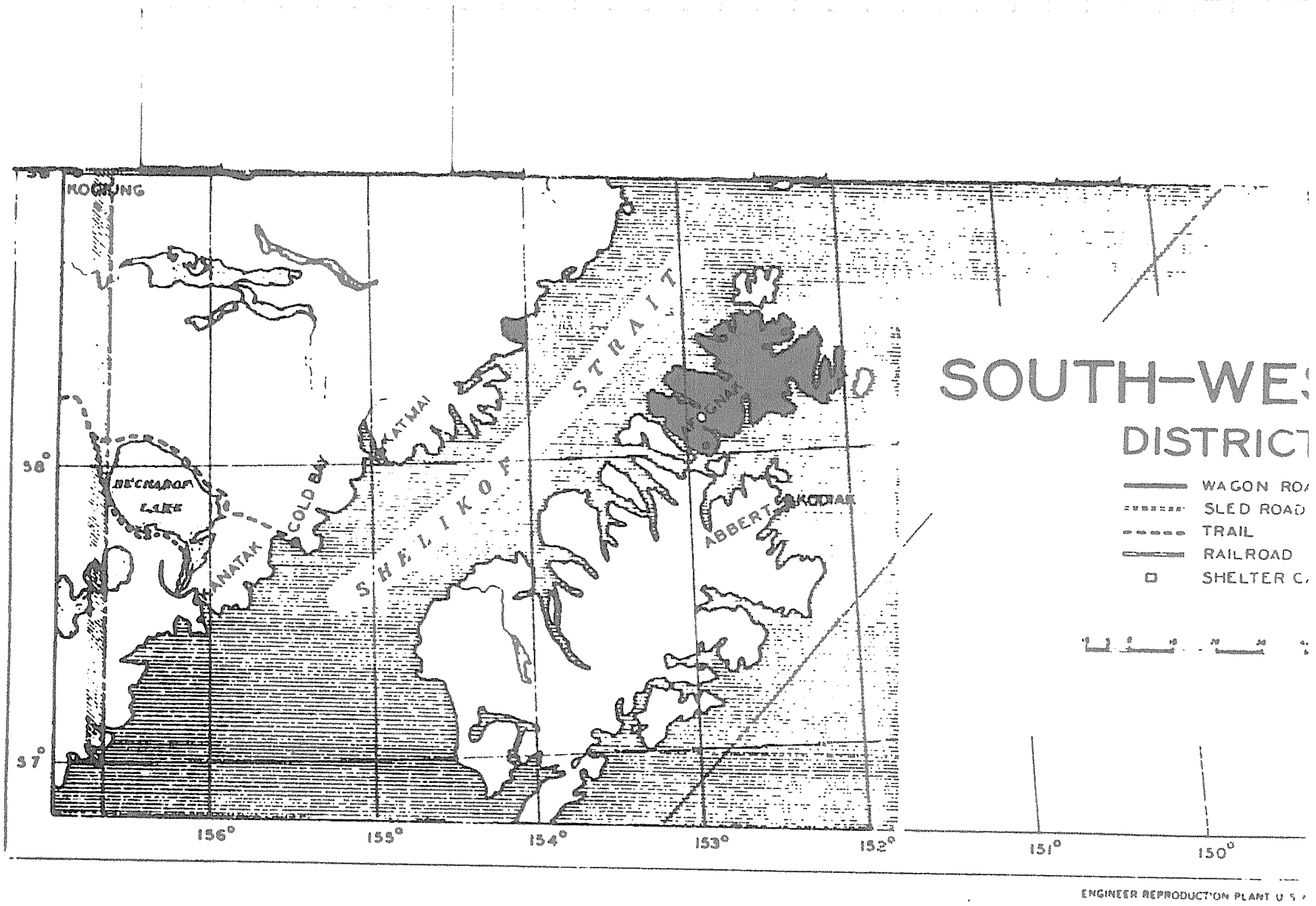


Figure 22. Section of 1925 Alaska Road Commission Map showing trails and road in vicinity of Becharof Lake.
Source: U.S. Alaska Road Commission 1925.

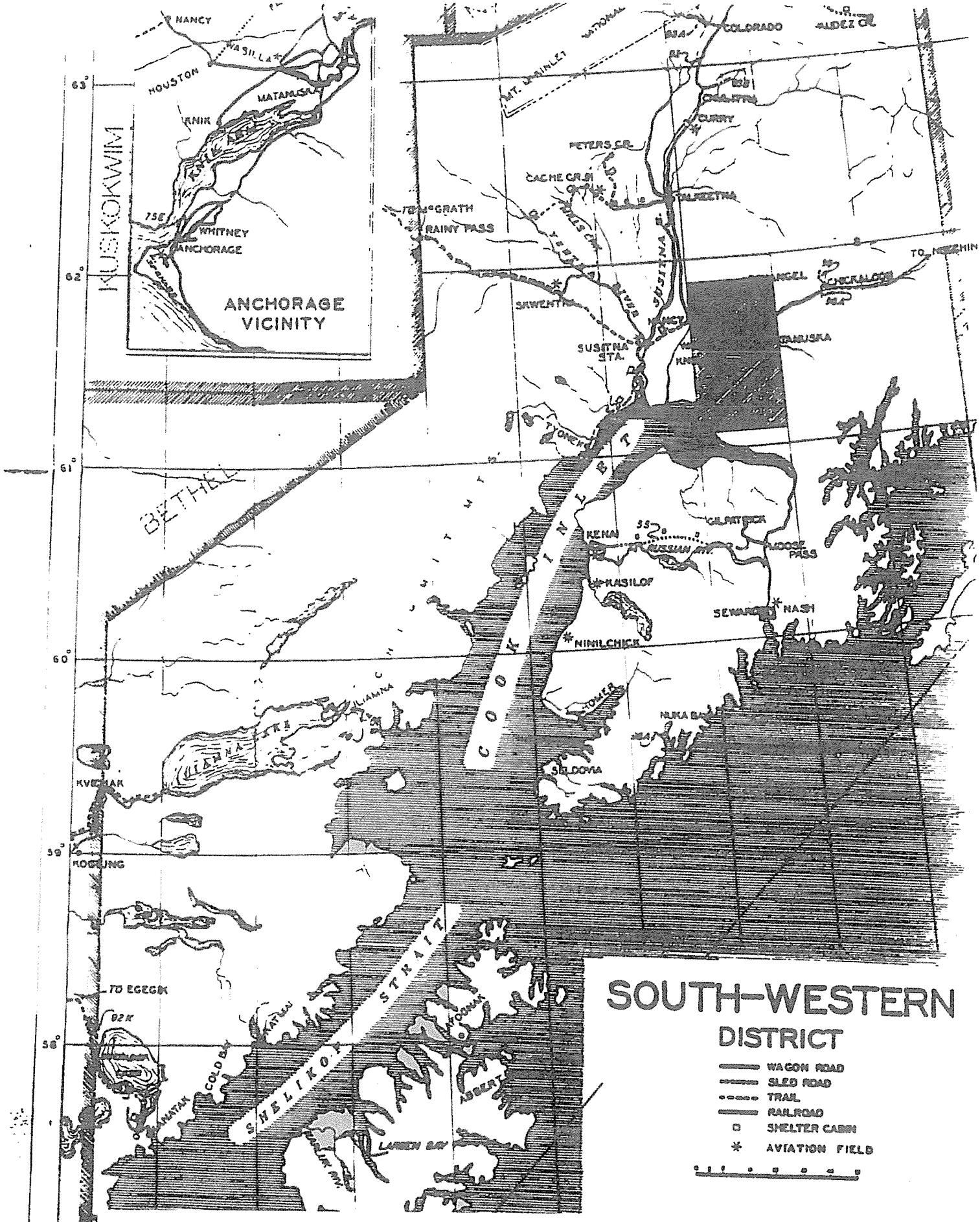


Figure 23. Section of 1932 Alaska Road Commission Map showing trail and wagon road in vicinity of Becharof Lake. Source: U.S. Alaska Road Commission 1932.

Frank's Creek was known as "*Wagon Road Creek*" in the 1920s, and referred to as "*Roadhouse Creek*" between 1937 and 1956 (Adams, et al. 1962). Nida Nelson (pers.com. 1996) recalled "*Roadhouse*" being occupied in the 1940s by a man named Fabo and his wife, Nick Shanigan's sister. Nida described the site location of "*Roadhouse*" as along the north side of the stream (Frank's Creek), upstream from the mouth.

A traffic census by the U.S. Alaska Road Commission (1926:35) from January through April 1925 indicates the degree of activity along the "*Kanatak-Becharof Lake*" route. The census shows 338 people, 27 autos, 9 wagons, 88 sleds, 60 pack horses, and freight of 72 tons passed along the road. [Note by WJK: The above cited census data are taken from a table that lists the Kanatak-Becharof Lake route as Route 94. Route 94 is located on Kodiak Island. The correct designation in 1926 for the "*Kanatak-Becharof Lake*" route was Route 95. It appears that a typographical error for the route number may have occurred, but it is also possible that the data reflect the "*Kodiak-Abberts*" traffic on Kodiak rather than the "*Kanatak-Becharof Lake*" traffic.]

The Corps of Engineers also described the road between **Kanatak** and **Becharof Lake** in a 1932 Egegik River survey report cited earlier (Hurley 1932). This description illustrates again the annual migration of people between Kanatak and Egegik along the overland and water route.

> "*About one half of the total native labor* [for Egegik canneries] *comes from the east coast. The Indian laborers generally move their families with them, and as a result about 100 local people cross the peninsula each spring and return in the early fall. Transportation over the intervening section between the head of navigation on Becharof Lake and Portage Bay on the east coast has been provided for by the construction of a road by the Alaska Road Commission. This road is poor, has heavy grades, and is 8 3/4 miles in length between the lake landing and the village of Kanatak on Portage Bay. It is passable for wagons hauling light loads in dry weather. The total expenditure to date on the construction and maintenance of this road is $30,000.*" (Hurley 1932:17-18).

The change in Alaska Road Commission maps found in the Commission's annual reports during the 1920s and 1930s reflects the diminished activity along travel routes from Cold Bay and increased activity originating in Kanatak (Figures 21, 22, and 23).

Coinciding with oil development and road construction activities of the early 1920s in **Island Arm** were the well documented activities of Bureau of Fisheries and their

"*destruction of predatory fishes and birds*" (Bower 1923-1927). Henry Looff and one or two assistants carried out the Bureau's policy of methodically eliminating trout and/or Dolly Varden to enhance the salmon populations. Looff worked the summers of 1921-26 in Island Arm. The operations conducted in Island Arm for this period are summarized in annual reports by Ward Bower, titled *Alaska Fishery and Fur-Seal Industries*. Two lengthy but illuminating report summaries, for 1923 and 1924 respectively, chronicle early motorized boat travel, weather delays, time of lake ice breakup, travel around Island Arm, the Fish Village site, and barter with local Alaska Natives.

> *"Egegik.--The Egegik crew, with H.B. Looff in charge, was transported on the Star of Lapland, landing at Egegik on May 26* [1923]. *After overhauling the Evinrude and equipment and assembling supplies they left for upriver on May 30. Camp was made for a short period at the rapids near the outlet of the lake. Boats with equipment and supplies were lined over the rapids and a start was made for the Little Becharof Lake District* [**Island Arm** District]. *A severe storm forced a landing and delayed progress for four days at Gass Rocks. While efforts were made with set nets here, results were negligible. As soon as the weather permitted camp was moved and established at* **Salmon Creek** *where operations were begun. Work here was not satisfactory, and camp was again moved to Kanatak village* [**Fish Village**], *where part of the supplies were stored in a native barabara. Heavy windstorms, accompanied by rain, occurred through the first two weeks and prevented much work. Camp was then moved from creek to creek, the crew traveling with light equipment, the method being to fish each creek as effectively as possible and then move on to another. In this way good catches were made, and when the routine was established the daily catch averaged 30 to 500 trout. Specimens weighing 8 pounds were taken, and 5 pound trout were common. The number of small trout taken reduced the average weight considerably.*
>
> *"The most successful method of capture early in the season was by stretching gill nets entirely across the streams.... The season continued stormy, which made it necessary to do most of the work in the creeks, operating throughout their full length in some cases.*
>
> *"A trip to the cannery* [in Egegik] *was made on July 20 to take up more supplies and to arrange to operate as late as possible before proceeding to the States via Kanatak about September 1. This gave a month longer for operations. Storms and heavy rains delayed the return of the party to*

Kanatak village until August 10, when work was resumed with results nearly equal to those before the departure for the cannery.... Good catches were made up to the day of departure for Kanatak to take the steamer Starr for Seward en route to Seattle. Equipment was overhauled and stored in a cabin at Little Becharof Lake....

"All fish captured here were Dolly Vardens, 17,210 of which were destroyed. These average 3 pounds and weighed a total of 51,630 pounds. Gill nets, fyke nets, seines, traps, handlines, and spears constituted the equipment used." (Bower 1924:77).

"Becharof Lake.--The past season [1924] *at Becharof Lake was the most successful yet conducted in Bristol Bay district, which was primarily due to the longer period of operations and greater familiarity with equipment and habits of the fish.*

"Henry Looff and an assistant, with necessary equipment and supplies, proceeded on a commercial steamer from Seattle April 5 and arrived at Kanatak April 17. Freight was transferred to the lake on pack horses, and work began immediately on arrival at **Crooked Creek [Frank's Creek]**, *this being the only place where fishing was possible at the time because of severe weather conditions and ice. Hand lines were used with but fair results pending the arrival of a creek seine from Kanatak. Seine fishing was conducted the entire length of the creek and very good catches made. Gill nets were also effective during this period in a small open stretch of water at the mouth of the creek. Other creeks in the vicinity that were open were prospected for trout before the ice left the lake, but almost no trout were seen except in* **Point Creek**, *where several fair catches were made.*

"The ice began to break up in the lake May 14, and warm weather, assisted by heavy rains, brought all the creeks to flood stage, making fishing extremely difficult owing to the debris. As soon as weather conditions permitted traps were installed in the streams and produced fair results for a short period. All catches, however, fell off rapidly when the ice left the lake, the schools of trout breaking up and scattering.

"Camp was then moved to various locations that had produced good catches in former seasons. No trout were in evidence in any of these points, and the operators returned to the base camp at **Fish Village** *on June 4. The results*

here also were meager. On June 11 camp was established on Camp Creek. While the returns were small there, some large specimens were captured in 4-inch mesh gill nets. Dolly Varden trout 30 inches in length and weighing 15 pounds were taken, and none weighed less than 5 pounds.

"After visiting all the important locations of former years, the operators returned to Crooked Creek on June 15. The water was too high for seining, but trout were noted schooling in considerable numbers. Gill nets produced fair results until salmon made their appearance on June 26. As salmon eggs were then available for bait, hand lines were operated thereafter with excellent results. After this date, also, record catches were made with beach seines along the beach shore, using salmon eggs as lure. The eggs were obtained from the natives at the village, and trout caught were given in exchange....

"Various trips were made during the season to prospect the different streams for trout, but the scarcity noted at each point visited compelled the centering of attention on Crooked Creek and vicinity." (Bower 1925:101).

In 1927, the Alaska Road Commission (1927:63,67-68) examined a route connecting **Egegik** to **Kanatak** (Figure 23 and 5), as part of a winter through-route from Bethel to Kanatak.

"A special examination was made of a route from the lower Kuskokwim district to the coast at Kanatak with a view of establishing a permanently marked winter trail from the Bethel district to some point on the winter boat route down the Alaska Peninsula. As a result of this examination the route from Egegik to Kanatak has been permanently marked."
(U.S. Alaska Road Commission 1927:67-68).

Approximately 40 miles of trail were brushed out or staked along the south side of **Becharof Lake** in 1927. Two "*Shelter Cabins*" were built along the trail the same year. They were identified as 10'X12' frame cabins costing $250.00 each and were situated at "*Upper End Becharof Lake*" and "*Lower End Becharof Lake*" (U.S. Alaska Road Commission 1927:67). The following year, another $250.00, 10'x12' cabin was constructed "*one mile east of Gas Rock.*" A revised 1957 map of the Alaska Road Commission's Kodiak District (Figure 6) shows four shelter cabins along the Kanatak-Egegik winter trail. They are located north of the mouth of **Featherly Creek**, east of

Gas Rocks, at the Becharof Lake outlet, and on Egegik River between the rapids and the lagoon. The revised 1957 map shows a dirt road from Kanatak to the mouth of **Frank's Creek**. The map also places the winter dog sled trail route on offshore lake ice, except for a 3 mile run west of the Featherly Creek shelter cabin and a 1 mile run west of the Gas Rocks shelter cabin.

From August 10 to August 31, 1956, four Service Fishery Aides surveyed salmon spawning streams in **Island Arm** (USFWS 1956:3,10-14). Egegik resident Pete Boskoffsky guided the four aides, who observed most tributaries of Island Arm and **Ruth Lake**. Based at a Service cabin near the mouth of **Cleo Creek**, two-man crews used a 14-foot aluminum boat with an 18 horsepower outboard for transportation from the cabin to Island Arm tributaries. They also used a Bristol Bay gill netter and a 12-foot aluminum boat with an 18 horsepower outboard to access other areas of the **Becharof Lake** watershed. The spawning ground survey report does not indicate whether the fishery aides accessed Ruth Lake by foot or by boat.

A brief biographical sketch of Paul Boskoffsky by an *Alaska Geographic* writer (Campbell 1995b:85-86) includes recollections and descriptions of travel between **Kanatak** and **Egegik** via **Fish Village** during the 1940s and 1950s. Boskoffsky grew up in Kanatak, living there until the village was abandoned in the mid-1950s.

> *"... each spring as families made preparations for the summer away. His family, other villagers and their dogs would walk along the trail through the mountains to Marraatuq, or Fish Village, a small year-round settlement at the edge of Becharof Lake. This would take about four hours. They kept boats at Fish Village.... Then they'd boat across the lake and down the river to Egegik.*
>
> *"When summer work in Egegik ended, they would boat back upriver with a winter's supply of flour, rice and other purchased groceries. They'd arrive at Fish Village in time for chum salmon, which they'd catch and dry for winter. They'd also pick berries and do a little hunting. Then they'd load everything in packs on their backs and on their dogs and walk home to Kanatak, often making several trips, said Boskoffsky."*
> (Campbell 1995b:85).

Nick Abalama (pers.com. 1995) recalled visiting **Fish Village** several times in the 1920s. He stated,

> *"I was in Fish Village maybe around '26, '27, I barely remember. There were a lot of people in houses there, mud houses you know. Sod houses. People from Kanatak, they go fish camp there in the fall. They put up a lot of fish, and then they go back to Kanatak, after they put the fall fish."* (pers.com. N. Abalama 1995).

He further recalled traveling to **Fish Village** via double-ender sailboat, and the presence of other sailboats at Fish Village. He also stated sailboats did not travel up **Ruth River** to **Ruth Lake** due to the shallow water. He uncertainly suggested kayaks may have been used at one time to travel up Ruth River.

Nida Nelson (1990) described historic activities and structures around **Fish Village** in a BIA interview. She mentioned a unique "*steam bath*" in her account of cabins and "*mud houses*" in Fish Village. She described the steam bath, that was built into the side of a small hill, as an upside down sailboat that was covered with mud. Her husband, Andrew Nelson, referred to boat use in the same interview. He described gas boats and sailboats (double-ender fishing dories) used for hauling groceries and supplies from **Egegik** to Fish Village, as well as being used for wood gathering on some Island Arm islands.

