

Fishery Management Report No.04-01

**Fishery Management Report for Sport Fisheries in the
Northwest Alaska Management Area, 2002-2003**

by
Fred DeCicco

March 2004

Alaska Department of Fish and Game

Division of Sport Fish



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition.

| Weights and measures (metric) | | General | | Mathematics, statistics, fisheries | |
|--------------------------------------|----|---|---|---|-------------------------|
| centimeter | cm | All commonly accepted abbreviations. | e.g., Mr., Mrs., a.m., p.m., etc. | alternate hypothesis | H_A |
| deciliter | dL | | | base of natural logarithm | e |
| gram | g | All commonly accepted professional titles. | e.g., Dr., Ph.D., R.N., etc. | catch per unit effort | CPUE |
| hectare | ha | and | & | coefficient of variation | CV |
| kilogram | kg | at | @ | common test statistics | F, t, χ^2 , etc. |
| kilometer | km | Compass directions: | | confidence interval | C.I. |
| liter | L | | | correlation coefficient | R (multiple) |
| meter | m | east | E | correlation coefficient | r (simple) |
| metric ton | mt | north | N | covariance | cov |
| milliliter | ml | south | S | degree (angular or temperature) | ° |
| millimeter | mm | west | W | degrees of freedom | df |
| | | Copyright | © | divided by | ÷ or / (in equations) |
| | | Corporate suffixes: | | equals | = |
| | | Company | Co. | expected value | E |
| | | Corporation | Corp. | fork length | FL |
| | | Incorporated | Inc. | greater than | > |
| | | Limited | Ltd. | greater than or equal to | ≥ |
| | | et alii (and other people) | et al. | harvest per unit effort | HPUE |
| | | et cetera (and so forth) | etc. | less than | < |
| | | exempli gratia (for example) | e.g., | less than or equal to | ≤ |
| | | id est (that is) | i.e., | logarithm (natural) | ln |
| | | latitude or longitude | lat. or long. | logarithm (base 10) | log |
| | | monetary symbols (U.S.) | \$, ¢ | logarithm (specify base) | log ₂ , etc. |
| | | months (tables and figures): first three letters | Jan,...,Dec | mid-eye-to-fork | MEF |
| | | number (before a number) | # (e.g., #10) | minute (angular) | ' |
| | | pounds (after a number) | # (e.g., 10#) | multiplied by | x |
| | | registered trademark | ® | not significant | NS |
| | | trademark | ™ | null hypothesis | H_0 |
| | | United States (adjective) | U.S. | percent | % |
| | | United States of America (noun) | USA | probability | P |
| | | U.S. state and District of Columbia abbreviations | use two-letter abbreviations (e.g., AK, DC) | probability of a type I error (rejection of the null hypothesis when true) | α |
| | | | | probability of a type II error (acceptance of the null hypothesis when false) | β |
| | | | | second (angular) | " |
| | | | | standard deviation | SD |
| | | | | standard error | SE |
| | | | | standard length | SL |
| | | | | total length | TL |
| | | | | variance | Var |

| Weights and measures (English) | | | | | |
|---------------------------------------|--------------------|--|--|--|--|
| cubic feet per second | ft ³ /s | | | | |
| foot | ft | | | | |
| gallon | gal | | | | |
| inch | in | | | | |
| mile | mi | | | | |
| ounce | oz | | | | |
| pound | lb | | | | |
| quart | qt | | | | |
| yard | yd | | | | |

| Time and temperature | | | | | |
|-----------------------------|-----|--|--|--|--|
| day | d | | | | |
| degrees Celsius | °C | | | | |
| degrees Fahrenheit | °F | | | | |
| hour | h | | | | |
| minute | min | | | | |
| second | s | | | | |

| Physics and chemistry | | | | | |
|------------------------------|--------|--|--|--|--|
| all atomic symbols | | | | | |
| alternating current | AC | | | | |
| ampere | A | | | | |
| calorie | cal | | | | |
| direct current | DC | | | | |
| hertz | Hz | | | | |
| horsepower | hp | | | | |
| hydrogen ion activity | pH | | | | |
| parts per million | ppm | | | | |
| parts per thousand | ppt, ‰ | | | | |
| volts | V | | | | |
| watts | W | | | | |

FISHERY MANAGEMENT REPORT NO. 04-01

**FISHERY MANAGEMENT REPORT FOR SPORT FISHERIES IN THE
NORTHWEST ALASKA MANAGEMENT AREA, 2002-2003**

by

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Division of Sport Fish, Research and Technical Services
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March 2004

The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm> This publication has undergone regional peer review.

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EXECUTIVE SUMMARY

This document provides a wide array of information specific to the recreational angling opportunities that exist within the Northwestern Management Area. Information specific to the proposals that the Board of Fisheries will address at the January 12-19, 2004 meeting are contained within numerous sections of this report. As a means to assist board members in acquiring information in a timely manner, Appendix A has been constructed (page 102). This table guides the reader to specific information contained within text, table, and graphic format that, hopefully will be useful in evaluating regulatory proposals.

PREFACE

The goals of the Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) are to conserve wild stocks of sport fish, to provide a diversity of recreational fishing opportunities, and to optimize social and economic benefits from recreational fisheries. In order to implement these goals the Division has in place a fisheries management process.

This report provides information for the Northwestern Alaska Management Area (NWMA) and is one in a series of reports providing an annual update of fisheries management information about important sport fisheries within Region III. The report is written to make that information available to the State Board of Fisheries (BOF), Fish and Game Advisory Committees, the general public, and other interested parties. It presents fisheries assessment information and the management strategies that are developed from that information. In addition, the report includes a description of the fisheries regulatory process, the geographic, administrative, and regulatory boundaries, funding sources, and other information concerning Sport Fish Division management programs within this area.

An annual regional area review is conducted in mid-winter during which the current status of important area fisheries is considered and research needs are identified. Fisheries stock assessment research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Biological information gathered during the course of these research projects is combined with effort information and input from user groups and is used to assess the need for and to develop fisheries management plans and propose regulatory strategies.

Sport Fish Division management and research activities are primarily funded by a combination of State of Alaska Fish and Game (F&G) and Federal Aid in Fisheries Restoration (D-J) monies. The F&G funds are from the sale of fishing licenses. The D-J (Dingle-Johnson, named after the congressmen who wrote the Act) funds are from a federal tax on fishing tackle and equipment. D-J funds are provided to the states at a match of up to three-to-one with the F&G funds. There is also an amendment to the D-J Act (W-B, for Wallop-Breaux) that provides money to states for boating access projects at the same three-to-one match with F&G funds. The funding source for W-B money is a tax on boat gas and equipment. Other, additional funding sources can include contracts with various government agencies and the private sector.