In a subsequent interview Nida and Andrew Nelson (pers.com. 1996) described boat use in greater detail. Nida's father, Dan Amok, had three cabins around **Island Arm** during the 1940s and 1950s. Located at **Featherly Creek**, **Fish Village**, and south of the mouth of **Bear Creek**, they were used as seasonal residences and trapping cabins. Nida's father had a 30-foot long, homebuilt wooden boat that was purchased from Kejulik River resident George Hadden. It was powered by a Redwing outboard engine and described as wider than a double-ender. Members of the Amok family traveled by boat between various locations in Island Arm. Nida also recounted annual round trips between Island Arm and **Egegik** as the family accompanied her father to Egegik for the commercial fishing season. The Amok family departed for Egegik as soon as the lake and river ice went out, usually about June 1. The family traveled by the previously described 30-foot boat, which towed a double-ender and an 18-foot skiff. The double-ender and skiff were loaded with winter supplies and fuel purchased in Egegik for the July or August return trip to Island Arm. During a month long period of late summer in the 1940s, Andrew and Nida recalled that as many as six or eight boats at a time might be found at Fish Village. People came from Egegik in double-enders and 20-24- foot long skiffs for multiple activities, such as putting up fish, visiting, celebrating a church holiday in **Kanatak**, and bear hunting.

Nida Nelson also described her personal experiences in boats at two Island Arm streams, Featherly Creek and Ruth River. Nida said she had traveled up **Featherly Creek** in a

16-foot skiff, past the shallow mouth, to a point approximately 2 miles upstream from the mouth. Regarding **Ruth River**, she said as a girl she used to "*push*" the family skiff up the entire length of the stream to access **Ruth Lake** for the purpose of catching fish and duck hunting. Nida described the process of getting the boat upstream as three or four people or children wading in the stream, pushing the skiff in front of them. She characterized Ruth River as often having low water, but having high water following rains. She remembered that many people went to Ruth Lake in the fall, recalling that someone did travel up the river by boat. However, she did not remember who it was.

BIA anthropologist Matt O'Leary referred to **Island Arm** in an investigative report of Kanatak. He briefly sketched activities of **Kanatak** residents for much of the twentieth century, activities detailed in several oral interviews by former area residents that support O'Leary's description. He wrote,

> *"Kanataq trapping camps and winter residences dating from the first half of this century dot the southeast shores* [Island Arm area] *of Becharof Lake, where village residents hunted moose, caribou and bear, and harvested a variety of fish from the lake waters and tributary streams. Kanataq people had long maintained a large summer fish camp (Marraataq)* [Fish Village] *at the lake's southeast end which they continued to occupy each summer when the commercial fishing season ended."*
> (U.S. Bureau of Indian Affairs 1991b:6).

Several pre-statehood camps and cabin sites on **Island Arm** shores are described in detail by O'Leary (U.S. Bureaus of Indian Affairs 1991a) in his investigative report of historical places and cemetery sites on **Becharof Lake**. O'Leary's report contains an excellent historical summary of activity on Island Arm supported by numerous oral interviews of previous residents and of seasonal users. The report includes some general comments regarding boat use and mentions Dan Amok's boat, previously described by Nida Nelson (pers.com. 1996).

Egegik resident Frank Tretikoff (pers.com. 1995) recalled traveling to **Island Arm** and **Fish Village** in the early 1950s. As a young teenager, he accompanied Nickolai Ruff ("*Chiefy*") in a boat named the "*Swallow.*" According to Tretikoff, Ruff's boat was a converted double-ender with a "*lugger*" engine. When asked about hazards in Island Arm, he cited shallow water and submerged rocks along the Arm's west shore, and shallow water off Severson Peninsula. Jack Abalama (pers.com. 1995) mentioned an area southeast of Severson Peninsula with a shallow, rocky lake bottom. Charlie Kelly

(pers.com. 1995) and Eddie Clark also mentioned the need for cautious boat travel in many areas of Island Arm due to shallow water and submerged rocks.

e. Post-statehood uses

One early and notable post-statehood use of **Island Arm** and several of its tributaries involved oil company drilling activities in 1959 and 1960. Road construction and transportation affected Island Arm at the **Little Narrows**, and two streams, **Bear Creek** (Figure 24) and **Featherly Creek**. One example of correspondence regarding oil exploration impacts follows. Service fisheries biologist George M. Kaydas described initial oil road activities and their impact on streams and Island Arm.

> *"On May 2, 1959 an aerial survey was made of the road from the head of Bear Creek to Mt. Peulik to observe the effects the road had on the fish streams in the area....*
>
> *"With reference to the attached map the road begins at the old drilling site (no.1) and follows the meanders of Bear Creek. In approximately the first six miles of road (to point no.2) there are nine crossings. There is evidence that at one time culverts had been installed on most of the crossings but subsequently had been washed out or broken and now all of the crossings have been accomplished by driving through the stream bed. In two locations the road went down the middle of the stream for a distance of several hundred yards.*
>
> *"Equipment observed on the road included trucks with semi-trailers and bulldozers, at least D-8's, and probably larger. The semi-trailers appeared to be quite heavily loaded with portions of the drilling rig, generators, wanigans, etc.*
>
> *"The road crosses the uppermost arm of Becharof Lake* [Island Arm at Little Narrows] *with an earth fill approximately two hundred yards long and originally, there were two culverts installed in the fill to allow free flow of water. Discussions with Mr. Earl Walker, assistant manager for General Petroleum on this project, revealed that a short time ago high water washed out both culverts so a solid fill was made to allow equipment to keep moving. Later a portion of the fill was removed to allow free flow of the water. The road crosses two more salmon streams after crossing the end of the lake. The stream at the base of Mt. Peulik (#4) has the only two working culverts that were observed on any of the fish streams. There were two three foot culverts installed properly in the stream and running full of water.*

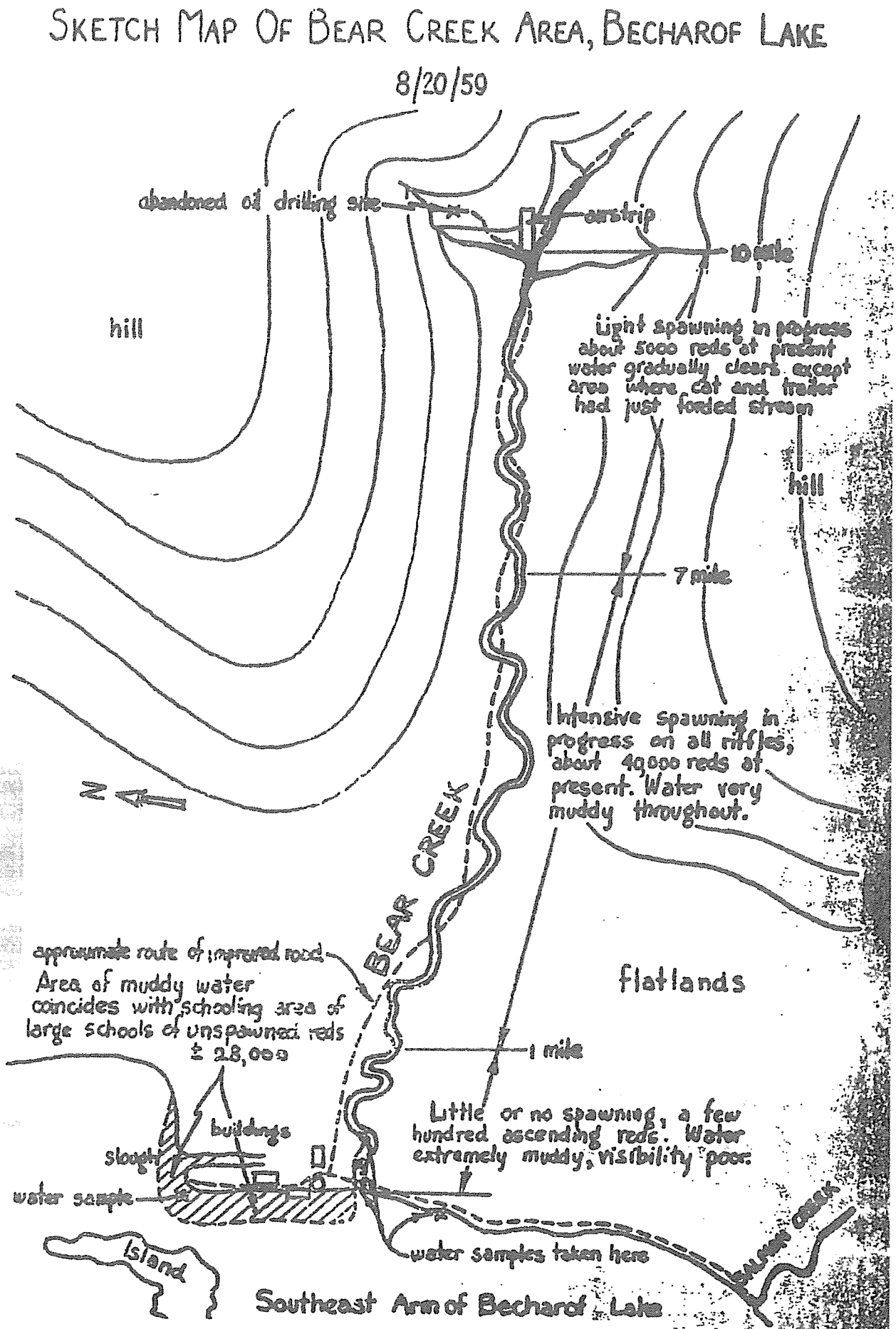


Figure 24. Sketch map of Bear Creek (Island Arm), oil road, and terminus for tug and barge.
Source: Noerenberg 1959.

There are no salmon streams that cross the road west of Mt. Peulik. The drilling rig will be installed near Dago Lake at #5 on the chart.

"....The crew moving the drilling rig began freighting about March 15. It is estimated that about sixty individual trips will be required to move the rig and presently about one third have been completed." (Kaydas 1959).

Correspondence by others (Noerenberg 1959; Paddock 1960) further detail the impacts of oil drilling activity on **Island Arm** shoreline, the **Little Narrows**, **Featherly Creek**, and other streams in 1959 and 1960. Visible submerged evidence of fill material and culverts at the Little Narrows still remains in its shallow water (pers.coms.: Kelly and Clark 1995; J. Abalama 1995; Tretikoff 1995; Eaton 1995). Dewey Eaton (pers.com. 1995) also stated a culvert remains at Featherly Creek, approximately 3.5 to 4 miles upstream from its mouth. The transportation of oil drilling materials by tug and barge from the mouth of Bear Creek is described in the Becharof Lake, Post-Statehood Use section of this chapter.

The Fisheries Resource Institute, University of Washington, conducted hydroacoustic fish stock surveys in **Island Arm** during 1974 for ADF&G. Institute scientists made 10 Island Arm transects during September 1974, using a 17-foot, outboard powered Boston Whaler (Lemberg and Mathesin 1975:1-2). Though the investigators did make numerous transects of **Island Arm** in a 17-foot, outboard powered Boston Whaler, they omitted **Ruth Lake** from their study. They wrote, *"**Ruth Lake** was not surveyed because low water in Ruth Creek precluded access by boat."* (Lemberg and Mathisen 1975:1).

Five ADF&G employees conducted salmon surveys on Island Arm tributaries in 1975 (ADF&G, Div. Commercial Fisheries 1975). They surveyed **Cleo Creek**, **Becharof Creek**, **Bear Creek**, **Ruth River**, and **Featherly Creek** primarily by walking, but they also used an Avon inflatable boat of undetermined size. At **Cleo Creek** they surveyed 4 miles upstream from the mouth and had *"No need for the Avon at mouth."* On **Becharof Creek** they *"Counted mouth areas from Avon - worked well, Used Avon to Mile 2."* On **Bear Creek** they had *"No need to use the Avon on this stream."* Field notes comments for **Ruth River** read *"Use of the Avon is very helpful and may be taken up .5 miles from mouth."* **Featherly Creek** Field notes have the comment, *"Ideal stream to use Avon raft due to the high bank,"* and contains a recommendation that an Avon be used to halve survey time. During the August survey of these streams they observed 67 bears and counted more than 10,000 bear killed salmon. The Field notes contain comments on the danger of working on the streams with the hazardous presence of brown bears.

Three ADF&G personnel conducted a **Ruth Lake** and **Ruth River** fish survey in 1980 (Russell 1980). Report excerpts follow.

> *"June 4. ...left King Salmon with Peninsula Airways in a widgeon at 1340 hrs. bound for Ruth Lake. Arrived at the lake at 1440 hours and landed at the outlet end...the beach was firm enough to taxi the widgeon up on the bank....*
>
> *"Inflated our Avon raft and made trip around the lake....*
>
> *"June 6.... Observed no one around the "Fish camp" cabin at the Ruth River outlet. Found location of old native village near river mouth - east side of river. Walked old Kanatak trail back up to camp at Ruth Lake."*
>
> *"June 7.... Located 20-30 old pit house sites on grassy terrace just east of lake outlet."* (Russell 1980:1,4).

Egegik resident Frank Tretikoff (pers.com. 1995) stated he reached **Ruth Lake** by boat on one occasion. He described the boat as an 18-foot skiff powered by a 9 horsepower kicker. He said **Ruth River** was alternately shallow and deep, necessitating the boat to be pushed through shallow water, while intermittently using the outboard engine to propel the boat through deeper water.

Egegik resident Jack Abalama (pers.com. 1995) worked as an assistant hunting guide for Park Munsey during the early 1970s, primarily in the Island Arm area. Mr. Abalama described **Ruth Lake** as deep and **Ruth River** as very shallow, noting that the deepest river water was about two feet deep. He said he could travel up Ruth River to Ruth Lake in a jetboat, but not in a boat with an outboard, which would require pushing it upstream by hand.

Charlie Kelly (pers.com. Kelly and Clark 1995; pers.com. Olsen 1995) traveled halfway up **Ruth River** in a 20-foot skiff, but shallow water prevented further travel. He noted that heavy rains will raise the water level in the river. He also mentioned Frank Tretikoff's successful trip to Ruth Lake via Ruth River.

Pete Olsen (pers.com. 1995) attempts to visit Kanatak annually. He said he gets almost halfway up **Ruth River** with a skiff where he then camps and continues on foot to **Kanatak**. Shirley Kelly related that she and husband Charlie traveled "*three bends up*"

Ruth River in a 20-foot skiff. She also stated they almost reached Ruth Lake in a "*little Zodiac*" with a "*little kicker*" (pers.com. Olsen 1995).

Dewey Eaton (pers.com. 1995) conducted fisheries field research for the summers of 1991 and 1992. He investigated four **Island Arm** streams, visited several others, and traveled throughout the area. He recalled seeing only one boat other than his during the two summers of work there. He suggested a 14-foot aluminum Lund with a jet unit probably could go up **Ruth River** to the lake in moderate to high flow stream conditions that occur occasionally. Describing **Becharof Creek** as the largest Island Arm tributary, Eaton stated he could ascend the creek approximately one mile under normal water conditions in a 21-foot Woolridge with an inboard jet unit. He did travel approximately 6 miles upstream in a 14-foot Lund with a 40 horsepower jet with Becharof Creek at flood stage. Commenting on other tributaries, Eaton described **Featherly Creek** as having a sandy, shallow delta at its mouth. Deterred by shallow water at the mouth, he did not attempt to ascend this tributary. Regarding **Salmon Creek**, Eaton said boat travel upstream was possible for approximately one-quarter of a mile to a place where gravel bars stop further passage.

Service fisheries biologists established a temporary camp on **Featherly Creek** during 1994 and 1995 (pers.com. Adams 1995). They reached the creek by landing a wheeled aircraft on a sandblow approximately 3 miles above the mouth. They then packed a 12-foot Redshank inflatable boat overland 100 yards to Featherly Creek. The stream's water, though very shallow, allowed them to wade upstream with the inflatable boat and float downstream on several occasions. Charley Kelly (pers.com. Kelly and Clark 1995) said he had no problem running a jetboat quite far up **Featherly Creek**.

Dan O'Hara (pers.com. 1995), while working as a commercial air taxi operator, frequently landed a wheeled plane at the **Featherly Creek** sandblows (about 3 miles upstream from the mouth of Featherly Creek) to drop off hunters and fishermen. He referred to this stream as a very popular place for fishing and drop-off hunting. He said, *"People don't go up Featherly Creek in a skiff; they walk down it, all the way to the mouth from the sand blows."*

f. Navigability Status

A 1994 "*Fact Sheet*" of Alaska navigable waters authored by the U.S. Army Corps of Engineers, Alaska District (1994), lists **Becharof Lake** (and Island Arm by inclusion) as one of 36 Alaska waterways determined to be navigable by the Corps.

The BLM issued a 1984 navigability determination for all water bodies on lands encompassed by State selections in eight townships of the Ugashik quadrangle (Arndorfer 1984). Two of those eight townships include **Ruth Lake**, **Ruth River**, and the southernmost portions of **Becharof Lake**. According to the report, the 1984 determinations were the first made for these waters by the BLM. Citing general information, three books, and oral interviews with eight people, the BLM's Deputy State Director for Conveyance Management made a determination for purposes of conveyance only. He found Becharof Lake, Ruth Lake, and Ruth River to be navigable. He found all other named and unnamed freshwater lakes and streams in T. 30 S., R. 42 W., S.M., and T. 30 S., R. 43 W., S.M., to be non-navigable.

> "*Based on this report, I determine* ***Becharof Lake***, ***Bellim Bay*** *(because of lateral extension),* ***Ruth Lake***, *and* ***Ruth River*** *to be navigable. It appears from the available information that these water bodies were used as highways of commerce by commercial waterborne crafts (i.e., wood skiffs) at the time of Statehood. The river and lakes provided access to trapping cabins and trapping areas and transportation for the sale of these furs; they also served as a travel and trade route across the Alaska Peninsula from time immemorial. Also, I affirm the determination that Lower Ugashik Lake is navigable. I determine all other named and unnamed water bodies within the report area to be nonnavigable. Note: Portage Bay and Kanatak Lagoon are tidally influenced and are therefore navigable."*
> (Arndorfer 1984:7).

The above quoted determination unclearly defines **Becharof Lake**. The Director may have referred to Becharof Lake in its entirety, a small portion of Becharof Lake within two specified townships, or Becharof Lake's Island Arm which he mistakenly may have called **Bellim Bay**. The relatively small Bellim Bay (Figure 20) is approximately seven miles northeast of the Becharof Lake township waters cited in the report. The waters of Bellim Bay are part of Island Arm, as well as part of Becharof Lake.

The 1984 BLM navigability determination, cited above, also included the following information regarding **Ruth River** and **Ruth Lake.**

> *"According to Aleck Griechen, Ruth Lake was used before 1959 for trapping. Old sailboats and power skiffs were used by trappers to reach Ruth Lake. He claimed that a 32-foot vessel can be taken up Ruth River to Ruth Lake when the water is high. Two years ago* [1981], *he saw a party use Ruth Lake for access to trapping areas. They were flown in and were using a skiff and canoe which was brought up Ruth River earlier and left at Ruth Lake. There is an old fish camp at the northeast end of Ruth Lake. Mr. Griechen noted that Standard Oil built a road in the area about 1927. The company used the road rather than the lake to transport goods. Mr. Griechen said that Kanatak Pass was the main route from Kanatak Village to Bristol Bay. This pass is no longer used for transportation purposes. Years ago people dragged 18-foot skiffs by horse-drawn trailers from Kanatak Village to Ruth Lake. Trappers traveled down Ruth River with supplies and furs which were picked up at Bellim Bay.*
>
> *"Warren Seybert said that Ruth River and Ruth Lake were used traditionally by the Natives for about 50 years. He said he got his information from talking to the Natives through the years. He has not seen boats on Ruth Lake, however.*
>
> *"Ruth River is 'not entirely navigable,' claimed Randy Wilk. He described the river as being shallow and rocky, and recalled that he once saw a 15-foot, flat-bottom Boston Whaler about one-third the distance up the river. He added that travelers could possibly effect portages on the river.*
>
> *"Dick Russell described Ruth Lake as deep and very windy. State Fish and Game personnel once used an Avon raft with a small motor on Ruth Lake for netting operations. Visiting the area one year with a friend, he noticed the remains of an old village on the northeastern corner of Ruth Lake. Only big collapsed piles remained. Commercial sport fishing guides now fly people to the lake, he said.*
>
> *"Mr. Russell described Ruth River as being a good-sized body, approximately 250 feet wide with a large volume of water. The river is shallow, however. He saw the remains of an old wooden fishing boat hull,*

less than 20 feet in length, in the grass on the lower 100 yards of the river. Mr. Russell commented on the 'old mail route trail' which runs near Ruth Lake and Ruth River, saying that he saw an old anchor on the trail.

"Jerry Yeiter said that in his opinion Ruth Lake is navigable. He claimed that the old portage from Bristol Bay to Kanatak included Ruth River and Ruth Lake. Mr. Yeiter stated that he transported sportsmen to Ruth Lake by airplane for trout and salmon fishing and caribou hunting. He said that the people walked along Ruth River to Bellim Bay where he met them with his plane. He thought that one could get boats up Ruth River at certain times of the year but he has never seen any on the river. Mr. Yeiter described Ruth River as being about 150 feet wide and flowing at about 5-1/2 miles per hour. The bay at the mouth of Ruth River is deep. He said there are only a few cabins standing in the Bellim Bay area: two guide cabins and three or four trappers' cabins. Mr. Yeiter said he got his information from talking to different people from Pilot Point and Ugashik."
(Arndorfer 1984:5-6).

To confirm and expand upon the above comments, attempts were made to contact sources cited in the BLM determination. In a 1996 telephone conversation, Aleck Griechen (pers.com. 1996) stated he had never traveled by boat on **Ruth Lake** or **Ruth River**. When asked if he had ever seen a boat on Ruth Lake or Ruth River, he stated he had only accessed Ruth Lake by float plane. He did note that several air taxi operators based in King Salmon flew clients to Ruth Lake. When asked about mail routes, trapping activities, and travel over the Kanatak-Fish Village trail, Mr. Griechen suggested Egegik residents would be more knowledgeable of this area. Orin Seybert (pers.com. 1996) hurridly offered no information when asked about flying clients to Ruth Lake for the hunting and fishing purposes. Randall Wilk, a former Becharof NWR biologist, was not contacted. Portions of Richard Russell's journal accounts of Ruth Lake and Ruth River are included in earlier parts of this report section. Mr. Yeiter is reported to be deceased.

No other navigability reports or determinations were located for other Island Arm tributaries.

King Salmon River and Tributaries

C. King Salmon River Watershed Unit

The 92 mile-long King Salmon River Watershed Unit has two sections (Figures 25 and 26). The 63 mile long lower section, **King Salmon River and tributaries**, begins near the mouth of the Egegik River and ends at RM 63 where the King Salmon River becomes Takayofo Creek. The elongated lower section, located mostly within Becharof NWR (Figures 2 and 3), has numerous lowland tributaries.

The upper section of the King Salmon River Watershed, referred to as **Upper Tributaries of King Salmon River**, begins at RM 63 and ends at RM 92 in the upper reaches of Takayofo Creek. This smaller section of the King Salmon River Watershed lies in a mountainous basin, almost entirely within the designated wilderness area of Katmai National Park and Preserve.

The King Salmon River is the major tributary to the Egegik River.

C. King Salmon River Watershed Unit

1. King Salmon River and tributaries

a. Summary

The lower section of the King Salmon River Watershed Unit extends from the mouth of the King Salmon River upstream 63 miles to the boundary of the Becharof National Wildlife Refuge and Katmai National Park and Preserve. The hydrologic characteristics of the King Salmon River are not well documented. The river is a silty stream with glacial origins that flows across tundra lowlands and discharges into the Egegik River near its mouth. Braided channels and slow moving currents typify the King Salmon River, which is tidally influenced 4 miles upstream from its mouth. High winds, fluctuating water stage, shallow water, slow current, and Class III rapids 2 miles upstream of the Gertrude Creek confluence have impacted river travel.

Notable clearwater streams flowing into the river include Jack Alto's Creek, Gabes Creek, Kelly Pt. Creek, Whale Mountain Creek, Mossy Creek, Granite Creek, Mink Creek, and Gertrude Creek. Gertrude Lake and numerous unnamed lakes occupy the watershed.

Documented pre-statehood use of the King Salmon River is scarce. Subsistence activity occurred along the river by people using bidarkas and motorized skiffs. The lower half of the King Salmon River has been identified as a historic subsistence resource area. The extent or existence of pre-statehood commercial/recreational hunting, trapping, and fishing activities is unclear and requires further investigation.

Post-statehood use of the King Salmon River primarily has been characterized by on-going fishing and hunting subsistence activities and by growing sport fishing and hunting activities. A greater incidence of subsistence activities occurs on the lower reach of the King Salmon River. Access to upper river areas is primarily by air, but boat travel has occurred along the entire length of the river's mainstem. Sport hunters and fishers have frequently floated down the upper King Salmon River in inflatable rafts, having accessed the river from aircraft drop points on the upper tributaries of the King Salmon River. Motorized skiffs and jetboats from Egegik are reported to have traveled the entire length of the mainstem river. Raft and boat activity occurs on Gertrude Creek.

b. Names and locations

The **King Salmon River** (Sec. 32, T. 23 S., R. 49 W., S.M.) discharges into the Egegik River 2 miles upstream from the village of Egegik and Egegik Bay. The river has the ADF&G anadromous fish stream catalog number 322-10-10080-2011 (ADF&G, Habitat Div. 1994:119). The approximate lower one-third of the King Salmon River winds primarily through State lands while the upper two-thirds of the river lay in the Becharof NWR (Figure 4). The King Salmon River extends upstream to the confluence of Takayofo and Contact creeks at RM 63 (Sec. 20, T. 23 S., R. 41 W., S.M.). This confluence marks the boundary between Katmai National Park and Preserve and Becharof National Wildlife Refuge (Figure 25).

Orth (1971:523) states the river was named by W.H. Osgood in 1902. Osgood (1904) makes no reference to the river in his reconnaissance of the Alaska Peninsula other than showing the place name on a map. He did paddle past the mouth of the **King Salmon River** on September 29, 1902 (Osgood 1904:19). Nick Abalama (1990) calls the river by its Yup'ik name, "*Quqtarvik,*" which translates as "*a place to gather wood, usually firewood.*" Floating the King Salmon River by raft in 1978, a Federal Government employee noted "*an abundance of wood*" at the river's upper reaches, "*little firewood*" in the Granite Creek area, and limited firewood on the lower river (Dapkus 1978:2-4). Andrew Nelson (pers.com. 1996) stated he and others cut alders along the lower King Salmon River for use as fuelwood in Egegik village residences.

Only two streams discharging into **King Salmon River** within this lower section are named on USGS topographic maps. These are Granite Creek and Gertrude Creek. Several King Salmon River tributaries lacking official names have local names identified by local residents and Service personnel (pers.com. Terrell-Wagner 1995b).

King Salmon tributaries, river-miles, section-township-range location of the tributaries' mouths, and ADF&G anadromous fish stream identifier numbers follow. The streams are ordered from the mouth of the King Salmon River to upstream points.

Jack Alto's Creek flows into King Salmon River at RM 3 (Sec. 21, T. 22 S., R. 49 W., S.M.). Two miles upstream on Jack Alto's Creek, USGS topographic maps show the creek bifurcates and a smaller channel meanders to King Salmon River at a point 4.5 miles upstream from the main channel mouth (RM 7.5). The USGS topographic map [Nanknek B-4 Quadrangle, 1:63,360 series] shows unnamed Jack Alto's Creek drains numerous

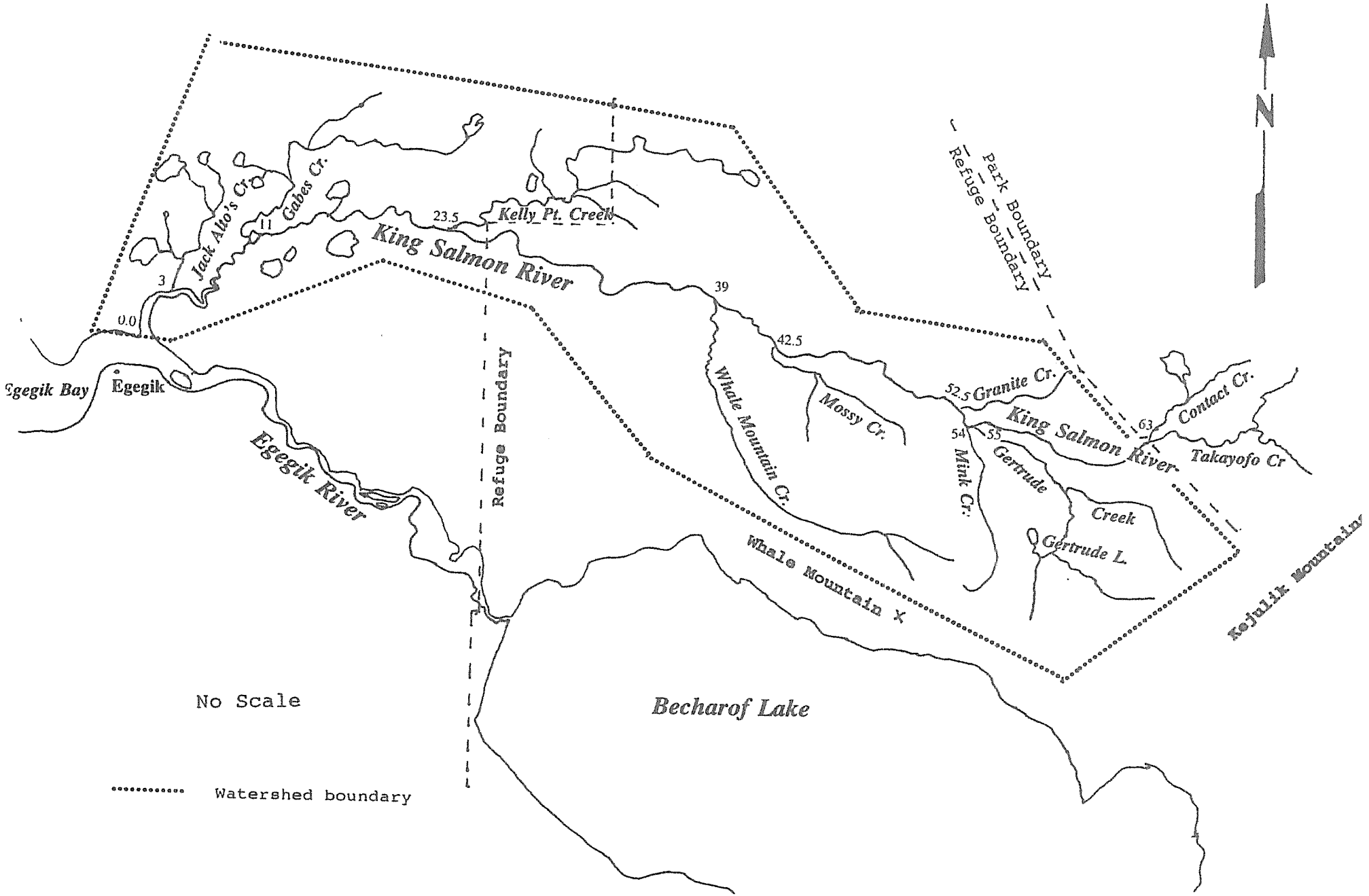


Figure 25. King Salmon River watershed, excluding upper tributaries.

potholes and two unnamed lakes. The unnamed lakes have a surface area greater than one mile square each (Sec. 35, T. 21 S., R. 49 W., S.M., and Sec. 8, T. 22 S., R. 49 W., S.M.).

Gabes Creek discharges into King Salmon River at RM 11 (Sec. 6, T. 22 S., R. 48 W., S.M.). This stream divides into dozens of smaller distributaries, drains hundreds of small ponds, and heads at unnamed potholes in Sec. 31, T. 20 S., R. 46 W., S.M.

Kelly Pt. Creek enters King Salmon River at RM 23.5 (Sec. 2, T. 22 S., R. 47 W., S.M.).

Whale Mountain Creek flows into King Salmon River at RM 39 (Sec. 24, T. 22 S., R. 45 W., S.M.). The ADF&G anadromous fish stream identifier for this stream is 322-10-10080-2011-3080. This approximately 25 mile long King Salmon River tributary drains the north slopes and north basin of Whale Mountain.

Mossy Creek enters the King Salmon River at RM 42.5 (Sec.. 32, T. 22 S., R. 44 W., S.M.).

Granite Creek, at RM 52.5, is the river's first official named tributary upstream from the mouth on the King Salmon River. Granite Creek's name was reported by the USGS in 1952 as a local name (Orth 1971:383), but it had been known as Granite Creek as early as the 1920s (Wingard n.d.).

Mink Creek discharges into King Salmon River at RM 54 (Sec. 24, T. 23 S., R. 43 W., S.M.). This stream drains eastern Whale Mountain and has origins just 2 to 3 miles north of Becharof Lake shores.

Gertrude Creek is a 15 mile long tributary flowing into King Salmon River at RM 55 (Sec. 19, T. 23 S., R. 42 W., S.M.). Gertrude Creek's name was reported by the USGS as a local name in 1952 (Orth 1971:365). However, the creek is shown as Limestone Creek on a 1920's era hand drawn U.S. Bureau of Fisheries map (Wingard n.d.). Gertrude Creek has the ADF&G anadromous fish stream identifier number 322-10-10080-2011-3130 (ADF&G, Habitat Div. 1994:117). Contrary to current USGS topographic maps that show Gertrude Creek heading in a small pond at Sec. 27, T. 24 S., R. 41 W., S.M., Service personnel refer to the main branch of Gertrude Creek as the longer southern fork which terminates in T. 25 S., R. 40 W., S.M., (pers.com. Adams 1995; pers.com. Terrell-Wagner 1995b).

Other tributary place names are indicated on the 1920s U.S. Bureau of Fisheries map (Wingard n.d.) but imprecise cartography makes matching early place names with contemporarily mapped tributaries speculative. They include Eva Creek, Prospect Creek, Shist Creek, North Fork, Middle Fork, and South Fork (Figure 13).

Gertrude Lake is located at Sec. 16, T. 24 S., R. 42 W., S.M., where it discharges into a small tributary of **Gertrude Creek**.

c. Physical characteristics

The Service's comprehensive plan for Becharof NWR (USFWS 1985:21-22) summarizes the physical characteristics of both sections of the **King Salmon River Watershed Unit**, the King Salmon River (RM 0 to RM 63) and the Upper Tributaries of the King Salmon River (RM 63 and above). The plan states,

> *"The King Salmon River originates in the Kejulik Mountains in Katmai National Park and flows west about 100 miles (160 km) into the Egegik River near the village of Egegik. It drains 990 square miles (2,560 km^2). Because the river does not have a gauge, its discharge and flow regimes are unknown. Groundwater yields along the river vary from 10 to 100 gallons/minute (40/400 L/min). Three major tributaries, Contact, Angle, and Takayofo creeks, form the headwaters of the King Salmon River....Sediments carried by these creeks contribute to the turbidity of the King Salmon River.* (USFWS 1985:21-22).

The 63 mile long **King Salmon River** has very little documented hydrologic data. The USGS has conducted no hydrologic study of the watershed (Bigelow 1995). The limited but best documented information for King Salmon River hydrology is found in 1978 recreation oriented reports from U.S. government employees (Dapkus 1978; Merrick 1978; Wagner 1978). Representing five Federal and State agencies, seven people floated the length of the river in 1978 to assess the river's suitability for designation as a wild and scenic river. Three river recreation publications (Mosby and Dapkus 1992; U.S. Heritage and Recreation Service n.d.; Carter 1982) also describe King Salmon River but contain considerably less detail than 1978 Federal agency field notes and memoranda.

Alaska Paddling Guide (Dapkus and Mosby 1992:62) describes **King Salmon River** as a *"slow (1-2 mph), silty river flowing across moist and wet tundra covered coastal plain."* *Floating Alaskan Rivers* (Carter 1982:32) calls King Salmon River a tundra stream, winding across the coastal plain.

Floating the lower 10-12 miles of **King Salmon River** in August, 1978, Heritage Conservation and Recreation Service planner David Dapkus (1978:4) estimated the current velocity at 0-1 mph. He described this lower reach of the river as silty, roughly 200 feet wide, 2 feet deep, and being braided into several sandy bottom channels. He noted tidal effects on the lower 4 miles of the river. Dapkus and the other members of the governments' 1978 river reconnaissance party camped overnight on one of the numerous

King Salmon River sand bars 10-12 miles upstream of the river's mouth. Field notes by Dapkus describe the river between RM 10 and 30. His journal entry reads,

> *"The riverbed and banks consisted of gravel, small rocks, and some sand. The river was 150 feet wide, 3 feet deep with some 8 foot deep pools, and had a 1 mph current. It continued to be silty with clearwater tributaries."* (Dapkus 1978:4).

Dapkus also described the **King Salmon River** between the vicinity of RM 30 and Granite Creek at RM 52.5.

> *"The river continued to be murky and its tributaries clear. It was braided and shallow - inches to five feet deep, but usually two feet deep. The river varied from 75 feet to 10 feet wide, while flowing at 2 to 3 mph."* (Dapkus 1978:3).

Between the mouth of Granite Creek at RM 52.5 and the upstream limit of **King Salmon River** at RM 63, Dapkus observed,

> *"Riverbed was mixed sand and gravel. The River was 100 feet wide, two feet deep, with a current of three to four miles per hour. There were a few sweepers. It was all Class I except for a 100 yard long Class III rapid about two miles above Gertrude Creek* [RM 57]. " (Dapkus 1978:3)

Gertrude Creek is a large clear water tributary of King Salmon River. The lower 4 miles of Gertrude Creek are described as having good gradient and 4 or 5 pools about 6 feet to 8 feet deep. The stream averages 50 feet wide and two feet deep along the lower four miles. A shallow water riffle is located approximately one mile upstream from the mouth of Gertrude Creek, where there are signs of aluminum boats scraping creek bottom rocks (pers.com. Adams 1995). The "*main channel*" of Gertrude Creek from the confluence of the Gertrude Lake outlet (Sec. 21, T. 24 S., R. 42 W., S.M.) to the stream confluence in Sec. 34, T. 23 S., R. 42 W., S.M., is characterized as a narrow and very shallow channel with many gravel bars and protruding rocks (pers.com. Adams 1995).

Gertrude Lake is a small, more or less circular lake of approximately 200 acres with a one-half mile diameter on its longest axis. Service fisheries biologist Jeff Adams stated that the outlet channel of Gertrude Lake is much too narrow to permit passage of a 12-foot inflatable raft (pers.com. Adams 1995).

One member of the 1978 river survey party generally described the fishing and recreational values of tributaries of **King Salmon River**. Bureau of Land Management area manager John Merrick stated,

> *"The clear water stream junctions suitable for fishing were not only relatively few in number, but did not seem to be very productive despite the fact of salmon present. Many of these largest tributaries were either too fast and shallow, or too slow and still."* (Merrick 1978:2).

No waterway changes before, at, or since statehood on the King Salmon River and its tributaries have been found during this research.

c. I. Impediments to travel

Various natural impediments to travel exist on the **King Salmon River**. They include shallow water on braided river sections, silty water, rapids, slow moving water, high winds, sweepers, and dense bear populations (Dapkus 1978; Merrick 1978; Wagner 1978). Some sections of the river are reported as braided and "*inches*" deep. Class III rapids occur at approximately RM 57, two miles above the Gertrude Creek confluence. The entire length of the river is silt laden. Sweepers occur on the lower King Salmon River. The extreme lower reaches have a very slow current in a wide channel where tidal effects exist and winds may be most apparent. Strong upstream winds cited by Dapkus (1978:4) slowed his 1978 downstream float trip. Numerous brown bears in and along the upper river may halt or slow traffic considerably. Signs of beaver activity exist along the riverbanks, but their hindrance to travel is undetermined.