This report provides fisheries information for 2002 with preliminary information from the 2003 season. Following the introduction, which includes an overview of the region, this report is organized into four major sections. Section I provides an overview of the Northwestern Alaska Management Area. Included is a description of the management area and sub-areas, Board of Fish activities, and management information and activities within the area. Section II provides a

summary of the most recent fishing season. Section III provides effort and harvest results for the management area and sub areas. Section IV provides more detailed summaries of major fisheries and activities occurring during the reporting period. Included in these summaries are a fishery description; a description of recent performance of the fishery; a description of recent Board of Fishery actions related to the fishery; a discussion of social or biological issues that may be associated with each fishery; and a description of ongoing research and management activities related to each fishery.

INTRODUCTION

REGION III DESCRIPTION

The Alaska Board of Fisheries (BOF) divides the state into ten regulatory areas for the purpose of organizing the sport fishing regulatory system by drainage and fishery. These areas (different from Regional Management Areas) are described in Title 5 of the Alaska Administrative Code (5 AAC). Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) divides the state into three administrative Regions with boundaries roughly corresponding to groups of the BOF regulatory areas (Figure 1). Region I is Southeast Alaska. Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands. Region III includes two and most of a third of the BOF fishery regulatory areas. They are the Upper Copper and Upper Susitna regulatory area, the Arctic-Yukon-Kuskokwim (AYK) regulatory area, and the Tanana River drainage. The lower Yukon and lower Kuskokwim drainage from the Aniak River downstream and Kuskokwim Bay were added to the region in spring 2000.

Region III is the largest region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 1,251,300 km² (485,000 mi²) of land, some of the state's largest river systems (the Yukon, the Kuskokwim, the Colville, Noatak, Kobuk and upper Copper River and upper Susitna River drainages), thousands of lakes, and thousands of miles of coastline and streams. Regional coastline boundaries extend from Sheldon Point in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is very sparsely populated, with the most densely populated center located in the Tanana River valley. Fairbanks (population about 31,000) is the largest community.

For administrative purposes Sport Fish Division has divided Region III into five fishery management areas. They are:

- (1) The Upper Copper/Upper Susitna Management Area (the Copper River drainage and the Susitna River drainage upstream from the Oshetna River).
- (2) The Upper Tanana River Management Area (The Tanana River drainage upstream from Banner Creek and the Little Delta River).
- (3) The Lower Tanana River Management Area (The Tanana River drainage downstream from Banner Creek and the Little Delta River).
- (4) The Northwestern Management Area (Norton Sound, Seward Peninsula and Kotzebue Sound and Chukchi Sea drainages south of Point Hope).

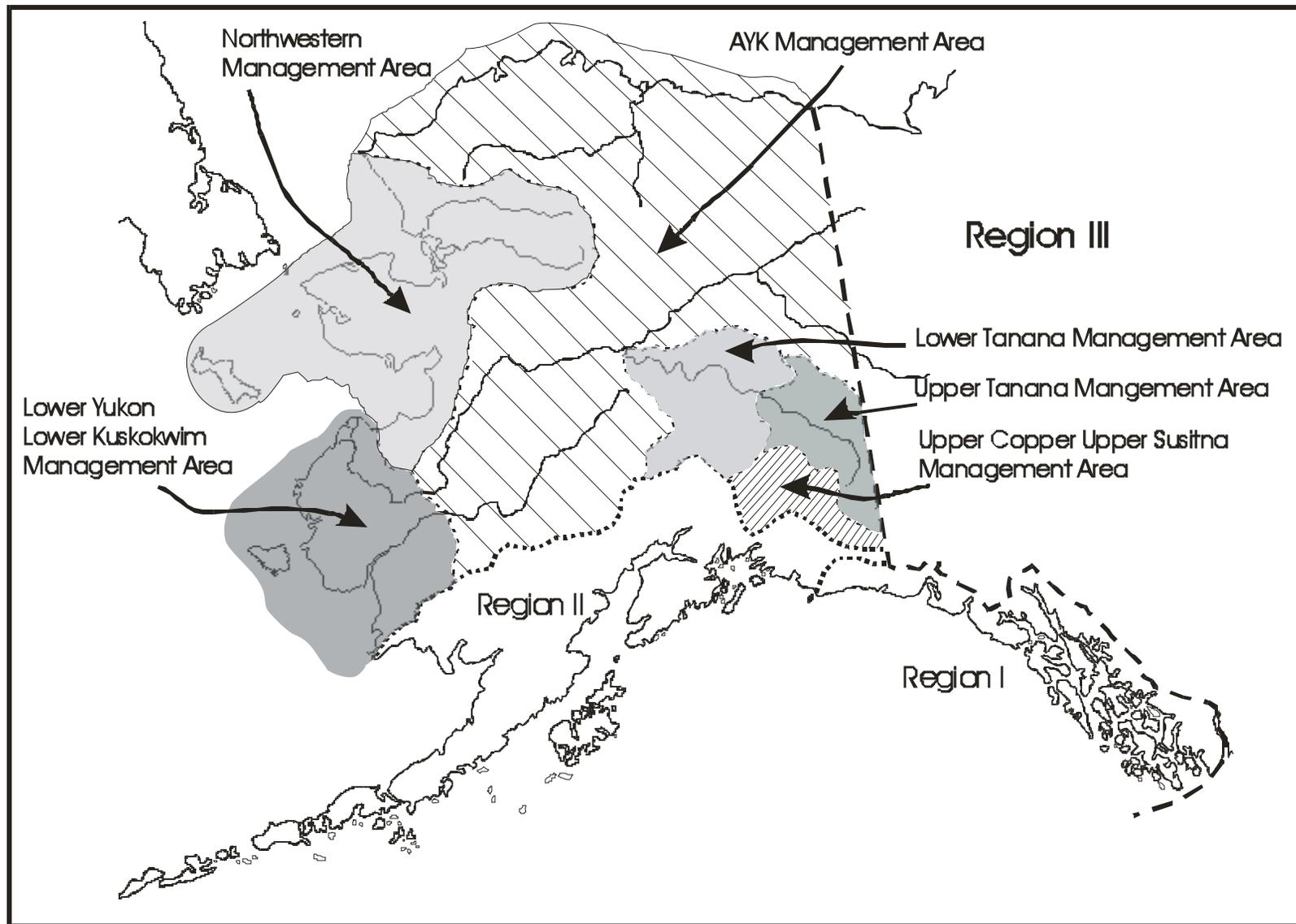


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

- (5) The AYK Management Area (the North Slope drainages, the Yukon River drainage except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- (6) The Lower Yukon/Lower Kuskokwim (LYLK) Management Area (the Yukon drainage downstream from Paimute and the Kuskokwim drainage downstream from and including the Aniak River drainage), which was created and added to Region III in 2000.