The **Gertrude Lake** outlet, an unnamed tributary of **Gertrude Creek**, is too narrow to allow passage of an inflatable raft. A riffle with shallow water exists on Gertrude Creek approximately 1 mile upstream from its mouth.

d. Pre-statehood use

Documented use of the **King Salmon River** prior to statehood is scarce. The BLM navigability reports found at the end of this sub-chapter describe historic use of the King Salmon River. However, the reports contain no specific reference to pre-statehood use.

Early **King Salmon River** travel via kayak is mentioned by Yup'ik elder Nick Abalama (1990) during a 1990 BIA interview. Mr. Abalama, 67 years old at the time of the interview, described an overland portage for kayak travelers from the north shore of Becharof Lake to King Salmon River. A map accompanying the interview transcripts shows the route terminus at the mouth of an unnamed King Salmon River tributary, identified locally as **Mink Creek**, (approximate RM 54). The route began in the vicinity of **Grindle Creek** (Becharof Lake LM 25.5), and may be the Becharof Lake to King Salmon River portage indicated on Maddren's 1903 map (Figure 17). Abalama refers to a time following cannery establishment in Egegik, and a time when skin boats were still utilized; probably during the first three decades of this century. Virginia White (pers.com. 1996) confirmed the existence of a historic portage route between Becharof Lake and King Salmon River. A translated Yup'ik language excerpt of a 1990 interview with Nick Abalama follows.

> Interviewer: *"(Didn't you say about kayaking....the other day you mentioned about kayak traveling through this route here.)"*
>
> Nick Abalama: *"(Yes, from over hear* [sic] *near Blue Mountain* [Whale Mountain]....*this is called Arvernaq, the real name for it (Blue Mountain). They say they'd go by kayaks to this river to travel down the river."*
>
> Interviewer: *"(They'd carry their kayaks, is that right?)"*
>
> Nick Abalama: *"(They would carry them over land. They say they would begin bringing their kayaks up at break of dawn. They would come to this river (Quqtarvik)* [King Salmon River] *and travel down the river. They would go down the river and by the time they reach the mouth of the river* [at Egegik] *the canneries noon bell would sound off. They would begin here (near Blue Mountain) perhaps 2 or 3 o'clock in the morning and arrive here at noon. They were hunting and looking for food. The reindeer and bear meat was the food source of these people...."* (Abalama 1990:90KON11, p.9).

Maddren's map also shows another portage route between **King Salmon River** and Naknek Lake to the north (Figure 17). This route extends northerly from an unnamed King Salmon River tributary to the southwest shore of Naknek Lake. The short distance shown on Maddren's map between Naknek Lake and the King Salmon River grossly distorts the significantly longer actual distance between the water bodies.

The **King Salmon River** has been identified as a historic subsistence resource area for Egegik (Morris 1987; Behnke 1978). Subsistence hunting, fishing, and trapping continued along the King Salmon River through the time of statehood (Abalama 1990; U.S. BIA 1990a; Lockard 1982; pers.com. O'Hara 1995; pers.com. Tretikoff 1995; pers.com. Olsen). Nick Abalama stated he first traveled up the King Salmon River to hunt moose in 1953, and later hunted moose in 1965, traveling via skiff as far as Walter Kelly's cabin (pers.com. Abalama 1995). Virginia White (pers.com. 1996) recalled being a 15 year-old girl (ca. 1940s) and traveling up the King Salmon River by dog team to go "*hooking for rainbow trout.*"

The extent or existence of pre-statehood commercial/recreational hunting, trapping, and fishing activities involving travel on the King Salmon River is undetermined.

Jay Hammond (pers.com. 1995) stated he landed float planes on King Salmon River near **Gertrude Creek**, and landed wheel planes on Gertrude Creek gravel bars. He also stated the only people he knew that landed float planes on King Salmon River did so because they experienced engine failure.

In 1932 correspondence, Alfred Anderson described **Granite Creek** as a King Salmon River tributary which he traveled up 12 miles. USGS topographic maps indicate Granite Creek has an approximately 7 mile long course. He significantly overestimated the river miles he traveled, or, he may have been referring to another King Salmon River tributary. Mr. Anderson wrote,

> *"I have been prospecting the King Salmon country out from Egegik the last two fall's This last fall I ran a power boat up to Granite Creek which emptys* [sic] *in to King Salmon, and then poled up Granite Creek about 12 miles which was as far as I could get, then I started on foot tword* [sic] *the foot hills and came to another creek which comes from the hills I have been trying to reach..."* (Stirling 1985:Appndx.4, p.104).

e. Post-statehood use

Bureau of Land Management manager John Merrick, a member of the previously mentioned 1978 government sponsored float trip team, made the following **King Salmon River** observations and comments regarding access, boatability, recreational value, and hunting value.

> *"The steam* [sic] *itself is a relatively easy trip for a raft or a kayak. Except for one class III-IV rapids a mile or so before Gertrude Creek, the stream could be negotiated safely in an open canoe - thus it has little challenge for the whitewater enthusiast.*
>
> *"With Lake 592 (which we used by special permission) being in a wilderness area of Katmai, the remaining access alternatives are a second lake* [**Gertrude Lake**] *on a tributary of Gertrude Creek (and reportedly involving a long portage), or landing on a river bar outside the park.*
>
> *"Thus, the difficult access, the murky and relatively unchallenging water, the so-so fishing, the less than spectacular scenery and vegetation are all likely to make the King Salmon River a less than sought after river trip. A probable exception may well be the use of the river for a hunting float trip, since it does have big game which together with its relative inaccessibility may well be an advantage in this instance."* (Merrick 1978:2).

Subsistence hunting and trapping has continued since statehood along the **King Salmon River** (Abalama 1990; U.S.BIA 1990a; Morris 1987; Lockard 1982; Behnke 1978; pers.coms.: O'Hara 1995; Olsen 1995; Tretikoff 1995). Residents of Egegik, Naknek, South Naknek, and King Salmon use the King Salmon River area as a source of fish, caribou, moose, and waterfowl. These resources are harvested by subsistence users and sport/recreation users. S.R. Behnke (1978:143-144) described the King Salmon River area as one accessible only to fly-in hunters whose *"Float planes can land in many lakes in these areas while planes on wheels can use river bars and bare ridges."* He also indicated the entire King Salmon River, downstream of the Park boundary at RM 63, to the mouth of the river, as an *"area of heavy use by fly-in moose and caribou hunters."* According to a Service subsistence study of the Alaska Peninsula, most, if not all, of the King Salmon River lies within the Egegik village resource harvest area, 1962-1982 (Morris 1987:94).

Walter F. Kelly applied for a Native allotment in 1964 and 1969 on the north bank of **King Salmon River** at approximate RM 23.5. He has resided at a cabin site there since 1962, using the area to hunt, fish, and trap (Ducker 1982:13). Mr. Kelly continues to occupy a King Salmon River cabin and to subsist along the river (pers.com. Kelly and Clark 1995).

Egegik resident Pete Olsen (pers.com. 1995) stated he traveled with Charley Kelly up **King Salmon River** beyond the confluence of Granite Creek on a rainbow trout fishing trip. They traveled in September just before freeze up via a 22-foot skiff with an outboard. Mr. Olsen said it was a good time to travel the river because fall rains increased water depth. He also recounted a recent early February thaw and breakup, enabling him to boat up the river. The confluence of **Takayofo Creek** and **Contact Creek** (RM 63) is the upstream limit of his river travel. He stated the King Salmon River is a popular hunting area for moose and ducks.

Naknek resident Dan O'Hara (pers.com. 1995) has hunted the upper **King Salmon River** since 1969. He often hunted moose upstream of the **Gertrude Creek** confluence (RM 55), accessing the area by wheel plane and landing on gravel bars in the King Salmon River. He stated he frequently fished for trout at Gertrude Creek. He further stated one King Salmon outfitter stored a 14-foot Lund skiff at Gertrude Creek. The outfitter would land on a gravel bar, erect a tent, and fly-in parties of four or five fishermen at a time. The client fishermen used the boat to fish the Gertrude Creek-King Salmon River area. Mr. O'Hara stated he has seen jet-boats on the upper King Salmon River, and, that the river was too difficult to ascend a few miles upstream of Walter Kelly's cabin (RM 23.5) with a prop-driven boat.

Heavy sport fishing activity near the confluence of the **King Salmon River** and **Gertrude Creek** is described in a 1985 Service publication.

> *"The major sport fishing area on the refuge is the King Salmon River near Gertrude Creek. Approximately 80% of the sport fishing occurs here, an estimated 560 visitor days. Access is primarily by light aircraft landing on gravel bars in the river. The commercial guide operating in Gertrude Creek books approximately 120 clients in an average season; the average stay lasts about 4 days...."* (USFWS 1985:64).

The **King Salmon River** and **Gertrude Creek** showed frequent and increasing use by sport fishermen according to a cursory Service survey conducted in 1989 and 1990. Based on results from that survey, a follow-up creel survey was conducted in 1991 on

Gertrude Creek that indicated increasing sport fishing activity. Sixty-eight anglers in 26 parties fished 282 hours and captured 829 fish. Anglers at Gertrude Creek primarily targeted rainbow trout, with coho salmon, Dolly Varden, and Arctic grayling also sought (USFWS 1993:101). Guided anglers accounted for the majority of use days (USFWS 1994c:22).

In response to a request from the Region 7 Water Resources Branch, the refuge evaluated water resources threats on the King Salmon River and Gertrude Creek. This evaluation indicated a growth in sport fishing on these rivers. In 1994, the Service's King Salmon Fishery Resource Office (USFWS 1994c:22) believed that the King Salmon River was, *"probably the second most popular drainage fished on the Complex* [AP/BNWR Complex]."

Spring and late summer fish also are harvested by Egegik residents who travel the lower river by "*skiff*" (Morris 1987:85). Winter subsistence ice fishing also occurs on **King Salmon River** (USFWS 1994b:115). According to Frank Tretikoff (pers.com. 1995), Egegik residents travel up the King Salmon River by snowmachine or ATV to ice fish for rainbows in the vicinity of **Gertrude Creek**.

One area of the **King Salmon River** in the vicinity of the western refuge boundary, near RM 25, was investigated briefly in 1981 as a potential source of hydroelectric power (USFWS 1982:44-46). This site was one of numerous possible hydroelectric sites on Bristol Bay rivers reconnoitered by the Alaska Power Authority. Five such Bristol Bay sites were investigated further, but the King Salmon River site was not among them.

At one time, a lodge in King Salmon kept a boat near the mouth of **Whale Mountain Creek** for their fly-in clients' use. The boat was described as a 14-foot jet-boat powered by a 40 horsepower motor (pers.com. Adams 1995).

Gertrude Creek may be accessed via float plane at an unnamed lake (Sec. 16, T. 24 S., R. 42 W., S.M.), referred to as **Gertrude Lake**, that heads a tributary of Gertrude Creek. ADF&G biologist Richard Russell (pers.com. 1995a) twice floated Gertrude Creek and its tributary from the lake. He first traveled down the creek in a 12.5-foot inflatable Avon raft doing fisheries related work in 1978 or 1979. He again floated the same route with Becharof NWR employee Dwight Mumma in the same or very similar raft in the early 1980s. Mr. Russell stated the lake and creek are seeing an increasing frequency of use by sport fishermen and recreationalists. The trip required some portaging and lining of the raft.

Guide-outfitter Tracy Vrem maintained a Service permitted site for a tent frame at **Gertrude Lake** for an undetermined length of time. The site, which he accessed via Cessna 185 on floats, was removed in 1992 (USFWS 1994:138-139). The amount of trash accumulated and removed by Vrem from Gertrude Lake suggests significant lake use by fly-in hunters or fishers through 1992.

Several commercial guides and outfitters take hunters and anglers to the **King Salmon River-Gertrude Creek** area according to Ronald Hood (pers.com. 1996), Becharof NWR Refuge Manager. These commercial operators include Jake Gaudet (Jake's Alaska Wilderness Outfitters), Joe Maxey (Painter Creek Lodge), Phil Shoemaker (Grizzly Skins of Alaska), and J.W. Smith (Rod and Gun Resources).

Service biologist Jeff Adams (pers.com. 1995) and others made several fishery related research trips down **Gertrude Creek** between June and September 1990. They accessed the creek by flying into **Gertrude Lake** via Cessna 206. Following an approximate 1-mile long overland portage east to Gertrude Creek, they floated the stream in a 12-foot inflatable raft with an estimated 500 pounds of gear. Several areas along the stream required the raft to be pulled over shallow places or large rocks. The creek was floated easily after the raft passed the confluence of channels in Sec. 34, T. 23 S., R. 42 W., S.M. Gertrude Creek permitted free floating the remaining 4 miles to its mouth. Adams observed a shallow riffle on Gertrude Creek, about 1 mile upstream from the mouth that may have affected upstream travel by aluminum boats. He noted aluminum marks on creek bottom rocks, indicating they had been scrapped by aluminum boats passing through, or attempting to pass through, the riffle.

Service personnel noted that fishermen access the mouth of **Gertrude Creek** via wheel plane landing sites. One site is located at RM 56 of the King Salmon River, approximately one mile above the mouth of Gertrude Creek. The other site is a Super Cub landing strip at the confluence of Gertrude Creek and the King Salmon River. Service personnel also witnessed a float plane land on King Salmon River, taxi into Gertrude Creek, and discharge passengers for day fishing (pers.com. Adams 1995).

No waterway changes before, at, or since statehood have been found researching this report.

e. Navigability status

King Salmon River use and navigability were topics of 1982 BLM navigability reports and recommendations from the Anchorage District Office of the BLM (Lockard 1982; Ducker 1982; Arnold 1982). These reports were done for purposes of land conveyance and address river sections downstream and outside Becharof NWR. The portion of the King Salmon River addressed in these reports is less than clear due to inconsistencies of township descriptions in the three recommendations.

All reports recommended the **King Salmon River** be determined navigable from the river's mouth to Sec. 3, T. 22 S., R. 48 W., S.M., (approximate RM 14), where King Salmon River first crosses the township line. Some recommendations of navigability extend upstream as far as the township line in Sec. 34, T. 21 S., R. 47 W., S.M., at approximate RM 22.5, which is about 3 miles downstream from the Becharof NWR boundary.

A 1987 BLM memorandum by Arndorfer (1987:2), that reviewed this area's navigable waters, stated portions of the King Salmon River were determined navigable. Arndorfer apparently referred to the August 18, 1982, memorandum by Arnold (1982) which made recommendations for navigability, but did not make navigability determinations. [Note by WJK: It appears no distinction was made between navigability recommendations and navigability determinations in this review that followed the initial reports by 5 years.]

Excerpts from BLM navigability reports for the **King Salmon River** follow. Lockard (1982) discussed the lower King Salmon River, "*approximately 20 miles inland,*" in the earliest report located. In a general navigability report for the Naknek quadrangle he wrote,

> *"Use on the King Salmon River by local people was identified through the report area. This use is in conjunction with subsistence type hunting and fishing activities. A Native allotment and one cabin are also located upstream from the report area and are logically accessible by the River.*
>
> *"Dave Dapkus* [National Park Service] *stated that the King Salmon River was boatable by a large river boat a considerable distance upstream. He felt that a traditional watercraft capable of carrying in excess of 1,000 lbs could navigate the river 50 plus miles upstream. The entire river course is identified as being a "motorized boat corridor" by the Bristol Bay Management Plan access maps....*

> *"Dick Russell* [ADF&G] *said that he was aware of use by the local people (Egegik) as far upstream as 20 miles for subsistence type hunting and fishing. They usually use 18' riverboats powered by at least forty horsepower outboards."* (Lockard 1982:8).

Lockard concluded,

> *"Present use* [1982] *of this river through the report area is identified well past the report area. Its physical size and character lend itself to being a useful highway of commerce and travel route. This use will increase as more and more pressure is exerted on the Egegik area. Also, the easiest, and cheapest access for lands along the river will remain via the waterway. The entire course of the river is identified as a motorized boat route (Bristol Bay Management Plan access maps) and felt to be navigable through the report area."* (Lockard 1982:9)

Reviewing earlier BLM navigability materials, including Lockard's 1982 report, BLM Historian Ducker wrote the following in late 1982.

> *"The ADO's recommendation that King Salmon River throughout the selection area is correct. The lower twenty miles of the river passes through the State's selection. The ADO interviewed Richard Russell of the ADF&G and David Dapkus of the National Park Service....*
>
> *"In January 1964, Walter F. Kelly applied for a Native allotment on the northern bank of King Salmon River in Secs. 29 and 32, T. 21 S., R. 47 S., Seward Meridian* [approximate RM 23.5]. *This was more than twenty miles up the river and above the selection area. He submitted a second application on September 4, 1969. In 1969, Kelly claimed he had a 12'x18' cabin on the land near the river which he lived in each year since 1962 from August to March. From August through October he fished and hunted; from November through March he trapped and hunted. Phillip D. Moreland, the BLM Native allotment inspector for Kelly's application, noted the existence of Kelly's cabin in a report dated December 11, 1973. He also recommended a twenty-five foot horizontal easement above mean high water on the bank of the river 'for future pedestrian access and possible boat landing.'...*

> *"In 1974, the Alaska Department of Fish and Game submitted four easement recommendations revelant to the use of the King Salmon River in reaction to Native selections by Egegik....*
>
> *"The other two easements dealt with airplane access to the river. One called for wheel plane landing strips on two islands in the river in Secs. 2 and 4, T. 22 S., R. 47 W., Seward Meridian* [approximate RM 20.5 and RM 22.5]. *The ADF&G stated these were and continued to be used by local residents for hunting and sports fishermen and hunters. The recommendation said they currently received 'fairly heavy use' for fall caribou hunts. The ADF&G also anticipated their use as fly-in pick-up and entry points for float trips. Another ADF&G easement called for a campsite and plane tie-downs on an unnamed lake (Sec. 1, T. 22 S., R. 48 W., Seward Meridian)* [approximate RM 16] *and a twenty-five foot trail from the lake to the King Salmon River for access 'to [the] river.' The lake was used for sport fishing and by fly-in anglers. The ADF&G stated the reason for the easement was 'access to sport fishing lake by air and from nearby King Salmon River.'...*
>
> *"Recommendations: ...*
> *"King Salmon River be determined navigable through T. 21 S., R. 48 W., Seward Meridian* [approximate RM 17.5]. *Available evidence is unequivocal in indicating its susceptibility to and actual past use in support of locally important trade and travel through this area."*
> (Ducker 1982:13-16).

The BLM Deputy State Director for Conveyance Management (Arndorfer 1983:3) declared one short section of **King Salmon River** meandering through township T. 22 S., R. 47 W., S.M., (approximate RM 21 to RM 25) to be navigable in 1983. The BLM navigability memorandum supported that determination by an oral interview with ADF&G biologist Richard Russell, their assessment of historic use, and the assumption that the immediate downstream waters were determined navigable in 1982. Part of the memorandum states,

> *"Richard Russell, ADF&G, at King Salmon (246-3340) said that the King Salmon River is used by hunters and fishermen in 16'-18' riverboats with lifts. He believed that skiffs up to 24' could use the river as far as Gertrude Creek, in T.23 S., R. 42 W., Seward Meridian.*

> *"King Salmon River, which is silty due to its glacial origin, is used for subsistence fishing by inhabitants of Egegik in both a liquid and solid state for at least 15 miles upriver from Egegik.*
>
> *"One popular use of the river is rafting. Parties are dropped off on sandbars in the river, and raft downstream using Avon or larger rafts. A sandbar at Gertrude Creek* [approx. RM 55] *is a favorite landing spot because it is a clear-water stream, with several species of fish available there. Caribou hunters often use the river, with many being dropped off by plane and rafting down to Egegik. This area is a caribou migration area. Access to tributaries of lower portions of the King Salmon River is had by trappers using riverboats of 16'-18' in length. Trapping is done primarily on tributaries of the King Salmon River."*
> (Arndorfer 1983:1-2).