Area offices for the six management areas are in Glennallen, Delta Junction, Fairbanks, Nome/Fairbanks, and Bethel.

THE ALASKA BOARD OF FISHERIES

The BOF is a seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates fishery conservation plans for the State of Alaska. Board members are appointed by the Governor and must be confirmed by the legislature. Board members are appointed for three years.

Statewide fisheries issues may be considered at any BOF meeting. Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. The BOF meetings are usually in the winter, between early October and late March. Regulation proposals and management plans are received for evaluation by the BOF from ADF&G and the public (any Alaskan can submit a proposal to the BOF), and during its deliberations the BOF receives input and testimony through oral and written reports from the staff of the ADF&G, members of the general public, representatives of local fish and game Advisory Committees, and special interest groups such as fishermen's associations and clubs.

ADVISORY COMMITTEES

Local Fish and Game Advisory Committees (AC) have been established throughout the state to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes. Advisory committee members are individuals from the local public who are nominated and voted on by all present during an advisory committee meeting. Most active committees in urban areas meet in the fall and winter on a monthly basis; rural committees generally conduct only one fall and one spring meeting due to funding constraints. Advisory meetings allow opportunity for direct public interaction with department personnel who answer questions and provide clarification concerning proposed regulatory changes. The Boards Support Section within the Division of Administration provides administrative and logistical support for the BOF and Fish and Game Advisory Committees. During 2002, the department had direct support responsibilities for 56 Advisory committees in the state.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (EO) authority (5 AAC 75.003) to modify time, area, and bag/possession limit regulations. EOs are implemented to deal with conservation issues that are not adequately controlled by existing regulations. In that scenario, they deal with the issue until it is resolved or the BOF can formally take up the issue. EOs are also the mechanism by which "in-season" management of fisheries is accomplished. In-season management is in accordance with a fisheries management plan approved by the BOF when such plans exist.

REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT STAFFING

The Region III Sport Fish Division staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, an area management biologist for each of the six management areas, one or more assistant area management biologists, and two stocked waters biologists. The area biologists evaluate fisheries and propose and implement management strategies through plans and regulations in order to meet division goals. A critical part of these positions is interaction with the BOF, AC, other agencies, and the general public. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries. The research group consists of a research supervisor, research biologists, and various field assistants. The research biologists plan and implement fisheries research projects in order to provide information needed by the management group to meet division goals.

The Statewide Harvest Survey

Recreational angling effort, catch and harvest of important sport fish species in Alaska has been estimated and reported annually since 1977 (Mills 1979-1994, Howe et al. 1995, 1996, 2001a-d, Jennings et al. *in prep* a and b, Walker et al. 2003). The Statewide Harvest Survey (SWHS), a questionnaire mailed out to a random selection of sport fish license holders, is the instrument that provides the data analyzed to make these estimates. Estimates for a particular year usually become available in August or September of the following year. Effort, catch, and harvest are estimated on a site-specific basis, but estimates of effort directed toward a single species and the resulting species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the report. Utility of the estimates is strongly dependant on the number of responses for a site (Mills and Howe 1992). Estimates based on 12 or fewer responses are useful only to document that fishing occurred. Twelve to 29 responses produce estimates useful for indicating relative order of magnitude and for assessing long-term trends, and estimates based on 30 or more responses are generally the most useful in tracking harvest trends.

SECTION I: NORTHWESTERN MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION AND ITS FISHERIES RESOURCES

The Northwest Alaska sport fish management area (Figure 2) includes all waters north of the Yukon River drainage, in Norton Sound, the Seward Peninsula, Kotzebue Sound including the major drainages of the Kobuk and Noatak rivers, and the eastern Chukchi Sea to Point Hope. The total land area consists of approximately 67,800 sq mi (173,500 km²). The management area is comprised of two sub-areas, the Seward Peninsula/Norton Sound sub-area in the south and the Kotzebue /Chukchi Sea sub-area to the north. Fish species present in the Northwest Management Area include anadromous Dolly Varden *Salvelinus malma*, chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, chum *O. keta*, sockeye *O. nerka* and pink salmon *O. gorbuscha*; Bering cisco *Coregonus laurettae*, humpback whitefish *Coregonus pidschian*, as well as freshwater resident Arctic grayling *Thymallus arcticus*, Dolly Varden *Salvelinus malma*, Arctic char *Salvelinus alpinus*, northern pike *Esox lucius*, sheefish *Stenodus leucichthys*, round whitefish *Prosopium cylindraceum*, least cisco *C. sardinella*, humpback whitefish *C. pidschian*, broad whitefish *C. nasus*, burbot *Lota lota* and lake trout *Salvelinus namaycush*. Most of these species are harvested in sport, personal use or subsistence fisheries. In addition, marine species