The State of Alaska's *Bristol Bay Easement Atlas* (Alaska Dept. of Natural Resources, Div. of Land & Water Management 1990:172-174) depicts the **King Salmon River** as "*State Determined Navigable*" from the mouth of the river to the Becharof NWR boundary at approximate RM 25. One atlas map (Naknek B-4) also shows three lower King Salmon River tributaries and seven lakes as "*State Determined Navigable.*" These water bodies are described below.

Several channels of the multiple channeled **Jack Alto's Creek** at RM 3 (Figure 25) are depicted as navigable. The navigable streams of Jack Alto's Creek are those that empty the four largest unnamed lakes located in Sec. 8, T. 22 S., R. 49 W., S.M., and Secs. 21, 23 and 33, T. 21 S., R. 49 W., S.M. The four unnamed lakes are shown as navigable and as the upstream extent of navigability for Jack Alsto's Creek.

A single channel of **Gabes Creek**, RM 11, (Figure 25), is depicted as navigable from its mouth to the largest unnamed lake in Sec. 16, T. 21 S., R. 48 W., S.M. The north shore of this unnamed lake is the upstream extent of navigability for Gabes Creek.

An unnamed, 1 mile long tributary flowing into the King Salmon River from the north at approximate RM 16 (Sec. 35, T. 21 S., R. 48 W., S.M.) is depicted as navigable. The unnamed lake in Sec. 26, T. 21 S., R. 48 W., S.M., is the source of this short unnamed stream and also is shown as navigable.

An unnamed lake with no outlet south of the King Salmon River (Sec. 1, T. 22 S., R. 48 W., S.M.) in the vicinity of RM 17 is depicted as "*State Determined Navigable.*"

Upper Tributaries of King Salmon River

C. King Salmon River Watershed Unit

2. Upper Tributaries of the King Salmon River

a. Summary

The Upper Tributaries of the King Salmon River encompass the watershed area upstream of the boundary between Becharof National Wildlife Refuge and Katmai National Park and Preserve at RM 63. The King Salmon River becomes Takayofo Creek at the refuge/park boundary. Takayofo Creek, Angle Creek, Contact Creek, and Lake 592 are the primary water bodies within the Upper Tributaries of the King Salmon River area.

Information regarding the physical characteristics and use of water bodies in this watershed is very sparse. Larger streams are silty and shallow. The one square mile Lake 592 is described as extremely shallow. Impediments to travel on water bodies may include shallow water, gravel bars, silty water, dense vegetation and sweepers along banks, and the presence of brown bears in or near all creeks.

During this research, no documentation of pre-statehood boat use was found for waters of the Upper Tributaries of the King Salmon River.

Post-statehood use of water bodies appears to be limited to Lake 592, the 1.5 mile unnamed shallow stream draining Lake 592, and the lower 5 miles of Contact Creek. Hunters and anglers flown to Lake 592 and a small airstrip adjacent to Contact Creek float downstream in small inflatable rafts to the mainstem King Salmon River.

b. Names and locations

The **Upper Tributaries of the King Salmon River** watershed begin at RM 63 and end at RM 92 in the upper reaches of **Takayofo Creek**. Present day place name designation has the confluence of **Contact Creek** and **Takayofo Creek**, approximate RM 63, as the terminus of the King Salmon River. This confluence marks the border between Katmai National Park and Preserve, and Becharof NWR. The designation of the river's terminus at this point may be somewhat arbitrary. One observer (Dapkus 1978:3) noted at the Contact and Takayofo Creek confluence, *"There was no noticeable difference in size between Takayofo Creek and the King Salmon River."* The three named streams of this upper watershed lie almost entirely within the Katmai National Park and Preserve's wilderness area. Those streams are **Contact Creek**, **Takayofo Creek**, and **Angle Creek**. The first tributary of Takayofo Creek is referred to by some locals as **Kaye's Creek**.

Contact Creek was named by a USGS land survey party leader, W.H. Sargent, in 1923. Orth (1971:235) quotes Sargent as naming it so "*because it flows along a fault in the rock.*" The creek heads at Yori Pass, running southwesterly for 24 miles to Takayofo Creek. Contact Creek lies entirely within wilderness area of Katmai National Park and Preserve. The creek has the ADF&G anadromous fish stream identifier 322-10-10080-2011-3162 (ADF&G, Habitat Div 1994:116).

Takayofo Creek, also known as Takayoto Creek, was named by W.H. Sargent in 1923. Orth (1971:942) states the name has Native origins, said to mean "*king salmon.*" The creek heads at Kejulik Pass, running northwesterly for 39 miles to Contact Creek. Takayofo Creek lies entirely within wilderness area of Katmai National Park and Preserve. The creek has the ADF&G anadromous fish stream identifier 322-10-10080-2011-3156 (ADF&G, Habitat Div. 1994:126).

> **Kaye's Creek** is an unofficial but locally known name for the tributary that enters Takayofo Creek one-quarter mile upstream from the Takayofo and Contact Creek confluence at Sec. 28, T. 23 S., R. 41 W., S.M. (Terrell-Wagner 1995b). Kaye's Creek heads at Sec.8, T. 25 S., R. 39 W., S.M., near a Kejulik Mountain glacier.
>
> **Angle Creek**, also spelled Angel Creek, is a large tributary of Takayofo Creek. The creek heads at a glacier on Mt. Mageik and flows westerly 25 miles. The name comes from the above mentioned land survey field party in 1923, who so named it *"because it is at the southwestern angle of the Katmai National*

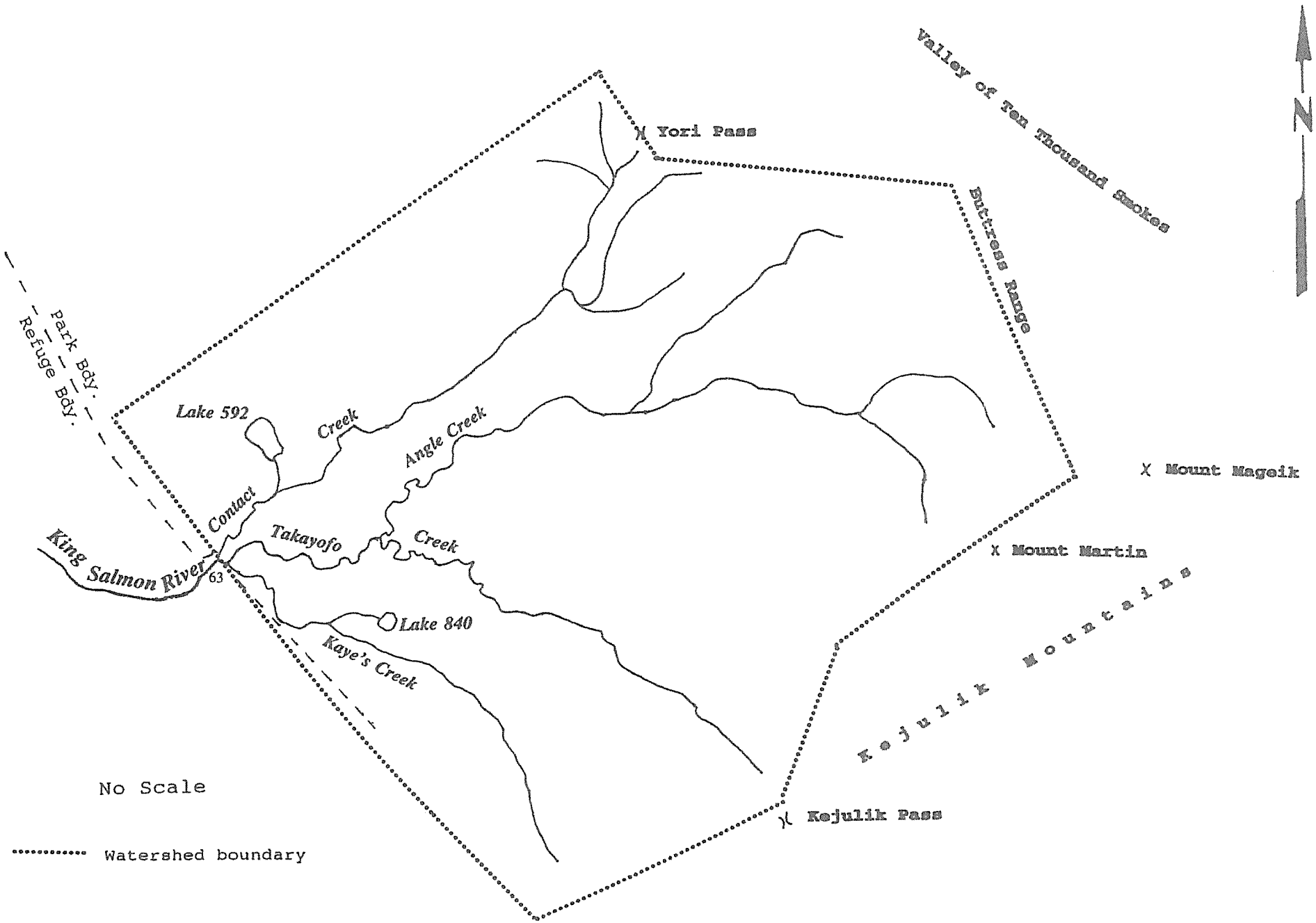


Figure 26. Upper tributaries of King Salmon River watershed.

Monument" (Orth 1971:78). Angle Creek has the ADF&G anadromous fish stream identifier 322-10-10080-2011-3156-4009 (ADF&G, Habitat Div. n.d.: Mt. Katmai, A-6).

Two small unnamed lakes have significance in this watershed. The first has been referred to as **Lake 592** or 592 Lake (Merrick 1978:1; Wagner 1978:2; Dapkus 1978:1), apparently named because of the "*592*" foot elevation printed on some USGS maps and aeronautical charts. It is a nearly 1 square mile lake that discharges into a short tributary of Contact Creek. The lake is situated at Sec. 3, T. 23 S., R. 41 W., S.M. This lake and smaller adjacent ponds were called "*Cozy Lakes*" by National Park Service biologist V.H. Cahalane (1959:14) during the 1953-54 "*Katmai Project,*" a multi-agency assessment of Katmai National Monument.

Another lake may be referred to as **Lake 840**. This small circular lake has an approximate surface area of 130 acres and discharges into a short tributary of Kaye's Creek. The lake is situated at Sec. 31, T. 23 S., R. 40 W., S.M.

c. Physical characteristics

An overview of general physical characteristics and hydrology for the King Salmon River, including the upper tributaries, is located in a preceding sub-chapter concerning the physical characteristics of King Salmon River. Specific physical characteristics of water bodies in the Upper Tributaries of the King Salmon River follow.

Contact Creek was floated by inter-agency government personnel in 13 foot inflatable Avon rafts during August, 1978. They floated from the outlet of "*Lake 592*" (Sec. 3, T. 23 S., R. 41 W., S.M.), down Contact Creek, to its confluence with Takayofo Creek. The stream's lower 3 miles were described as 20 feet wide, with a depth varying from inches to 4 feet. One rafter estimated current speed at 2 to 4 mph. No rapids were passed but many sweepers lined the banks of dense willow brush. The creek rated Class I on the International Whitewater Scale (Dapkus 1978:2).

An **Unnamed stream** draining Lake 592 is over 1 mile long and discharges into Contact Creek. Lake 592's outlet stream was described on August 4, 1978, by Dapkus (1978:2) as being 8 feet wide, 1 inch to 2 feet deep, and having little or no current.

Lake 592 has an irregular and somewhat elongated shape that is oriented northwest to southeast. The longest shore to shore diameter is approximately 6,000 feet, beginning from the outlet at the lake's southernmost point. Lake 592 has a surface area of just under 1 square mile. The lake was described by one member of a government field inspection team (Dapkus 1978:1-2) as *"about 3/4 of mile long and ½ mile wide, but extremely shallow."*

Takayofo Creek is the upstream extension of the King Salmon River. As mentioned previously, one observer noted no appreciable difference in size between the water bodies. They may be considered the same river with different place names.

Kaye's Creek is a glacial tributary of Takayofo Creek. Service personnel described it as having a steeper gradient than Contact Creek. A large riffle exists at the creek's mouth, requiring boats to be pulled across it for upstream travel. Service personnel who walked up the stream 1 mile stated raft travel would be very difficult due to extremely shallow water (pers.com.Adams 1995).

Lake 840 is a small circular lake of approximately 130 acres lying about 5 stream miles above the mouth of Kaye's Creek. The lake is drained by a 1.5 mile stream that discharges into Kaye's Creek.

Angle Creek is a 25 mile-long braided glacial tributary of Takayofo Creek. Angle Creek carries a much heavier silt load than the less turbid Takayofo Creek (pers.com. Adams 1995).

No further hydrologic information was found regarding the Upper Tributaries of the King Salmon River.

Any waterway changes before, at, or since statehood for this watershed area have not been found during this research.

Impediments to travel may include shallow water, gravel bars, silty water, dense vegetation and sweepers along the banks, and the presence of brown bears in or near all creeks.

d. Pre-statehood use

Very nearly all the area included in the Upper Tributaries of the King Salmon River was included in President Hoover's 1931 addition to Katmai National Monument (U.S. Dept. of Interior 1974:525-526). The Monument, initially established in 1918, became Katmai National Park and Preserve in 1980. The scarcity of documented use for this area makes any conclusions about pre-statehood use speculative. While specific historic documentation is scarce, some physical and social conditions are known. Hunting has been prohibited here since 1931. The area is more remote for historic subsistence users of the nearest villages than other adjacent subsistence resource areas. No past or present inholdings are recorded for this area (pers.com.: Leeper 1995; Gilbert 1995). Rugged mountain terrain surrounding the drainage basin, especially the high glaciated peaks on the coastal side of the basin, hinders access into and through the area. Difficult overland access to the area can be made from the tundra lowlands at the western outlet of the basin, or via two mountain passes, Yori Pass on the north (Sec. 22, T. 21 S., R. 39 W., S.M.) and Kejulik Pass on the south (Sec. 20, T. 24 S., R. 38 W., S.M.). (See Figure 26). Historic and proto-historic travel routes across the Alaska Peninsula are very well documented to the north (Katmai to Naknek route via Naknek Lake) and the south (Kanatak to Egegik route via Becharof Lake), while only rare and incidental comments have been found regarding travel in the Upper Tributaries of the King Salmon River.

J.A. Hussey (1971:75) made one reference to early and occasional subsistence hunting for caribou in the upper **King Salmon River** area. Hussey obtained this information from incidental comments on transcripts of tape recordings regarding eyewitness accounts of the 1912 Katmai eruption. The specific route and means of access from Brooks Lake to the caribou hunting area are not stated. The lengthy portage required for carrying a bidarka or other boat from the vicinity of Brooks Lake to the upper tributaries of the King Salmon River suggests it was unlikely boats were used to hunt in this watershed. Hussey reported,

> *"Caribou were sometimes plentiful in the valley of the Ukak River (the present Valley of Ten Thousand Smokes), and the residents of the settlement at the head of the Naknek Lake frequently hunted there. At times, however, it was necessary to make long journeys to obtain sufficient skins. One of the favorite hunting grounds for the Naknek Lake Eskimos was the upper waters of the King Salmon River, in the extreme southwestern portion of the present* [1971] *National Monument. The native hunters reached this region in two days by following the southern shores of Naknek Lake and Brooks Lake to the western fringe of the terminal moraine system, where they turned south*

> *on the glacial outwash plain and found easy going to their destination."* (Hussey 1971:75).

USGS field geologist Walter R. Smith (1925:184) stated, *"Very little was known of the character of the country between the upper part of Kejulik Valley and Naknek Lake prior to 1923."* USGS topographic and geologic survey expeditions traversed and investigated this area in 1923. An excerpt from Smith's report in a USGS Bulletin follows.

> *"The horses* [15 horses] *were taken overland while the field equipment and provisions were taken by power boat to the head of Cold Bay* [Puale Bay]. *From this point Mr. Fenner and the packers set out immediately for the Valley of Ten Thousand Smokes, traveling up the east side of Kejulik Valley. A pass was found* [Kejulik Pass] *across the Kejulik Mountains, and the Katmai district was entered from the west. Upon the return of the packers to Cold Bay, Mr. Lynt's party started north, mapping the country along the route taken by Mr. Fenner as far as Angle Creek. Thence the party traveled west around the mountains near the large lake* [Brooks Lake] *south of Naknek Lake and entered the Valley of Ten Thousand Smokes from the northwest.... The return trip of both parties to Kanatak, ending September 11, was made most of the way over the same route taken going into the country."* (Smith 1925:185).

Attempts to locate maps, reports, and field notes from the 1921-23 topographic survey party members R.K. Lynt, C.S. Franklin, Charles Yori, C.N Fenner,and R.H. Sargent have been unsuccessful.

Numerous Federal agencies, scientists, universities, and individuals in 1953-54 participated in a scientific assessment of Katmai National Monument's topography, geology, volcanic activity, biology, public health, and archaeology. The Upper Tributaries of the King Salmon River area within the Monument is not mentioned in the *Katmai Project, Interim Report, Katmai National Monument, Alaska* (National Park Service 1954) except for a short comment on the minor volcanic activity of Mount Mageik and Mount Martin. The lack of comment on this part of the Monument contrasts with descriptions of other areas of the Monument found in the project's report. This contrast suggests participants of the *Katmai Project* focused on the better known regions of the Monument and lightly examined the upper tributaries of the King Salmon River.

One participant of the *Katmai Project* was Victor Cahalane, former Chief Biologist with the National Park Service. On September 5, 1954, he collected plants at **Contact Creek**,

6 miles above the **Takayofo Creek** confluence (Calahane 1959:15-20). Collecting specimens at 600 to 1,000 foot elevations, he described the area as, *"Grassland with ponds; hills with grass and alder thickets."* His comments suggest he accessed Contact Creek via helicopter or other aircraft on the very last day of his summer-long botanical survey. Mr. Cahalane briefly notes that Ernest Muller, a USGS geologist, made incidental plant collections while doing geological research in 1953.

Dr. Ernest Muller collected specimens at "*Cozy Lakes*" (**Lake 592**) and at two locations on **Angle Creek**. Dr. Muller (1952) and others were members of the USGS sponsored *Bristol Bay Project* that conducted geologic, glaciologic, and cartographic research during the early 1950s. The upper tributaries area of the King Salmon River apparently occupied the periphery of their investigation. No description of their access route, means of access, or use of water bodies was located during this research.

The Service (Greenbank 1954) conducted a sport fish survey in Katmai National Monument in the summer of 1954. Though the upper part of the **King Salmon River** watershed was identified as one of three main groups of waters within the Monument, the area appears not to have been studied. John Greenbank (1954:4), the Service's fishery management biologist conducting the study, characterized the upper King Salmon River waters as, *"... fished very little if at all."*

Documentation of commercial or recreational activities, such as hunting, trapping, or fishing, that may have occurred in the Upper Tributaries of the King Salmon River prior to statehood, has not been found during this research.

e. Post-statehood use

Since statehood, lands in the vicinity of the Upper Tributaries of the King Salmon River have been controlled by the National Park Service, first as part of a national monument and later as part of a national park. The land's status as park lands has influenced the limited use of this watershed. **Contact Creek** and two nearby lakes (**Lake 592** and **Lake 840**) situated near the western (downstream) border of the watershed provide fly-in access points for guided and non-guided sportfishing, recreational hiking, and downstream big-game hunting.