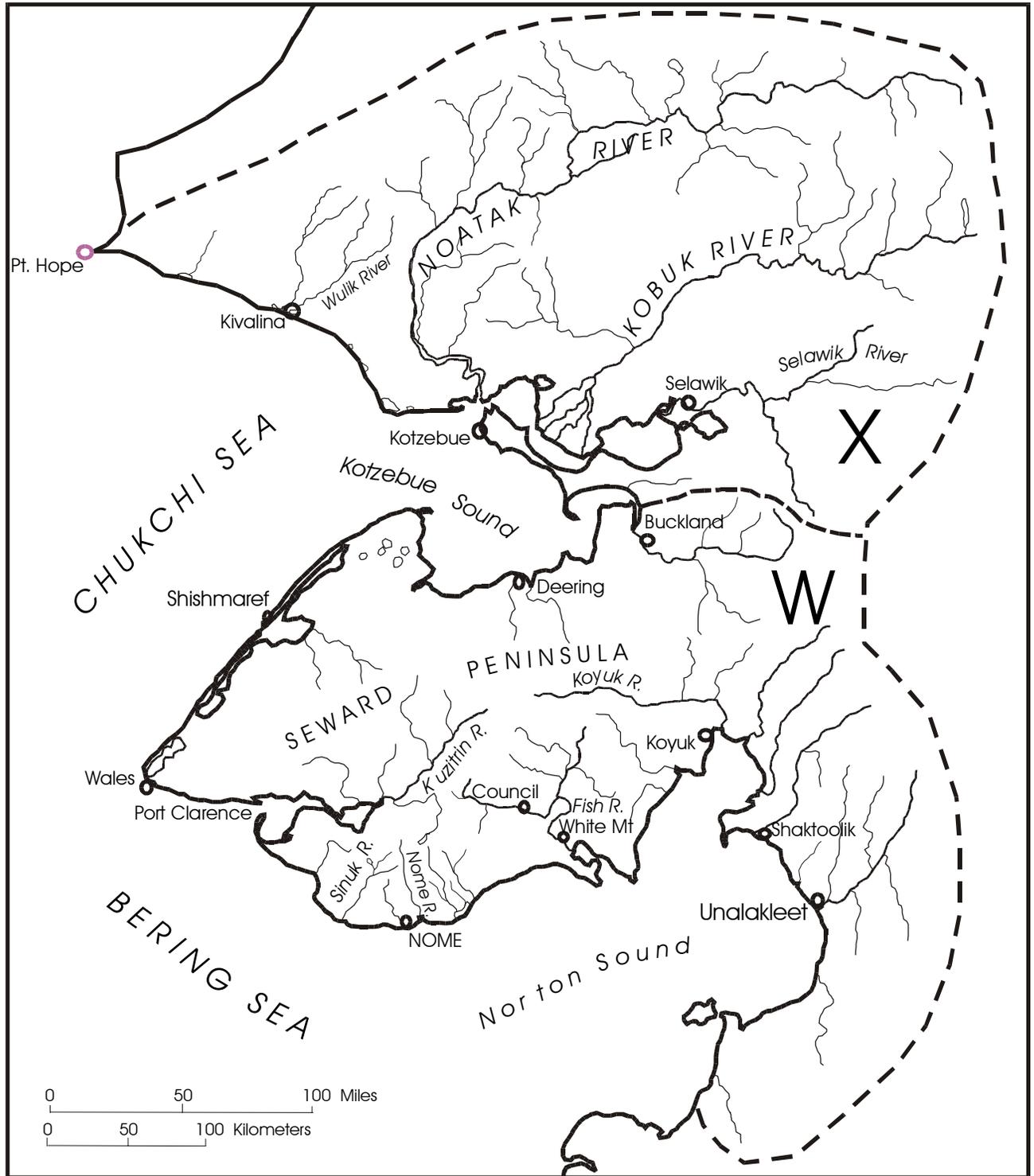


Figure 2.-The Northwestern Management Area with lines depicting reporting areas W and X.

such as red king crab *Paralithodes camtschatica*, Pacific herring *Clupea harengus*, rainbow smelt *Osmerus mordax*, saffron cod *Eleginus gracilis*, and starry flounder *Platichthys stellatus* are harvested.

Seward Peninsula/Norton Sound Sub-area

The Seward Peninsula-Norton Sound sub-area (statewide harvest Area W; Figure 3) includes all westerly flowing waters and adjacent marine (salt) waters, north of the Yukon River drainage and south of the Selawik River in the Kotzebue Sound/Chukchi Sea sub-area (ADF&G 1984). Streams in eastern Norton Sound (Figure 4) include the Golsovia, Unalakleet, Egavik, Shaktoolik, Inglutalik, Ungalik and Koyuk rivers. All but the Koyuk, drain the Nulato Hills which separate Norton Sound from the Yukon and Koyukuk River valleys. Of these, the Unalakleet River is the largest and most heavily utilized. The village of Unalakleet is located at the mouth of this river. The Unalakleet River has been designated a National Wild and Scenic River (Appendix B) and supports anadromous populations of Dolly Varden, chinook, coho, chum and pink salmon and resident populations of Dolly Varden, Arctic grayling and whitefish *Coregonus sp.* Other area streams provide the opportunity for high quality fisheries for the same species, but are not as intensively fished because of their remote nature and difficult access.

Many streams located along the southern half of the Seward Peninsula between Koyuk and Teller, (Figure 5) including the Fish, Niukluk, Bonanza, Eldorado, Nome, Snake, Sinuk, Feather, Tisuk, Pilgrim, and Kuzitrin rivers, are accessible via the Nome road system and offer sport fishing opportunity for Arctic grayling, Dolly Varden, salmon and northern pike (Fish, Pilgrim and Kuzitrin rivers). Small sockeye salmon runs occur in the Pilgrim and Sinuk rivers, and a few remnant late run sockeye are present in most other locations while chinook salmon are present in the Pilgrim, Niukluk and Fish rivers. Trophy Arctic grayling, larger than 1.4 kg (3 lbs), are present in many Seward Peninsula waters where some of Alaska's largest Arctic grayling have been taken. Of the 110 largest Arctic grayling registered in the ADF&G trophy fish program, 30 were taken from Seward Peninsula waters, and 20 of those were taken from the Sinuk River. Remote streams such as the Koyuk, Tubutulik, Kwiniuk, and Agiapuk rivers are accessible by aircraft or boat from nearby villages. These rivers receive little sport fishing effort but provide opportunity for remote high quality fisheries.

Most of the streams draining the northern half of the Seward Peninsula have never been visited by division personnel but likely have limited sport fishing potential due to relatively small flow volumes and difficult access. Much of the northwestern Seward Peninsula is part of the Bering Land Bridge National Preserve (Figure 6).

Other than thaw lakes on the northern side of the Seward Peninsula, there are few lakes in the sub-area. Unique lake formations include five maar lakes south of Cape Espenberg. These lakes were formed by sub-permafrost steam explosions and contain a combination of Arctic char, least cisco and sticklebacks. The largest inland water body is Imuruk Lake in the north-central portion of the Seward Peninsula. It is approximately 32 km² in area, and drains northward via the Inmachuk River. This lake is very shallow with a heavy load of suspended volcanic ash. It contains a small population of resident Arctic grayling.

Some small alpine lakes in the Kigluaik Mountains north of Nome contain lake resident Arctic char, (Kretsinger 1987) while others contain Dolly Varden (Phillips et al. 1999). Glacial