Contact Creek can be accessed via float planes that land at **Lake 592**, the shallow lake, which lies about 4 miles northwest of the mouth of Contact Creek. The previously mentioned 1978 interagency government team landed on the lake in a Peninsula Airways Grumman Goose. The team floated from the lake to the mouth of Contact Creek and beyond in two 13-foot Avon Adventurer inflatable rafts (Dapkus 1978:1). One member of that party, describing Contact Creek, stated,

> *"...continues to meander and numerous gravel bars require the rafts to be pushed and pulled with ropes much of the way. Streamside vegetation along Contact Creek is varied and relatively thick. Brown bears and salmon were first encountered in this stretch of creek."* (Wagner 1978:1).

Katmai National Park and Preserve issued a few Commercial Use Licenses (CUL) for **Contact** and **Angle Creeks** between 1981 and 1987. Park Service file records show a trend of increasing Park-wide activity for sport fishing and float trips. According to data compiled by a National Park Service historian (Norris 1992:144) two licensed guiding companies took 81 clients to Contact and Angle Creeks in 1981 for sport fishing and float trips. One licensed guiding company took 360 clients to this area in 1987.

A landing strip for wheeled aircraft used by Sam Egli is located approximately 5 miles above the mouth of **Contact Creek**. This lightly used access point is a drop-off for Becharof NWR destined hunters and fishermen who float Contact Creek and **King Salmon River** (pers.com. Egli 1995). Sam Egli, an air taxi operator, stated his clients either float to Egegik or make arrangements to be picked up at "*crash sites*" (locations of previous or probable aircraft accidents) along King Salmon River by other air carriers. Mr. Egli has furnished either a 12-foot inflatable raft with a flat rubber bottom, or a 16-foot raft with inflatable bottom and rowing frame to his air taxi clients. This Contact Creek air strip may be used as a drop-off site for hunters and anglers by other commercial air taxi operators who also use inflatable rafts for downstream floats

(pers.com. Brown 1995). Service biologist Jeff Adams (pers.com. 1995) said several air taxi operators take clients to the **Contact Creek** airstrip, typically for 1-day fishing excursions.

Lake 840 has been used by at least one air taxi operator with a Cessna 206 or 207 on floats (pers.com. Moody 1995). Sport fishermen are flown to this lake where they typically make a 1-day walking/fishing trip and are picked up later at **Lake 592**. Known air taxi operators in this area include Egli Air Service, Peninsula Airways or Pen Air, Branch River Air, and Katmai Air Service.

Service biologists accessed **Contact Creek** by landing on the previously mentioned Contact Creek airstrip in Sec. 1, T. 23 S., R. 41 W., S.M. They floated downstream to **Takayofo Creek** without difficulty in a 16-foot Avon inflatable with rowing frame (pers.com. Adams 1995).

Information of the post-statehood use of **Contact Creek**, except the previously noted raft travel on the lower 5 miles, has not been found during this research.

Information on the post-statehood use of **Takayofo Creek** and **Angle Creek** has not been found during this research. One air taxi operator who lands at a Contact Creek airstrip indicated he was not aware of landing sites for wheeled aircraft or float planes in the upper reaches of Takayofo and Angle Creeks (pers.com. Egli 1995). Another air taxi operator suggested shallow water in the streams and few fish may account for the apparent inactivity (pers.com. Moody 1995).

Judy Morris' map (Figure 7), *Egegik Resource Harvest Area, 1962-82,* shows the Upper Tributaries of the King Salmon River as outside the harvest area of Egegik residents.

f. Navigability status

No navigability determinations were located for any water bodies in the Upper Tributaries of the King Salmon River.

Kejulik River and its Tributaries

D. Kejulik River Watershed Unit

1. Kejulik River and its tributaries

a. Summary

The 46 mile long Kejulik River is Becharof Lake's largest tributary. This silt laden, glacial river is fed by many clearwater streams including Katrine Creek, Margaret Creek, East Fork, Albert Creek, and other unnamed tributaries. Shallow water and sandbars significantly hinder travel several miles upstream from the mouth of the Kejulik River. The river's 1 mile wide mouth is particularly shallow. High winds and marked changes in mainstem water stage are common and impact travel. Coarse hydrologic data for several water bodies in the watershed were collected secondarily to salmon spawning ground surveys in the 1930s and 1950s. Localized channel changes and instances of significant bank erosion have occurred.

Patchy documentation of pre-statehood and post-statehood travel on the Kejulik River and some of its tributaries has been found during this research. The Russian American Company's 1818 Korsakovskiy expedition, traveling by two and three hatch bidarkas, paddled down an undetermined tributary and at least the lower 10 miles of the Kejulik River. A few instances of boat travel occurred on the Kejulik River during the 1950s in conjunction with subsistence activities and guided hunting activities. Jay Hammond used rubber rafts, a canoe, and a small boat with a lift on the Kejulik River. Stan Chmiel traveled approximately 15 miles upstream from the mouth of the Kejulik River in a converted (motorized) double ender sailboat on one occasion. Aggie Alto sailed a double ender sailboat on the river. Two Service employees in 1956 accessed Katrine Creek in a 12-foot boat with outboard.

Post-statehood users of the Kejulik River include local subsistence users, trappers, and commercial hunting guides and outfitters. Boat use on the river since statehood has been light and infrequent, primarily associated with hunting activities. Boats used for river travel include small inflatable rafts powered by low horsepower outboards, kayaks, aluminum boats with propeller driven outboards, and jetboats.

b. Names and locations

The **Kejulik River** heads at a Mt. Martin glacier in Katmai National Park and Preserve (Figure 27) in Sec. 2, T. 24 S., R. 38 W., S.M. The river flows southwesterly for 45 miles, discharging into eastern Becharof Lake at LM 48.1, approximately 3 miles north of the Severson Peninsula. The upper reaches of the Kejulik River extend into the wilderness area of Katmai National Park and Preserve. The Kejulik River watershed below RM 34.5 at the park/refuge boundary falls within the Becharof wilderness area of Becharof NWR.

Orth (1971:507) states the **Kejulik River** is a Native name reported in 1904 and published by USGS geologist C.G. Martin in 1923. Other spelling variations of Kejulik River include Kajulik River, Kegulik River, and Kujulik River. McCurdy (1973:93) lists the variant *"Gargulik River"* used in 1923, while an undated map (Wingard, n.d.) from the same era shows it as *"Gargulic River."* Geologist S.R. Capps (1923:103) utilized the place-name spellings Kejulik and Garkulik. The earliest historic reference made regarding the river comes from Petr Korsakovskiy's 1818 travel journal (VanStone 1988:24) that cites the name *"Kaluliuk River,"* as translated from Russian to English. Nick Abalama (1990) refers to the river in a local Yup'ik dialect as Qikulek River, meaning '*one with clay*'. Korsakovskiy, in his brief physical description of the river (VanStone 1988:24), notes the presence of "*blue clay*" in the high sandy river banks at two locations on the lower Kejulik River.

The largest named tributaries of Kejulik River (Figure 27) are **Katrine Creek**, with its tributary **Margaret Creek**, **East Fork**, with its tributary **Albert Creek**, and **Gas Creek**. These place names were published initially in USGS reports of the 1920s. McCurdy (1973:94) mentions **Blackett Creek** as a very small tributary of Katrine Creek, but Blackett Creek is not listed in the *Dictionary of Alaska Place-names* (Orth 1971). McCurdy also references otherwise unnamed tributaries as **1st North Creek**, **2nd North Creek**,
3rd North Creek, etc., as designated by very early U.S. Bureau of Fisheries notes and sketches. Katrine Creek was also known as *"Bidarka Creek"* in the late 1930s (McCurdy 1973:93).

Korsakovskiy recorded Russian names for two **Kejulik River** tributaries in his 1818 portage from Shelikof Strait to Becharof Lake. Entering the Kejulik River watershed on May 22, 1818, he wrote, "*...we set up our tents right near a river called the Kayakushik, which flows from the ridges. We are supposed to go down it to a large lake.*" He continued his account the following day, May 23.

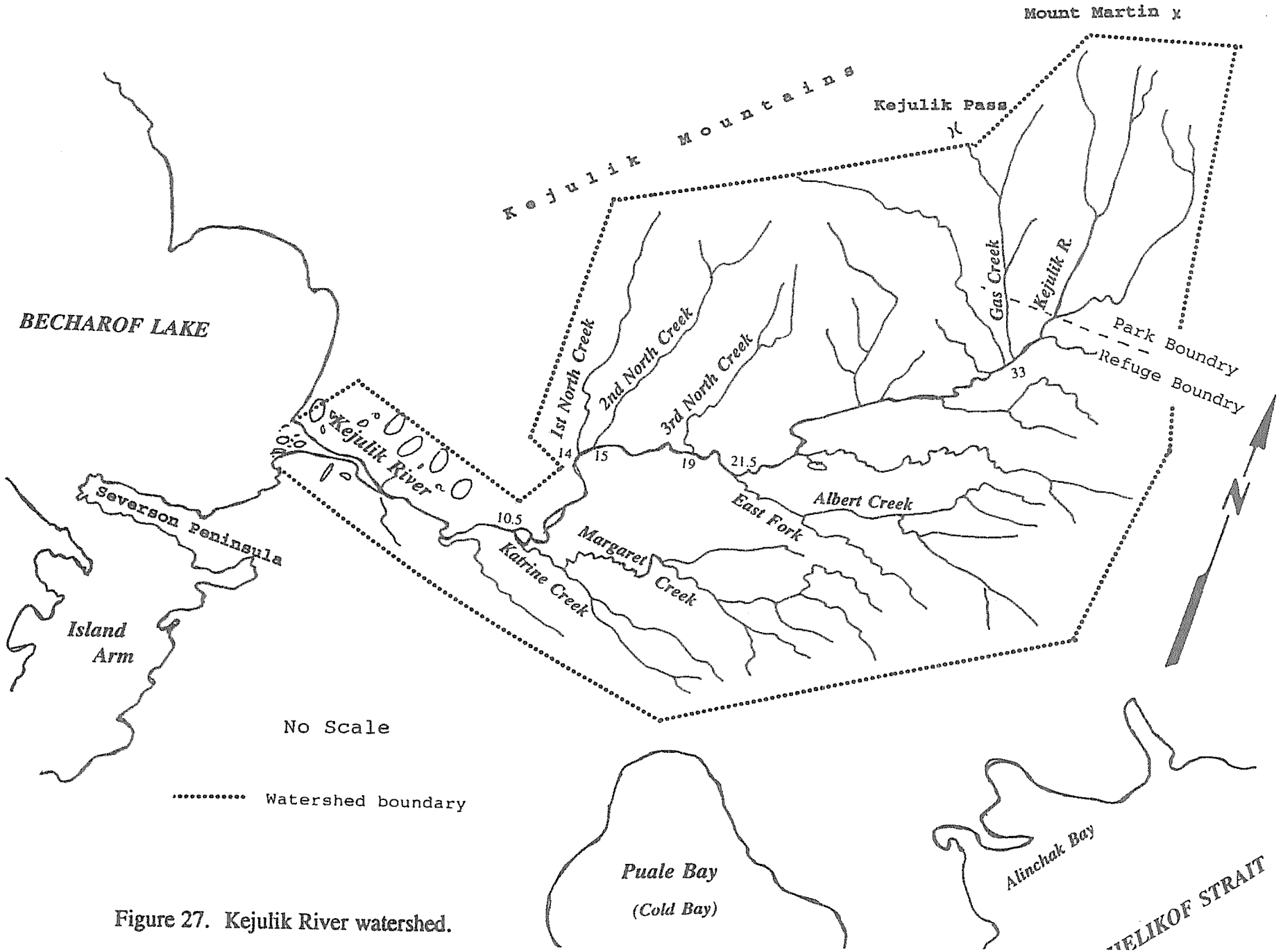


Figure 27. Kejulik River watershed.

> *"Early in the morning the crew set out in the baydarkas, but after only two hours the baydarkas had to be carried again. Meanwhile, I gave the crew biscuits and water, but outside of that there was nothing we could use as food. Having gotten ready, we left this place and went back along the river for two miles. A second river entered this one from the NE. This river is called the Anyakushak. Following along [its] course, we traveled two miles. It was five sazhens* [approximately 35 feet] *wide, and from one to three feet deep. Only low scrub willow grew along its banks. Next a third river, the Kaluliuk, empties into it from the north..."* (VanStone 1988:24).

Korsakovskiy's account suggests a route down **Katrine Creek** (*Kayakushik River*) to the confluence of **Margaret Creek** (*Anyakushak River*) that continues to the **Kejulik River** (*Kaluliuk River*). Kayakushik River may be translated as Little Kayak River; and Anyakushak River as Little Anna River. Katrine Creek's 1930s name of Bidarka Creek suggests a historic connection with Little Kayak River (Kayakushik River). After reading Korsakovskiy's journal, former Kejulik River valley hunting guide Jay Hammond (pers.com. 1995b) suggested the route to the Kejulik River may have been via Albert Creek rather than Katrine Creek.

Some discrepancy exists over the name of the 2 mile-long water body between the Kejulik River and the confluence of **Margaret** and **Katrine Creeks**. (See Figure 27). This water body has been referred to as *"lower Margaret Creek," "lower Katrine Creek,"* and the *"Katrine-Margaret channel."* Orth (1971:622) indicates Margaret Creek flows into the Kejulik, with Katrine Creek discharging into Margaret Creek. Likewise, a hand drawn map by Wingard (no date) circa 1923 shows Margaret Creek extending to the Kejulik River. However, U.S. Bureau of Fisheries personnel in 1939 (Moomey and Burt) refer to the 2 mile-long water body in their field notes as the "*1st tributary on right side of Kejulik river*", inferring Margaret Creek and Katrine Creek begin at their confluence. Later salmon escapement surveys in 1947 and 1948 cite the name "*Katrine-Margaret channel*" for the same 2 mile stretch below the confluence of Katrine and Margaret creeks (McCurdy 1973:98). Surveys between 1951-1957 refer to a "*Margaret-Kejulik confluence*" (McCurdy 1973:98-100). Adding to the place name confusion, ADF&G Habitat Division's statewide *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes* (1994:90) and its accompanying atlas classify Katrine Creek as the primary tributary to Kejulik River, with Margaret Creek discharging into Katrine Creek. Service personnel at AP/BNWR refer to this two mile long body of water as Katrine Creek (pers.com. Terrell-Wagner 1995b). For the purposes of this report,

Margaret Creek shall be considered a tributary of Katrine Creek, and Katrine Creek shall be considered a tributary of the Kejulik River.

c. Physical characteristics

Like other areas of the Egegik River/Becharof Lake drainage basin, the **Kejulik River** lacks substantive hydrologic data. The USGS has conducted no hydrologic study of the watershed (pers.com. Bigelow 1995). Some rudimentary data, descriptive text, and incidental comments do exist however, the most informative of which are the dated and intermittent spawning ground surveys conducted by the U.S. Bureau of Fisheries or ADF&G since the late 1930s (McCurdy 1973). Though most stream surveys have been aerial surveys, initial surveys were conducted on the ground. They appear to be the best source of the existing hydrologic data. Some Service reports offer lesser and limited hydrologic information, e.g., *Fishery Management Plan, Alaska Peninsula Becharof National Wildlife Refuges* (USFWS 1994c), *Becharof National Wildlife Refuge Final Comprehensive Conservation Plan...* (USFWS 1985), and *Annual Narrative Report, 1981* (USFWS 1982).

Kejulik River is 45.5 miles long and drains a 283.5 square mile area. The river heads at an elevation of 2,300 feet and discharges at Becharof Lake which has an elevation of 14 feet. According to 1939-1940 stream surveys the river's average width and depth at the mouth, is 1,200 feet wide and 0.9 feet deep. No other width/depth measurements or flow estimates for the river channel are indicated in McCurdy's compilation (1973:93-101) and no other recorded observations were located during this research. Numerous individuals made written or oral comments regarding the very shallow waters near the river's mouth (Lucas 1936:1; pers.com. Hammond 1995a; pers.com. Shoemaker 1995; pers.com. Olsen 1995;pers.com. Kelly and Clark 1995). Two sources (pers.com. Hammond 1995a; pers.com. Shoemaker 1995) noted water stage on the Kejulik River can change rapidly. Hammond stated the river may go from being a few inches deep to having the appearance of an inland sea a few hours later.

Petr Korsakovskiy traveled the **Kejulik River** from Katrine Creek to Becharof Lake with his 29 person expedition. The following description of the lower river, made in late May 1818, is the earliest known written record of the area.

> *"...the Kaluliuk, empties into it* [Kayakushik River] *from the north and all joining together, at which point it is 12 sazhens wide* [approximately 84 feet] *and from three to nine feet deep. The banks are high and some are sandy, containing some dark blue clay, and scrub alder grows in places. During the summer there are red salmon, which come from the west, and in season plenty of caribou. On these rivers, in places, there are beaver houses. ...we left this place, went downstream on that river to a large lake, and*

> *proceeded six miles to the west. Here the banks were high and sandy. There was some blue clay, and some scrub alder and willow grow here. There were beaver houses, but only here and there. The mouth of the river was shallow. We traversed it with difficulty and emerged on the lake."* (VanStone 1988:24).

Early 1920's USGS personnel make brief incidental comments about the **Kejulik River** in their geological reports. W.R. Smith and A.A. Baker (1924:167) describe the Kejulik River area as accessed from Cold Bay, which is located south of the watershed.

> *"Within the Kejulik Valley itself travel is not so easy unless the foothills are followed closely, and even then swampy ground will give some difficulty. A short distance away from the foothills swamps are the rule, and travel with a pack train is extremely difficult. Kejulik River is a glacial stream that is somewhat difficult to cross, as it is cold, swift, and deep. In its lower reaches it is too deep for a horse to wade, but in its upper part many places can be found where a man can wade it. Over a large part of the valley moss grows luxuriantly, making travel both slow and tiresome."*

Smith (1925:187) again mentions the **Kejulik River** the following year as, *"the principle stream of the Becharof Lake drainage basin and is rather broad and deep and too swift to be crossed on foot in its lower reaches."*

In 1936, U.S. Bureau of Fisheries Assistant Agent Fred R. Lucas (1936a:1) briefly inspected the mouth of **Kejulik River**. Traveling by "*speedboat,*" he visited the mouth on August 16, 1936, and later stated in his semi-monthly report,

> *"Ran around Severson peninsula and examined Kejulik, Marcus and Dan's Lagoon Creeks at the head of Big Lake. The two latter had enough fish for a good seeding of reds. The Kejulik is a large glacial stream and only a few fish were off the large sand flat where it discharges through three mouths into the lake. Did not have time to walk up the stream but Mr. George Haddon who lives on the stream informed me a good supply of fish had gone up. The main stream is 40 miles long and has 6 large tributaries, the lower three on the south side, one known as Katrine Margaret and East Forks Creeks. The others are nameless."*

Agent Lucas (1937:1) again attempted to enter the mouth of the **Kejulik River** on September 16, the following year. Unsuccessful after a 2-hour attempt in

Patrol Boat No. 9, he proceeded toward Island Arm. Patrol Boat No. 9 was described in a 1935 Bristol Bay District, Bureau of Fisheries report, as a 28-foot long "*speed boat*" powered by a 80 horse power Chrysler marine engine (Jorgenson 1935:13).

The **Kejulik River** and its tributaries are described below in a 1939 fish spawning ground survey.