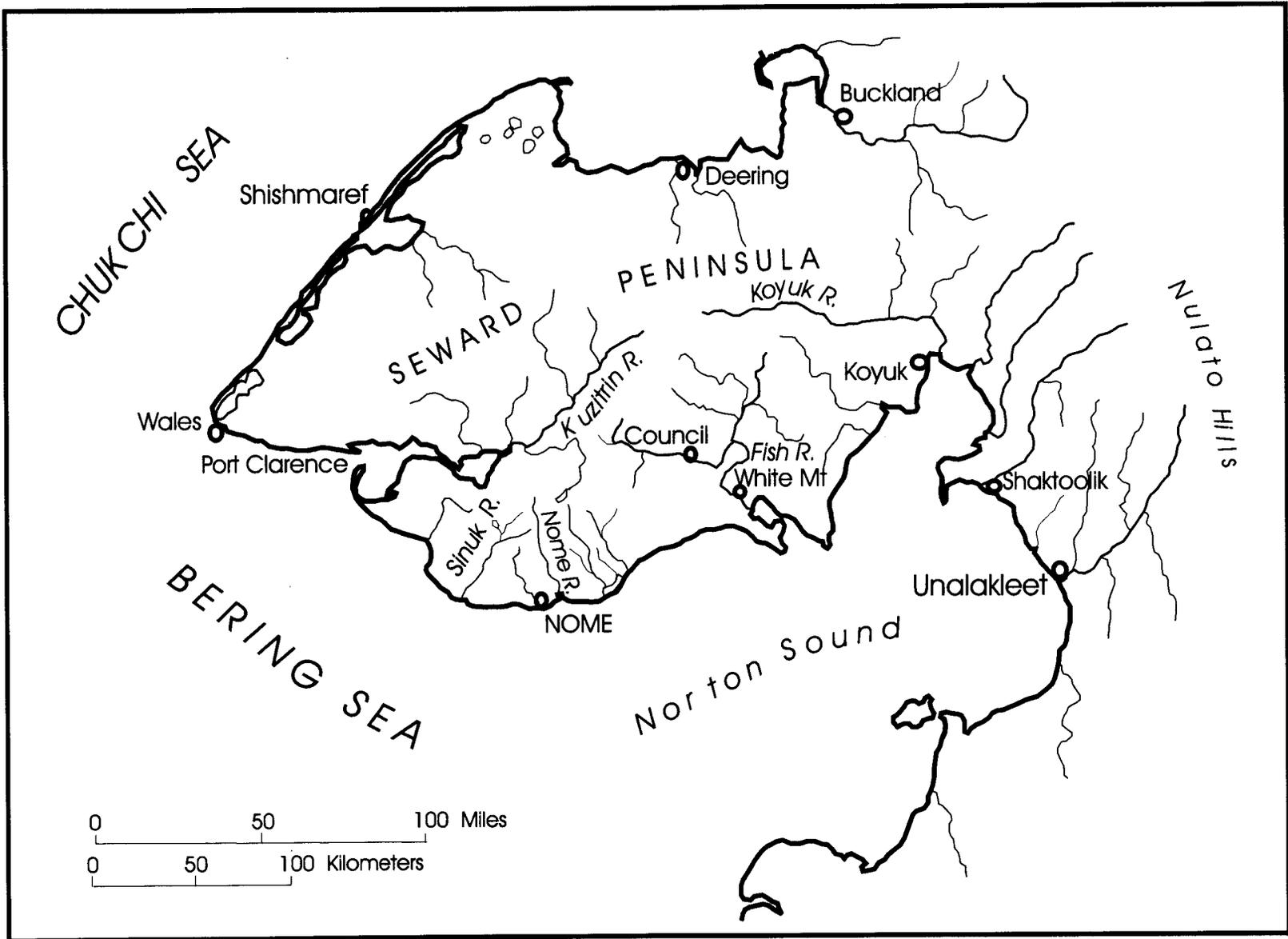


Figure 3.-The Seward Peninsula/Norton Sound sub-area.

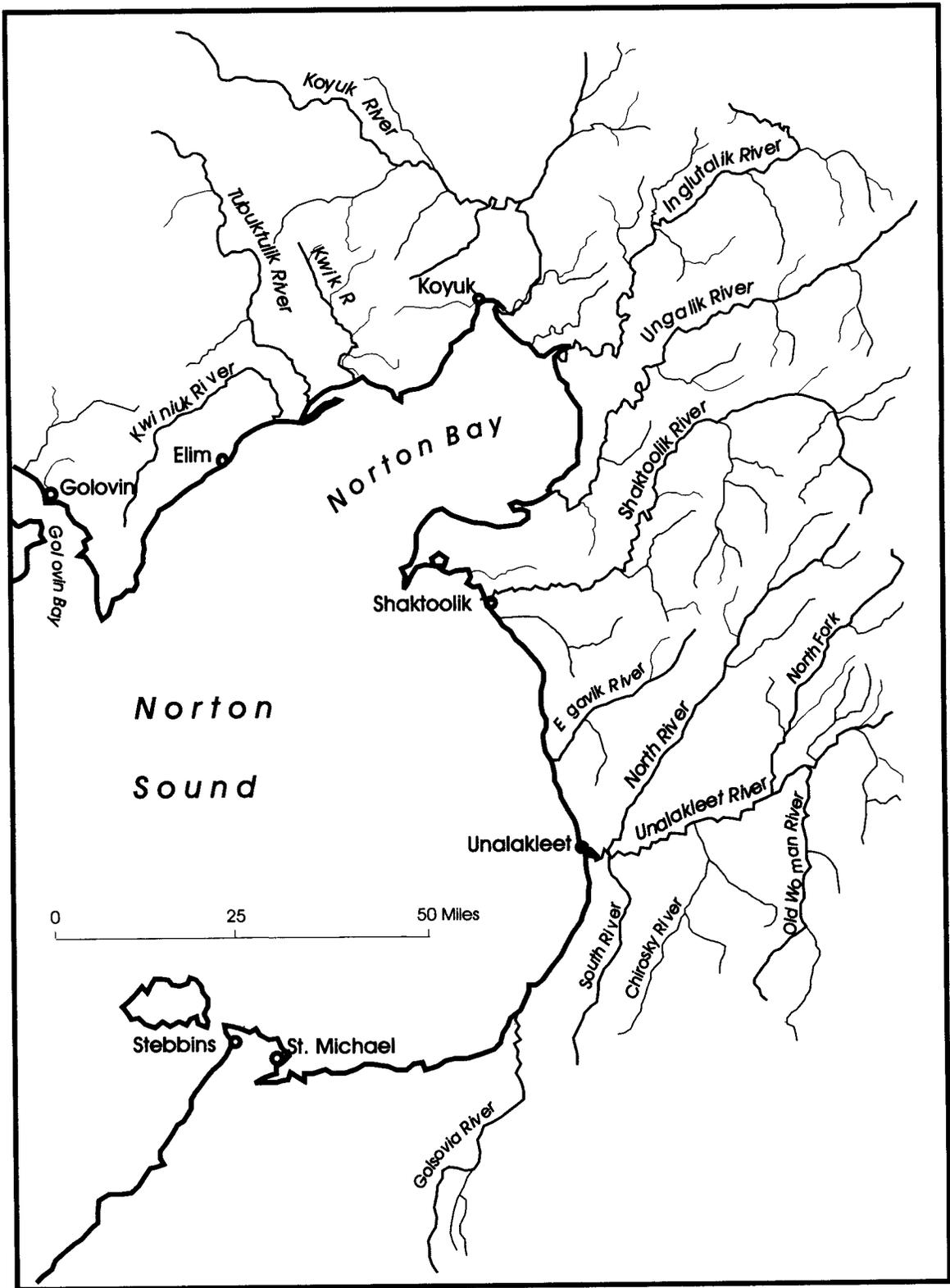


Figure 4.-Eastern Norton Sound.

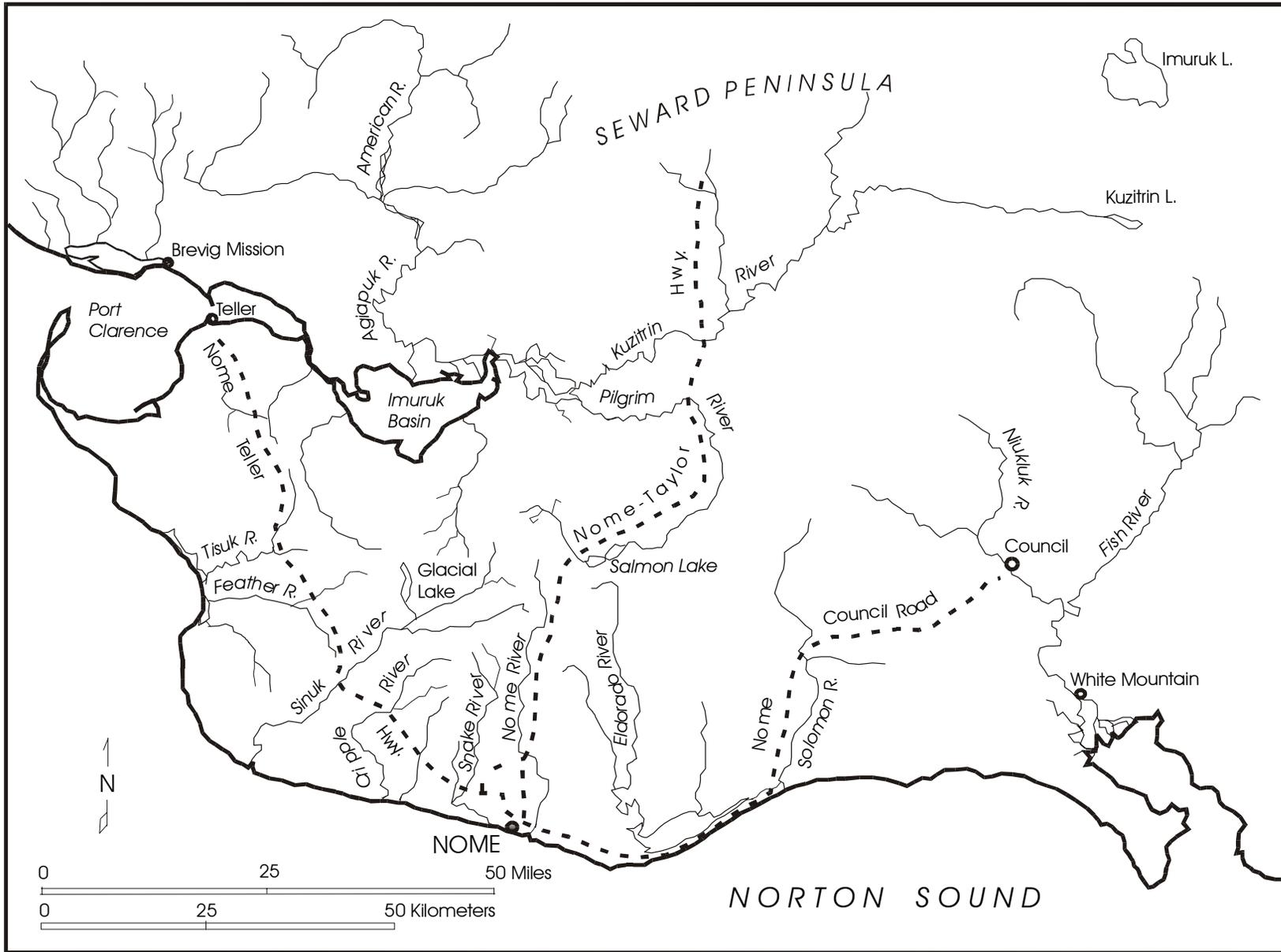


Figure 5.-Southern Seward Peninsula with road accessible waters.