> *"A large, glaciated stream, slow, shallow, and winding for the first 10 miles, and becoming extremely swift and fairly deep in the upper reaches. Navigation is possible for 30 miles or more, but is very difficult in the lower ten miles because of the sand bars and discoloration. The north side tributaries are swift, rapid, and poor spawning streams. The south side tributaries are slow, deep, and winding; and contain the best spawning grounds....* [Kejulik River] *contains many sand bars in the lower ten miles. Usually requires several weeks for good coverage on a ground survey. This system is best surveyed by air."* (McCurdy 1973:93-95).

An aerial stream survey from September 28, 1956, states, "*Unable to observe fish in Kejulik River proper because of turbid water*" (USFWS 1956:33). Landsat satellite imagery in a 1981 land-cover study (USFWS 1985:31-32) shows the lower 10 river miles of the **Kejulik River** as "*shallow/sedimented water.*" "*Shallow/sedimented water*" is defined in the study as water having a reflectance character that indicates a shallow water column and/or moderate to heavy suspended silt load.

The following **Kejulik River** tributaries are described from names and data compiled from McCurdy (1973:93-95), field notes by Moomey and Burt (1939), and notes on the "*Egegik System,*" apparently authored by Ferrier (1940). ADF&G Habitat Division's (1994) anadromous fish catalog stream identifier numbers follow the tributary name where available. River miles indicated are from the mouth of the Kejulik River as measured on current USGS topographic maps, scale 1:63,360. Water temperature data from August 1939-40 are found in McCurdy's work but are not included below. Also excluded below are hydrologic data from three Kejulik tributaries whose locations are unclear or have very low flow.

> **Katrine Creek**, 322-10-10080-2243-3008, is a slow, meandering, and clear stream at RM 10.5. At its confluence with Margaret Creek, measurements of August 23, 1939, show a 29 foot width, an 11 inch depth, clear water, and a bed of sand and fine gravel. Notes from 1940 give a width of 32 feet, depth of 14 inches, and portray the creek as slow, winding, and murky. Further upstream observations

show diminishing widths and depths. Katrine Creek at 2.0 miles averaged 25 feet wide and 1.0 feet deep. Katrine Creek bifurcates into north and south forks at 3.5 miles, where the stream was 20 feet wide and 0.6 feet deep. Waterfalls are located 2.0 miles up Katrine Creek North Fork. Katrine Creek South Fork, 2.0 miles upstream from the fork, was 12 feet wide and 0.6 feet deep. A 1956 Service report (USFWS 1956:13) indicates a stream flow of 54.0 cfs on August 28, 1956. Neither the site nor the method of flow measurement are specified in the report however.

Margaret Creek, 322-10-10080-2243-3013-4003, was measured at the mouth on August 24, 1939. The stream had a width of 66 feet and a depth of 13 inches. The water was characterized as clear and the streambed contained fine gravel and sand. The 1940 data showed a width of 70 feet and a depth of 24 inches. The stream was described as having a slow winding character with murky water.

1st North Fork, 322-10-10080-2243-3011, is a small, rapid, and cloudy stream at RM 14. It becomes extremely swift and precipitous 2 miles from the mouth. Average width and depth at mouth is 26 feet and 1.1 feet respectively. The streambed is coarse gravel.

2nd North Fork, 322-10-10080-2243-3013, is small, swift, and rapid. It is accessible to salmon for approximately 8 miles. The confluence with the Kejulik River at RM 15 is 1 mile upstream from the 1st North Fork. Mouth measurements from August 16, 1939, indicate a width of 43 feet, a depth of 15 inches, slightly cloudy water, and a bed of small rubble. Same day measurements 3.5 miles upstream from the mouth show a width of 36 feet, a depth of 13 inches, fast and slightly cloudy water, and a bed of large rubble. Same day observations 6.0 miles upstream from the mouth show a width 16 feet, a depth 16 inches, water fast and clear, and a bed of small rubble.

3rd North Fork, 322-10-10080-2243-3015, flows into the Kejulik River at RM 19.0. On August 17, 1939, the stream measured 26 feet wide and 11 inches deep at the mouth, contained clear water, and had a gravel bottom. The 1939 salmon surveyors further described the stream as a small, shale-graveled creek flowing through steep-walled canyons and fed by a series of small waterfalls. At 3.0 miles upstream from the mouth the stream was 24 feet wide, 11 inches deep, with a bed of small rubble.

East Fork, 322-10-10080-2243-3016, flows into the Kejulik River at RM 21.5. In 1939 it was described as deep, slow, and clear. Observations made at the mouth of East Fork on August 21, 1939, show a width of 64 feet, a depth of 21 inches, water slightly cloudy, and a bed of fine gravel and sand. Same day observations made 3.0 miles upstream from the mouth show a width of 51 feet, a depth of 19 inches, clear water, and a fine gravel bottom.

Albert Creek, 322-10-10080-2243-3016-4003, enters East Fork 3 miles upstream from the mouth of East Fork.

3rd South Fork, 322-10-10080-2243-3018, was described as slow, deep, and slightly brown colored in 1939. Observations at its mouth show a width of 57 feet, depth of 30 inches, slightly cloudy water, and a fine gravel and sand bed. Observations made 2.5 miles upstream from its mouth show the stream is 61 feet wide, 11 inches deep, with water slightly cloudy and a medium gravel bottom.

Gas Creek is located RM 33.0 of the Kejulik River. No recorded hydrologic observations have been found regarding Gas Creek, but a 1923 geological report mentions the creek in relation to an oil investigation in the Cold Bay [Puale Bay] Mining District.

"Small seepages of petroleum have been reported to occur in the Kejulik Valley, but they have not been seen by members of the Geological Surv.... The gas seepages on Gas Creek occur for about 200 yards along the stream and issue from loose boulders in its bed. The gas has a very faint odor, is colorless, and burns with a bright yellow flame. A small hole was made in the bottom of a lard can inverted over one of the seepages. The gas escaping from the hole burned with a flame about 8 inches in length that was continuously maintained for three days. It furnished sufficient heat to boil water for laundering. (Smith 1925:206).

Some waterway changes in the **Kejulik River** channel since statehood were described by Jay Hammond (pers.com. 1995) and Phil Shoemaker (pers.com. 1995). Considerable bank erosion has occurred at the former Hammond/Haddon cabin site at RM 1.5 according to Hammond and Service personnel. The river fronting the Shoemaker hunting camp, approximate RM 29.5, cut a new channel in 1993, but the river has since returned to its previous channel.

c. I. Impediments to Travel

A variety of physical impediments may hinder travel on the **Kejulik River**. As indicated above, shallow silty water with numerous sand bars characterize the wide lower portion of the river (USFWS 1985; VanStone 1988:24; Lucas 1936a; Lucas 1937; McCurdy 1973:95; pers.com. Olsen 1995; pers.com Shoemaker 1995; pers.com. Kelly and Clark 1995; pers.com. Hammond 1995a). The swift currents of the upper river channel may impede travel. River channels change frequently, as do the position of sand and gravel bars. Sudden change in water stage may hinder river travel (pers.com. Hammond 1995a; pers.com. Shoemaker 1995). The effect of beaver activity on river travel is undetermined.

The shallow, silt-laden waters at the mouth of **Kejulik River** appears to have hampered attempts to ascend the river, and has halted some attempts. Pete Olsen (pers.com. 1995) traveled up the river from its mouth in September 1994. He stated he spent several hours attempting to navigate numerous shallow channels at the mouth until he found one deep enough to pass through. In one "*low water*" year, Charlie Kelly (pers.com. Kelly and Clark 1995) attempted to boat through the river's mouth but could not find a navigable channel through the shallow water. As mentioned earlier, Bureau of Fisheries Agent Fred Lucas (1936a; 1937) unsuccessfully attempted to find a channel through the mouth in 1936 and 1937. Andrew Nelson (pers.com. 1996) said he never went up the Kejulik River because the water was too shallow at the river's mouth and he feared damaging his outboard motor.

High winds appear to play a significant role in hindering **Kejulik River** travel. Winds halted Korsakovskiy's travel by bidarka from May 23 to May 25, 1818. He wrote, *"May 23.... We had to go ashore on that river because a stiff WNW wind hindered us.... May 24 Stiff WNW wind. We could not proceed.... May 25 Strong WNW wind."* Two days later on May 27 he again wrote from the vicinity of the river's mouth, *"Stiff wind from the east.... There was a downpour all night with an east wind. May 28 A strong east wind, which prevented us from getting under way."* High winds also impacted aerial spawning ground surveys of the Kejulik River in August 1964 and August 1966. Flights were discontinued due to "*extreme turbulence*" and "*strong gusty winds*" (McCurdy 1973:100-101). Phil Shoemaker (pers.com. 1995), current resident and guide of the Kejulik River area, said winds at times had slowed his occasional river travel considerably. Jay Hammond (pers.com. 1995a) recounted one instance of being miles upstream from his former cabin at RM 1.5 with German hunting clients. Following failure of the boat's jet unit, he was unable to float downstream to his cabin. Wind blew the boat upstream against the current.

d. Pre-statehood use

Documented pre-statehood activities within the Kejulik River Watershed Unit are sketchy. Instances of overland travel and travel on water bodies follow.

No pre-historic sites have been identified in the **Kejulik River** watershed. However, Phil Shoemaker (pers.com. 1995), a local resident and guide, stated he has found "*arrowheads*" adjacent to the river.

On May 26, 1818, the Korsakovskiy expedition, making their way westward from Shelikof Strait to Bristol Bay, camped on the north bank at the mouth of the Kejulik River where promyshlenniki [Russian-American Company fur hunters/traders] occupied a dwelling. A small Native hunting camp was situated nearby. Korsakovskiy's journal includes a description of subsistence activities here, the earliest written account of such activities in the Becharof Lake area located during this research.

> *"We put ashore on the right bank and set up our tents where the promyslenniki have their dwelling. The natives brought us caribou meat and three whitefish. We ordered them to heat up the steam bath to wash the dirt from our bodies. After it was heated we went to them [their dwellings] no more than a mile away, toward a low mountain ridge running from NW to N. There I saw a chain of high mountains with snow. The settlement consists of a two-family barabora of no more than 15 persons. The occupation of the natives is caribou hunting. They come here from their villages in April. They set snares made from the skin of bearded seals. They set them on level sites near alder and willow scrub and they take the snares up in the last days of May. During those months they take 60 to 80 caribou skins. They dry the meat for winter and discard the antlers. In early June they disperse to their settlements to put up fish and they spend the winter there. The meat is hung outside completely uncovered. This method is not very economical. Much good meat is scattered about on the ground and after inclement weather there are hot days and the meat crawls with worms and much of it is spoiled. In the evening we cast our seines into the lake.*

> *"May 27. Stiff wind from the east. We pulled in our seines, in which we had caught six whitefish. Today an Indian from this settlement brought us several charr and caribou meat, for which I paid one bundle of tobacco. This Indian invited my crew to his place for supper. I let them go and when they returned, every one was pleased.*
>
> *"From the local inhabitants' assurances, we heard that on the SE side of this lake there are many small islands where geese, ducks, swans, and seagulls propagate. I sent two baydarkas to [illegible]. [The baydarkas] returned this evening and brought with them one caribou..."* (VanStone 1988:24-25).

Shelikof Strait's **Cold Bay [Puale Bay]** lies just a few miles south and outside of the Kejulik River watershed. This bay was a center of activity for fur trapping, oil exploration, and trading for the Shelikof Strait side of the Alaska Peninsula during the first decade of this century. A USGS geologist's report from 1923 sketched the brief history of Cold Bay, a site which undoubtedly impacted the Kejulik River basin because of its near proximity and the historic abundance of furbearers in the valley. Walter Smith (1925:191) described a trapper's cabin at the head of Puale Bay as the base of operations for several trappers in the area. Archaeologist Ales Hrdlicka (1930:187-188) listed Cold Bay as a "*small village,*" and located it on a map at the bay's northeast shore.

The **Kejulik River** valley is noted as having the best trapping in the region, showing good populations of fox, wolf, and wolverine (Behnke 1978:155). Commercial trapping occurred here under the Russian influence in the very early nineteenth century and likely has occurred ever since. A USGS geologist (Capps 1923:85) mentions trapping in his 1923 report on the Cold Bay Mining District, "*The trapping of fur-bearing animals for their pelts is carried on each year by natives and by a few white trappers.*" At one time the Kanatak Chief trapped beaver on the Kejulik River (Abalama 1990). A 1930s era resident on the Kejulik River was a trapper, Mr. George Haddon (Lucas 1936b:2; USFWS 1955:74; Nelson and Nelson 1990: Abalama 1990). His cabin was, "*about a mile up from the mouth of the* [Kejulik] *river*" (Moomey and Burt 1939). In the late 1940s a cabin on the lower Kejulik River, probably the Haddon cabin, was occupied by white trapper Henry Shaw (also known as Murphey) and his Aleut wife, Evelyn Shanigan from Egegik (Hammond 1990; Hammond 1994:80; Chmiel 1995). Jay Hammond later built his cabin adjacent to this site (Hammond 1990). Hammond stated Jackie Myers and Auggie Alto trapped the Kejulik River area in the late 1950s from a cabin at **Albert Creek** (pers.com. Hammond 1995a). According to Andrew Nelson (pers.com 1996), Auggie Alto did take a boat (perhaps a skiff) carrying "*groceries and stuff*" up the Kejulik River.

Commercial hunting activities in the Kejulik watershed occurred before statehood. Former Alaska Governor Jay Hammond became familiar with the **Kejulik River** valley as a Service pilot, hunter, and commercial hunting guide. Hunting guide Ray Loesche operated on the Alaska Peninsula in the mid 1950s. The Kejulik River drainage is cited by the National Park Service as one of Loesche's hunting areas (Norris 1992:156).

Naknek resident Stan Chmiel (pers.com. 1995) stated he previously worked as a hunting guide in the **Kejulik River** valley. In 1954 he traveled up the river an estimated 15 miles during an episode of high water following heavy rains. His boat was a converted double-end sailboat. He said the boat drew too much water to ascend the river under normal water condition. He also stated Auggie Alto traveled up the river in a sailboat that same year to deliver supplies to Chmiel's hunting camp. Mr. Chmiel further stated he has landed a float plane on the river at various locations over the years. He felt he could land almost anywhere on the Kejulik River except the two or three miles above the mouth, where there is an abundance of sandbars and the water is shallow.

Jay Hammond (pers.com. 1995) also addressed the suitability of the **Kejulik River** for plane landing. He said one could land on the river if landing places are chosen carefully. He also noted that river and gravel bar conditions could change dramatically overnight due to fluctuating water stage. Further describing changing river conditions, he said a sandbar usable for landing a wheeled plane on one day might be engulfed by water the next day, and, the river may go from being only a few inches deep to having the appearance of an inland sea hours later.

The **Kejulik River** basin is on the northern margins of the intense oil exploration and development activities that began in 1902 and later occurred intermittently. During the activity of the 1920s, the USGS conducted geological and topographical surveys in the Kejulik River area (Capps 1922; Smith and Baker 1924). Oil claims were staked over a wide area from the Kejulik valley to Chignik from 1920 to 1924 according to Smith (1925:204). Though claims were staked, no drilling for oil appears to have been made in the Kejulik River watershed area.

Routes of travel through the **Kejulik River** basin are imprecisely identified. Korsakovskiy's portage and travel via bidarka was mentioned earlier. Though a 1923 description says, *"From Cold Bay* [Puale Bay] *there are easy passes to the Kejulik (Garkulik) Valley..."* (Smith 1925:88), accounts suggest travel through the basin was infrequent and difficult. A more detailed 1924 account describing access says,

> *"From the head of Cold Bay* [Puale Bay] *there is an easy pass into the Kejulik Valley, but at high tide a bold headland on the* [illegible] *tends into the water and at low tide large boulders make it very dangerous to take pack animals around the point. Just south of the headland is a large creek known as Teresa Creek* [west side of Puale Bay] *or Schooner Creek, and near the head of the valley an easy trail may be followed into the Kejulik Valley. The Kejulik Valley may also be entered through one or two low passes from small bays northeast of Cold Bay, but most of these bays are too shallow even for small boats at low tide. Within the Kejulik Valley itself travel is not so easy unless the foothills are followed closely..."*
> (Smith and Baker 1924:166-167).

Two USGS land surveying parties left Cold Bay [Puale Bay] and headed north with 15 pack horses in June 1923. Though their specific route across the Kejulik valley is not identified, it did include travel via Gas Creek and Kejulik Pass. W.R. Smith further described the Kejulik area in a commentary about possible routes of travel to the Valley of Ten Thousand Smokes.

> *"A very low divide exists between the head of Cold Bay* [Puale Bay] *and Becharof Lake. The route by this divide was never extensively used, however, probably on account of the difficulty of landing* [at Puale Bay] *and the swampy areas along the way.... Another possible way of entering the valley* [Valley of Ten Thousand Smokes] *is by Cold Bay and the Kejulik River valley. The Kejulik Mountains would have to be crossed near the head of the valley, and this can be accomplished only by pack train."*
> (Smith 1925:192).

Another early general comment refers to three regional travel routes that may have included Kejulik River valley waterways.

> *"The peninsula* [Alaska Peninsula] *is often crossed from Portage Bay to Ugashik, part of the route being by water, and may be crossed from Katmai by way of Naknek Lake to Naknek, or from Cold Bay* [Puale Bay] *by way of Becharof Lake to Ugaguk* [Egegik]." (Atwood 1911:22).

Alaska Road Commission maps from the 1920s show a poorly defined route from Cold Bay to Igagik [Egegik] via the Kejulik valley (Figures 21 and 22). Referred to as both a "*trail*" and a "*pack trail (dog sled),*" this route does not appear in Alaska Road Commission annual reports after 1925. W.R. Smith refers to the presence of "*Bristol Bay*

mail carriers" and their several years use of a road leaving Cold Bay (Smith 1925:192). Smith's comment and the trail shown on the Alaska Road Commission maps suggests mail was hauled overland through the Kejulik River valley to Egegik and points beyond (Figure 5). Statements in a report by F.M. Chamberlain refer to a mail route via Becharof Lake in 1912. Included in notes attached to that report is a comment made by the unnamed mail carrier (Stirling 1985: Appndx.4, pp.21-22). At one time a Seward mail boat did make monthly stops at Cold Bay (Capps 1923:87).

An American Geographical Society map of 1923 [not included] depicts a pack trail from Puale Bay to Egegik, crossing the Kejulik River just south of the confluence with **Katrine Creek**. The trail then follows the north side of the river downstream to its mouth at Becharof Lake (Stirling 1985:Appndx.4, p.148).

The excavation of navigable channels across the Alaska Peninsula, that intended to reduce the time and expense of travel between Shelikof Strait and Bristol Bay, was considered by the Corps of Engineers in 1954. One plan suggested a 14-mile long canal between Puale Bay and Becharof Lake, and apparently was routed near the southern edge of the Kejulik River valley (U.S. Army, Corps of Engineers, Alaska District 1954:130). The proposed waterway would have eliminated approximately 800 miles of ocean travel around the Alaska Peninsula (Dorris 1973:49).

Jay Hammond (pers.com. 1995a) may be the individual with the most comprehensive knowledge of the **Kejulik River**. Interviewed on October 24, 1995, he stated his experience on the Kejulik River began in 1946. He hunted bear in the valley in 1947. While employed by the Service from 1948 to 1956, he established a hunting camp on the Kejulik River, eventually building a cabin adjacent to the George Haddon cabin at RM 1.5. Though Hammond primarily accessed the river via float plane, he used various watercraft on the river. He used rubber rafts for one season, but the rafts were destroyed by bears. In one instance, he floated the river in a "*Link*" canoe that he brought into the area attached to an aircraft float. Hammond also brought a boat with an outboard lift to the river via the Egegik River and Becharof Lake in 1957 or 1958. He also used a 50-horsepower Mercury outboard with a jet unit on his 18-foot flat bottomed Jon boat.

Describing the heavy silt load of the Kejulik River, Hammond recalled ruining a new jet unit after one hour's use because of silt and sand sucked into the impeller. He also recalled frequently getting stuck on the lower river due to the abundance of sand bars and the difficulty in reading the "*milky*" water that might range from "*a few inches to 7 feet deep.*"

Hammond said he never saw any "*floaters*" on the river. He occasionally did see people from Egegik on the river, but he stated they did not travel further than 5 river-miles upstream from the mouth. Their purpose on the river was grayling and salmon fishing, or bear and moose hunting.

Field notes by 1939 Bureau of Fisheries salmon stream surveyors (Moomey and Burt 1939) suggest they accessed and traveled the **Kejulik River** by boat, but boat travel is not mentioned specifically. Salmon stream surveyors checked the river, **Katrine Creek**, and **Margaret Creek** again in 1940 (Adams et al. 1962), but means of access to the streams is undetermined. All subsequent annual spawning ground surveys of the Kejulik River watershed between 1941 and 1959 apparently were conducted aerially with one 1956 exception (Adams et al. 1962).

The Service conducted extensive stream surveys of Becharof Lake streams in 1956, including the Kejulik River. A Service report (USFWS 1956:3) states an aluminum boat and motor was used ". . . *for transportation in surveys of the Kejulik River.*" On August 28, 1956, observers Blackett and Rowland apparently accessed **Katrine Creek** and "Blackett Creek" in a 12-foot aluminum boat with an 18-horsepower motor (USFWS 1956:3,13). **Blackett Creek** was described as a small south side stream about 1 mile upstream from the mouth of Katrine Creek (Adams et al. 1962).

e. Post-statehood use

The most extensive information sources regarding post-statehood use of the **Kejulik River** likely are previously cited individuals with a history of residence or activity in the Becharof Lake region, such as Frank Tretikoff, Jay Hammond, and Phil Shoemaker. Subsistence activities, commercial guiding, trapping, and sport hunting have continued since 1959. The intensity, extent, and fluctuation of such activities is unclear however, especially in regard to waterway use. Five Alaska recreational river travel publications, describing over 150 waterways, contain no information on the Kejulik River (Embick 1994; Jettmar 1993; Mosby and Dapkus 1992; Carter 1982; U.S. Heritage and Recreation Service n.d.).

The extreme lower reaches of the **Kejulik River** area are in the resource harvest area for resident Egegik subsistence users during the period 1962 to 1982 (Morris 1987:94). A report from the late 1970s states areas in the Kejulik drainage are used occasionally for subsistence purposes, although not as heavily as in the past (Behnke 1978:156). Hammond (pers.com. 1995) noted occasional hunting activity by Egegik residents on the lower 5 miles of the Kejulik River. Frank Tretikoff (pers.com. 1995) recalled delivering supplies by boat to Auggie Alto's Kejulik River hunting camp in 1963. Phil Shoemaker (pers.com. 1995), a relatively recent arrival to the Kejulik area, stated he was unaware of subsistence activity in the Kejulik Valley, other than his own. Charlie Kelly (pers.com. Kelly and Clark 1995) ascended the river by jetboat as far as Albert Creek at (RM 21.5). Egegik residents Jack Abalama (pers.com. 1995) and Pete Olsen (pers.com. 1995) have ascended the river to RM 29.5. Pete Olsen (pers.com. 1995) briefly described his September, 1994, travel on the **Kejulik River**. Following a several hour delay while negotiating the shallow waters at the river's mouth, he ascended the river without difficulty. He did see one party of rafters on the Kejulik River below the "*lodge*" at RM 29.5, the limit of his upstream travel.

A 1970s report mentions the **Kejulik River** area as one of several places where substantial harvests of moose and caribou occur by guided non-residents. The author (Behnke 1978:131) states in that report, *"Almost all access by recreational moose and caribou hunters is by aircraft in this area."* Non-guided hunters have accessed the upper Kejulik River area via float plane. Delivered by air taxi float plane operators to pot-hole lakes, hunters portage to the river where they hunt while floating downstream (pers.com. Brown 1995). Typical watercraft for moose hunters are described as small inflatable rafts, 8 or 10-feet long, used with 3-5 horsepower outboard kickers (pers.com. Moody 1995).

Eddie Clark has dropped off "*floaters*" at an unidentified lake near **Albert Creek**. They descend the **Kejulik River** and get picked up at Becharof Lake in the vicinity of

"*Bible Camp*" (pers.com. Kelly and Clark 1995). He may drop off two or three groups per year. According to Clark, hunter activity near the river varies from year to year and correlates with changing caribou migratory routes. He said when caribou pass through the Kejulik, hunting activity increases because pilots and outfitters take hunters to the caribou. Clark also said caribou do not migrate through the Kejulik every year.

That portion of the **Kejulik River** watershed which falls within the BNWR was recently designated as the USFWS BCH 03 guide-outfitter use area. A Service sole use permit for purposes of commercial guided hunting was issued to Philip Shoemaker for the Kejulik River area in 1993 (USFWS 1993:A-1,A-3). The only 1986 special use permit issued for guides/outfitters in the Kejulik River area went to Jay Hammond (USFWS 1987:103-106). Jim Cann and Jay Hammond independently operated as hunting guides in the Kejulik River valley for many years after statehood (pers.com. Cann 1995; pers.com. Hammond 1995a; pers.com. Shoemaker 1995). According to Jim Cann (pers.com.1995), hunting guide Jake Gregory traveled on the Kejulik River with a skiff powered by a 40-horsepower Johnson outboard with jet unit.

Phil Shoemaker (pers.com. 1995) and Rocky Harrison were interviewed in October 1995. As guides, outfitters, inholders, leaseholders, and year-round residents of the Kejulik valley region, they may be the people most familiar with contemporary use of the **Kejulik River**. They generally concurred with the account of the river's description and physical characteristics found in McCurdy (1973) and cited earlier. They also stressed the variability of river characteristics, stating that water depth can fluctuate up to 5 feet in a short period of time. They described the river as changing with weather and climate conditions. Mr. Shoemaker further commented that river variability makes boat navigation difficult and unpredictable. He described the mouth of the Kejulik River as extremely difficult to navigate, and suggested the formidable challenge of finding a navigable channel through the mouth's shallow waters was a factor limiting boat use by hunters on the Kejulik River. The changing water conditions also hinder aircraft access to the river.

Discussing the few non-guided hunters who use the area, Shoemaker (pers.com. 1995) stated one or two parties per year are dropped off by float plane at an unnamed lake in the upper Kejulik Valley. He estimated one party every other year or so floated down the **Kejulik River** and later were picked-up at downstream sites, including the cabin site at RM 1.5. He has observed fly-in floaters using various sorts of boats. Small inflatables typify boats used. He described seeing a small catamaran float downstream in 1995.

Shoemaker (pers.com. 1995) at one time owned inflatable boats but bears destroyed them. Two aluminum boats owned by Shoemaker and Harrison have been used for river travel.

One boat is a 17-foot jon boat purchased from Jay Hammond and the other was purchased from Jim Cann. Three outboard engines have been used with the boats; a 15 horsepower prop-driven kicker, a 35 horsepower jet unit, and a 60- horsepower jet unit. Use of the 15 horsepower prop driven kicker often resulted in the propeller dragging bottom. They stated changing river water levels and winds restricted their boat use to two or three times per year. They gave an example of a 6-hour river trip becoming a 12 hour trip due to winds in the Kejulik River valley. They said they never encountered others on the river during their boating excursions. In addition to motorized boat travel, they have used a kayak and fold-boat.

The extent of **Kejulik River** travel by Shoemaker and Harrison ranged from the mouth of the river to approximate RM 34. They stated that on one occasion during September when the water was high, they were able to get above the mouth of **Gas Creek** to the vicinity of the Katmai Park boundary. They mentioned that there were many boulders in this area of the upper river and that they had accidentally punched a hole in their boat. They characterized the Kejulik River below **Katrine Creek** (RM 10.5) as slow and very shallow. They estimated a water velocity of 4-5 knots for the Kejulik River upstream of Katrine Creek. Characterizing the entire length of the river as shallow, they said negotiating the Kejulik River requires constant alertness.

Two big game sport hunters uniquely accessed the upper **Kejulik River** in 1992. Wanting to hunt and float an area inaccessible to a wheeled or float plane, they parachuted into the upper reaches of the Kejulik River in the area of the Park/Refuge boundary. They were cited subsequently for illegal hunting activity 1 mile inside the Katmai National Park and Preserve along the Kejulik River (USFWS 1994b:121-122) and apparently continued floating down the river.

The Kejulik valley has been a historic trapping area for Egegik residents. Several men have trapped periodically in the valley. Frank Tretikoff (pers.com. 1995) helped Auggie Alto build a trapping/hunting cabin on an unspecified **Kejulik River** site. Tretikoff stated Egegik resident Paul Boskoffsky also built a trapping cabin along the Kejulik River. S.R. Behnke (1978:156) noted periodic trapping use from the late 1960s to the late 1970s, stating access to the area for trapping was achieved primarily by airplane. Naknek resident Allen Tibbetts trapped out of the upper Kejulik cabin in the late 1970s prior to the trapping activities of Phil Shoemaker (pers.com. Russell 1995a). Shoemaker (pers.com. 1995) was unaware of current trapping activity in the Kejulik valley, but one of his employees did trap for two winters in recent years. Though trapping is a winter endeavor, some incidental activities on a stream may occur prior to freeze-up. For example, Frank Tretikoff (pers.com. 1995) recounted a time on the Kejulik River

when he and Auggie Alto hiked upstream, located and cut timber for cabin construction, used the logs to make a raft, and floated downstream to the future cabin site. He recalled getting stuck many times on the downstream float. Tretikoff also recalled delivering supplies by boat to Auggie Alto's cabin on the Kejulik River. The location of the cabin site was not determined during this research.

One USGS topographic map, Karluk (D-6) Quadrangle of 1988, does shows a solitary structure on the south bank of **Kejulik River**, 1.5 miles upstream from the river's mouth. This site appears to be the same cabin site previously mentioned relating to Jay Hammond, Henry Shaw (Murphey), and George Hadden. Hammond used this trade and manufacturing site for a guiding business from the late 1960s until sold to the Service in 1990. In 1973, caribou hunters Dick Russell, Don Seidleman, and Jay Hammond traveled 2 to 3 miles above the cabin in a "*18 foot riverboat with a prop-driven lower unit*" (pers.com. Russell 1995a). The Hammond cabin, for a time designated as a refuge "*safety cabin*" (USFWS 1992:123), was lost to bank erosion in 1994 (Hood, pers.com. 1996). The realty appraiser examining the property in 1990 mentioned and photographed a dilapidated adjacent cabin. The appraiser stated that access to the site is by float plane or ski plane, depending on the season, and did not mention boat access (Alaska Valuation Service, Inc. 1990:30). The appraisal does not indicate whether the float plane landing site is on the river or on the abutting lake at the property's south side.

A 4.98 acre trade and manufacturing site is located on the **Kejulik River**, approximate RM 29.5, four miles below the Gas Creek confluence. James M. Cann originally applied for this site in 1972, receiving patent in 1980 (U.S. Survey 5889). The site has been leased by Phil Shoemaker for several years and used as a hunting base camp for his commercial guiding/outfitting operations. Mr. Shoemaker also owns a 40-acre parcel approximately 2 miles northwest of the mouth of **1st North Creek.**

A Service map showing access to popular areas depicts four locations along **Kejulik River**, all accessed by plane. Two locations indicate wheeled plane access and two locations indicate float plane access. The same map does not show boat access to Kejulik River, though other popular areas within Becharof NWR are indicated as having boat access.

McCurdy's (1973:100-101) compilation of spawning ground surveys for the Egegik River system indicate all post-1959 Kejulik River surveys were conducted aerially.

f. Navigability status

No navigability reports were located for the Kejulik River or any of its tributaries.

V. Conclusion

V. CONCLUSION

This report is a collection of data regarding the historical use and physical characteristics of waters in the Egegik River/Becharof Lake watershed. The goal of this report is to present factual information so that decisions on navigability of the many individual water bodies within the watershed can be made. The general and specific information presented in this report primarily has emphasized the physical characteristics and the historical use of the watershed's streams and lakes.

The authors have conducted a comprehensive research program to prepare this report, and it includes considerable information. However, navigability information for this watershed continues to become known. Some sources of information undoubtedly are unrecognized and undiscovered, while other sources are known or suspected to exist, but have not been researched. The search for report data has been comprehensive, but it has not been exhaustive.

This report includes a relative abundance of historical documentation for the largest and perhaps most significant water bodies in the watershed; Egegik River, Becharof Lake, and Island Arm. The collected information regarding the Kejulik River and the King Salmon River, especially the Upper Tributaries of the King Salmon River, is less complete and less precise due to the lower level of historic activity on these water bodies. The quantity and quality of data for tributaries of the main water bodies varies greatly. While considerable information exists for streams such as Featherly Creek and Gertrude Creek, little or no data were found for others.

Additional research on some topics or specific water bodies may be productive and is recommended. Suggested research areas follow.

1. Documentation of Russian, American, and Native American travel between Kodiak and Nushagak during the nineteenth century is sparse. Russian Orthodox church records archived in Kodiak may be illuminating.

2. Recently published bathymetric and other related hydrographic data for Becharof Lake and Island Arm are last minute additions to this report. Additional water chemistry, bathymetry, and limnology reports regarding Becharof Lake are expected to be published by the Juneau Center, School of Fisheries and Ocean Sciences, UAF. The reports have potential value and may become available through the Service, the ADF&G, the Lake and Peninsula Borough, or Professor Ole Mathisen.

3. Potentially insightful Alaska Commercial Company records housed at the University of Alaska Fairbanks that may include Becharof Lake area trapping information were not reviewed.

4. Bristol Bay fisheries records may yield detailed pre-statehood Bureau of Fisheries activities on Island Arm tributaries. These unreviewed records are housed at the University of Alaska Fairbanks.

5. Unlocated technical reports, field notes, or journals by members of two 1950s government projects may exist. They might provide incidental but pertinent information for the thinly documented Upper Tributaries of the King Salmon River, especially Angle Creek, Contact Creek, and Lake 592. The two past Federal projects are the "*Katmai Project*" and the "*Bristol Bay Project.*"

6. Another potential source of incidental information for the Upper Tributaries of the King Salmon River is unlocated transcripts or taped recordings of oral historians who witnessed the 1912 Katmai eruption. The recordings were made in 1964 by the University of Oregon and are cited by Hussey (1971:431). These and other oral histories may be in the Anchorage Office of the National Park Service (NPS), the NPS Western Regional Library, the University of Oregon, or UAF's Rasmuson Library. Oral histories by Katmai eruption witnesses recorded in 1976 are reportedly held by NPS anthropologist Tim Cochrane, Anchorage Office of NPS.

7. Fisheries related gray literature of Becharof Lake and tributaries by faculty and graduate students of the University of Washington's Fisheries Research Institute may be available in Seattle.

8. Possibly valuable field notes, journals, plane-table sheets, and reports by USGS topographers and cartographers, who surveyed the Kejulik River and upper King Salmon River the 1920s, were not located during this research. Attempts to locate such materials at the USGS Geographic Names office in Reston, Virginia, at the USGS warehouse in Herndon, Virginia, or in the possession of *Dictionary of Alaska Placenames* author Donald Orth, were unsuccessful. Mr. Orth (pers.com. 1996) did state that original USGS materials he assembled for his work were inspected by an archivist from the National Archives and destined for the Cartographic Division. He did not know whether the materials were cataloged and stored, or simply stored. No further search was undertaken at the National Archives by this report's writers.

9. Finally, living oral historians likely are the best sources for further navigability information. Follow-up interviews with Nick Abalama, Nida Nelson, Jay Hammond, Orin Seybert, Phil Shoemaker, and Aleck Griechen could yield more detailed information on specific water bodies. Several people not interviewed undoubtedly hold considerable valuable knowledge. They are Paul Boskoffsky, Walter Kelly, Jackie Myers, Nick Shanigan, Richard Deigh, Robert Deigh, Jack Alto, and Allen Tibbetts. Paul Boskoffsky may be the most knowledgeable and authoritative source of information for Ruth River and Ruth Lake. Walter Kelly may be the best informed source of information for King Salmon River and some tributaries. Uninterviewed hunting guides, fishing guides, outfitters, and air taxi operators, e.g., Jake Gaudet, Joe Maxey, and J.W. Smith, may be valuable information sources regarding important water bodies such as Gertrude Creek and Kejulik River.

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Appendix

APPENDIX

The following Townships are within the Egegik River / Becharof Lake watershed.

T. 21 S., R. 40 W., S.M.
T. 21 S., R. 45 W., S.M.
T. 21 S., R. 46 W., S.M.
T. 21 S., R. 47 W., S.M.
T. 21 S., R. 48 W., S.M.
T. 22 S., R. 37 W., S.M.
T. 22 S., R. 38 W., S.M.
T. 22 S., R. 39 W., S.M.
T. 22 S., R. 40 W., S.M.
T. 22 S., R. 44 W., S.M.
T. 22 S., R. 45 W., S.M.
T. 22 S., R. 46 W., S.M.
T. 22 S., R. 47 W., S.M.
T. 22 S., R. 48 W., S.M.
T. 22 S., R. 49 W., S.M.
T. 23 S., R. 38 W., S.M.
T. 23 S., R. 39 W., S.M.
T. 23 S., R. 40 W., S.M.
T. 23 S., R. 41 W., S.M.
T. 23 S., R. 42 W., S.M.
T. 23 S., R. 43 W., S.M.
T. 23 S., R. 45 W., S.M.
T. 23 S., R. 46 W., S.M.
T. 23 S., R. 47 W., S.M.
T. 23 S., R. 48 W., S.M.
T. 23 S., R. 49 W., S.M.
T. 23 S., R. 50 W., S.M.
T. 24 S., R. 38 W., S.M.
T. 24 S., R. 39 W., S.M.
T. 24 S., R. 40 W., S.M.
T. 24 S., R. 41 W., S.M.
T. 24 S., R. 42 W., S.M.
T. 24 S., R. 43 W., S.M.
T. 24 S., R. 45 W., S.M.
T. 24 S., R. 46 W., S.M.
T. 24 S., R. 47 W., S.M.
T. 25 S., R. 37 W., S.M.
T. 25 S., R. 43 W., S.M.
T. 25 S., R. 44 W., S.M.
T. 25 S., R. 46 W., S.M.
T. 26 S., R. 37 W., S.M.
T. 26 S., R. 38 W., S.M.
T. 26 S., R. 39 W., S.M.
T. 26 S., R. 46 W., S.M.
T. 26 S., R. 41 W., S.M.
T. 26 S., R. 42 W., S.M.
T. 26 S., R. 45 W., S.M.
T. 26 S., R. 46 W., S.M.
T. 27 S., R. 38 W., S.M.
T. 27 S., R. 39 W., S.M.
T. 27 S., R. 40 W., S.M.
T. 27 S., R. 41 W., S.M.
T. 27 S., R. 42 W., S.M.
T. 27 S., R. 43.W., S.M.
T. 27 S., R. 44 W., S.M.
T. 27 S., R. 45 W., S.M.
T. 28 S., R. 41 W., S.M.
T. 25 S., R. 38 W., S.M.
T. 25 S., R. 39 W., S.M.
T. 25 S., R. 40 W., S.M.
T. 25 S., R. 41 W., S.M.
T. 25 S., R. 42 W., S.M.
T. 28 S., R. 42 W., S.M.
T. 28 S., R. 43 W., S.M.
T. 29 S., R. 41 W., S.M.
T. 29 S., R. 42 W., S.M.
T. 30 S., R. 42 W., S.M.