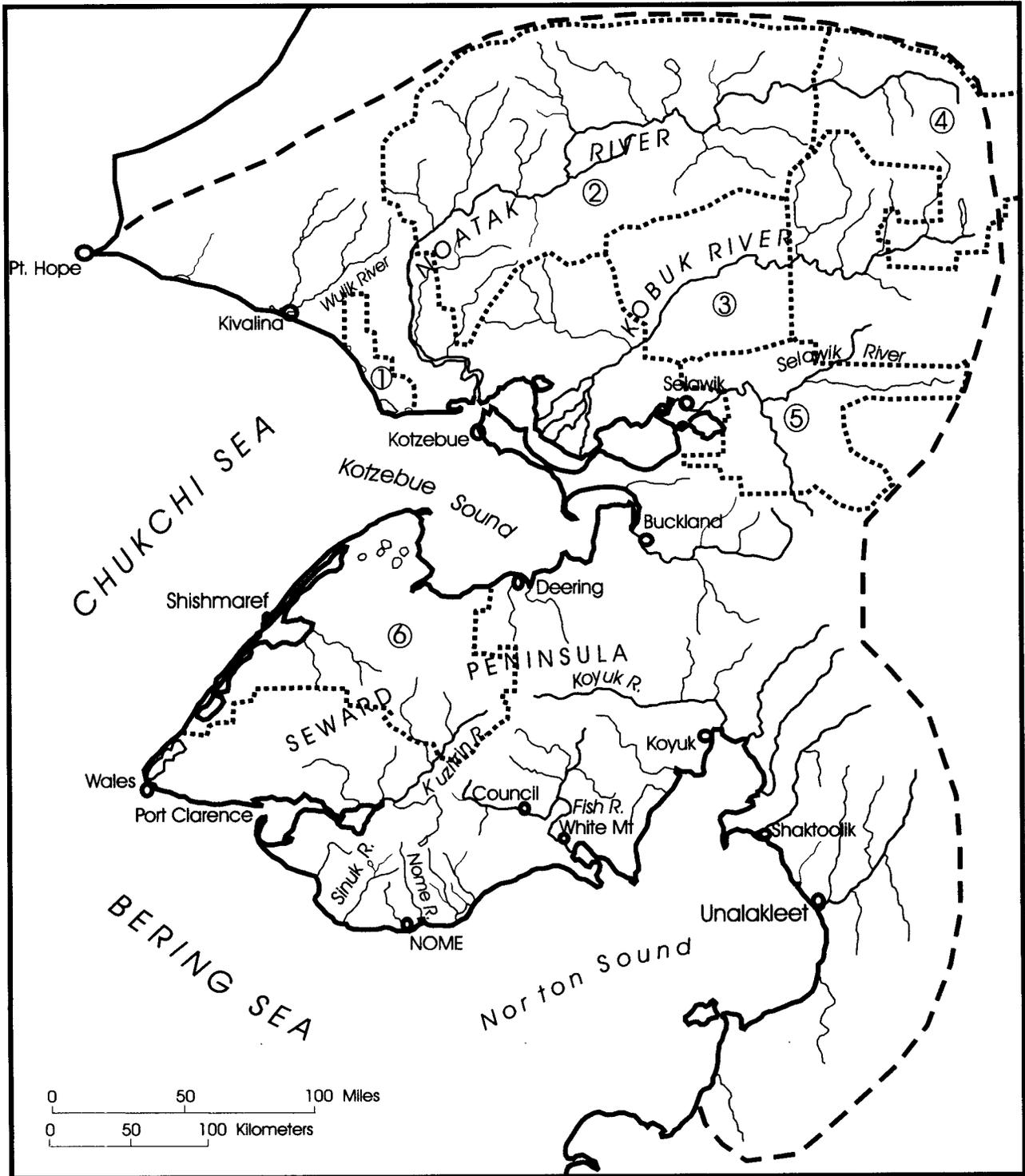


Figure 6.-National Parks Preserves and Wildlife Refuges in NWMA. 1) Cape Krusenstern National Monument, 2) Noatak National Park, 3) Kobuk Valley National Park and Preserve, 4) Gates of the Arctic National Park, 5) Selawik National Wildlife Refuge, and 6) Beringland Bridge National Preserve.

Lake in the Sinuk River drainage contains sockeye salmon and round whitefish, while Salmon Lake, located about 150 km north of Nome in the headwaters of the Pilgrim River, contains sockeye salmon, Arctic grayling, round whitefish, least cisco, slimy sculpin, ninespine stickleback, burbot and Dolly Varden which use it as a migration corridor (DeCicco 1995). Even though Salmon Lake can be reached by road, it receives little sport fishing use. During the first half of the century it was an important fishing area for gold miners and sockeye were nearly extirpated from the drainage. Subsistence fishing for salmon in Salmon Lake has been prohibited for many years because the sockeye stock was practically eliminated by early fisheries. The sockeye population has been recovering during recent years with the help of lake fertilization. However, all fishing for salmon in the lake and its tributaries is still prohibited.

Kotzebue/Chukchi Sea Sub-Area

The Kotzebue/Chukchi Sea sub-area, statewide harvest Area X, includes all waters and drainages of the Selawik, Kobuk, Noatak, Wulik, Kivalina and Kukpuk rivers (Figure 7). The area also includes all salt water from the northern half of Eschscholtz Bay, including the Chamisso Island area and the northern half of Kotzebue Sound to and including Point Hope (ADF&G 1984).

The most important streams of Kotzebue/Chukchi Sea sub-area are the Noatak and Kobuk rivers, each of which drains approximately 12,000 sq mi (31,000 km²) of the southern and western slopes of the western Brooks Range. Both rivers are approximately 400 mi (640 km) in length (U.S. Army Corps of Engineers 1967). The third largest drainage is the Selawik River, with an approximate area of 4,600 sq mi (11,700 km²). Abundant groundwater sources serve to stabilize flow and water temperature fluctuations on the lower main stem of the Noatak River and in tributaries of the Kobuk River. These areas provide important overwintering and spawning habitats for many species of fish.

The Noatak River is a National Wild and Scenic River (Appendix B) and most of the drainage is included in the Noatak National Preserve (Figure 6). The extreme upper headwaters of both the Noatak and Kobuk rivers are included in the Gates of the Arctic National Park. A portion of the lower Kobuk Valley between the villages of Kiana and Ambler is included in the Kobuk Valley National Park, and the Salmon River tributary, as well as the upper main stem of the Kobuk River are National Wild and Scenic Rivers as is the Selawik River. Much of the Selawik River valley is part of the Selawik National Wildlife Refuge. These three large river systems contain abundant fisheries resources.

The Noatak River produces a large run of chum salmon that contributes to a Kotzebue-based commercial fishery. Many thousands of anadromous Dolly Varden overwinter the lower 300 km of the river and spawn in some of the river's tributary streams. During the commercial salmon fishery in August a significant incidental harvest of adult Dolly Varden is sometimes taken. This system is known for its trophy size Dolly Varden. The fish that held the State of Alaska record for Dolly Varden/Arctic char from 1991 to 2000 (19.75 lbs.) was taken from the Kelly River in the Noatak River drainage. Whitefish, Arctic grayling, Dolly Varden, lake trout, Arctic char, burbot and northern pike are resident in the Noatak River drainage. Sheefish use the lower reaches of the river for feeding during the spring of the year, but are not known to spawn there (Alt 1987).

The Kobuk River also supports a large run of chum salmon that contributes to the Kotzebue commercial fishery. Major spawning areas are located in many of the Kobuk's tributary streams and in the upper part of the main stem of the river. The Kobuk River contains the largest

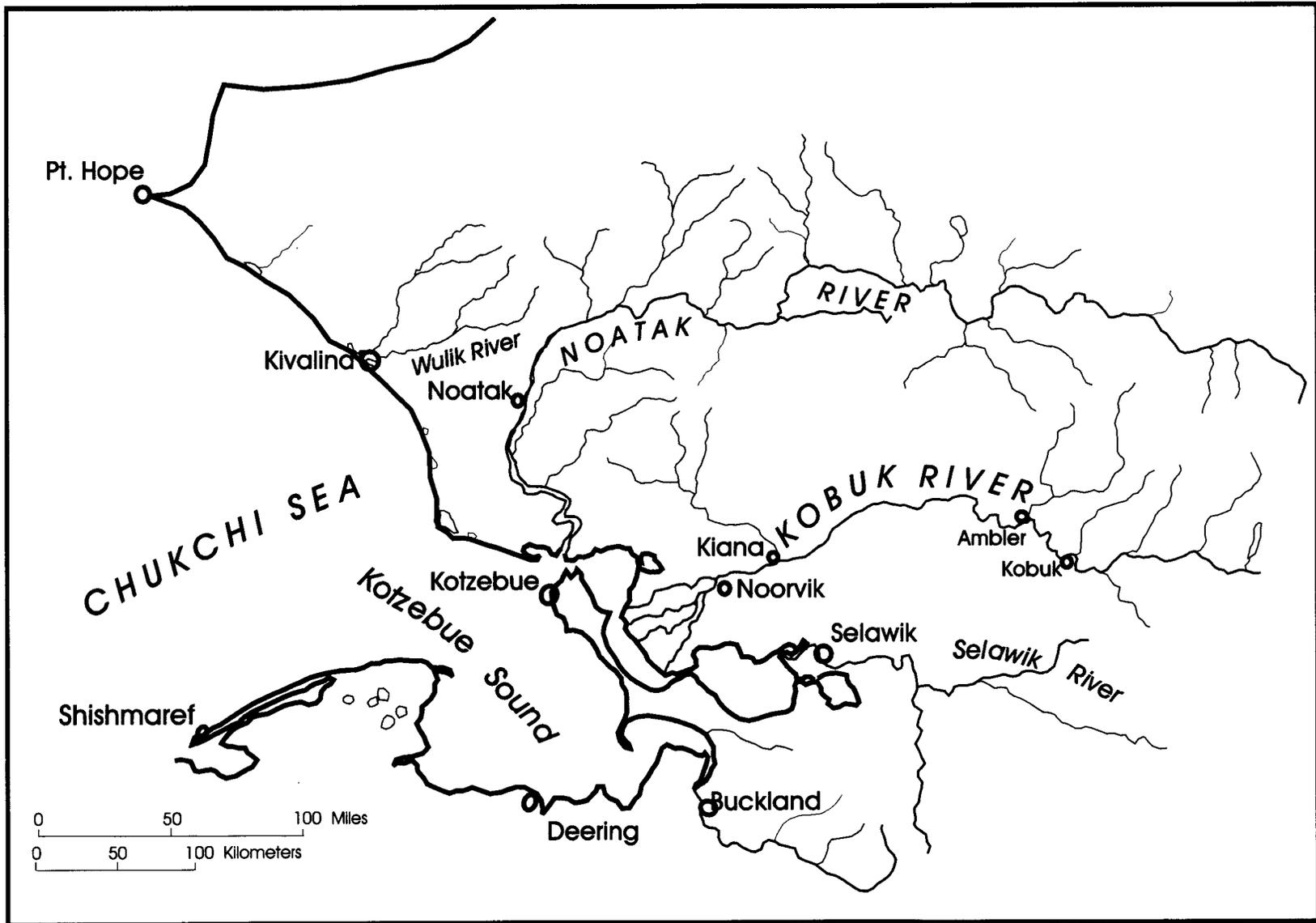


Figure 7.-Kotzebue Sound Chukchi Sea sub-area.

spawning population of sheefish in northwestern Alaska. Sheefish migrate upstream over 300 miles to spawn in the upper reaches of the drainage. Hotham Inlet, Selawik Lake and the delta system at the river's mouth serve as winter feeding areas for juvenile and adult sheefish. The Alaska state record sheefish, 24 kg (53 lbs), was taken in 1986 from the upper Kobuk River. Abundant whitefish (*C. sardinella*, *C. nasus*, *C. pidschian*) utilize the river, including Selawik Lake and Hotham Inlet (Kobuk Lake). Whitefish support important subsistence fisheries in villages along the river. Dolly Varden, northern pike, Arctic grayling, burbot, lake trout and Arctic char inhabit various parts of the Kobuk watershed.

The Selawik River also supports a spawning population of sheefish that shares rearing and winter feeding areas with the Kobuk population. Sheefish in both populations are slower growing, but attain a larger size than those in other areas of Alaska (Alt 1987). The Selawik River drainage and associated wetlands provide abundant habitat for whitefish (*C. sardinella*, *C. nasus*, *C. pidschian*) and northern pike.

Other important waters in the sub-area include the Wulik and Kivalina rivers that drain into the Chukchi Sea near the village of Kivalina. These drainages provide rearing, spawning and winter habitat for diadromous Chukchi Sea Dolly Varden. All five species of North American Pacific salmon, Arctic grayling, burbot and whitefish also occur in these relatively small drainages, but populations are not large.

Sport fishing effort in the northern part of the NWMA is relatively light compared to most other areas in the state with heaviest use on the Noatak, Kobuk, and Wulik rivers. Many visitors to Gates of the Arctic National Park and Kobuk Valley National Park participate in float trips on the Kobuk River from Walker Lake to Kobuk village (Alt 1984; ADF&G 1986; National Park Service (NPS) 1984, 1985). A small amount of shore based sport fishing for sheefish takes place near Kotzebue in the summer. Guided and unguided anglers and river floaters use the Noatak River as do Kotzebue area residents who boat or fly to different parts of the river to fish or hunt. The most popular fishing area on the Noatak River is the Kelly River, but other tributaries such as the Nimiuktuk and Kugururok rivers are also used occasionally for Dolly Varden fishing (Alt 1978). Raft, canoe, and kayak trips are becoming increasingly popular. Arctic grayling, Dolly Varden, northern pike and lake trout are available in the upper Noatak River, and downstream from the Nimiuktuk River, chum salmon also occur. Lake trout occur in Matcharak, Feniak, and Desperation lakes and in some other lakes in the middle and upper Noatak drainage. Some lakes also contain Arctic char or Dolly Varden. Most lakes in the area are accessible during summer months only by floatplane. Thirteen lakes surveyed by Alt (1978) in the upper Noatak River all contained fish. Round whitefish, lake trout and Arctic grayling were the most common species. Least cisco, northern pike, Arctic char, slimy sculpin *Cottus cognatus*, salmon (chum and sockeye), and ninespine stickleback *Pungitius pungitius* were also found. Of six lakes surveyed in 2000, two contained resident populations of Dolly Varden (DeCicco, unpublished data).

The lower floodplains of the Kobuk and Selawik rivers, especially in the vicinity of the Kobuk River delta, and the lower Noatak River contain hundreds of shallow thaw lakes of various sizes. Fisheries resources in this area have been poorly inventoried, but populations of whitefish, and northern pike are known to be seasonally present. Dolly Varden spawn in several Kobuk River tributary streams, including the Squirrel, Salmon, Tutuksuk, Hunt and Ambler rivers. The mountains in the upper Kobuk River drainage contain several relatively large, oligotrophic lakes. Lake trout, Arctic grayling, Arctic char, northern pike and several species of whitefish inhabit these lakes that include Walker Lake, Nutuvukti Lake, and Selby Lake.

Most sport fishing throughout the region is by unguided private individuals. The sport fish guiding industry, while present in some of the region's best fishing waters, is not as large or well developed as in other parts of the state. DeCicco and Barnes (1992) produced a list of guide services by area, species and fishery.

RURAL ALASKA SPORT FISHING

With the exception of the limited road system around Nome, waters of the Northwestern Management Area are not accessible from highways or roads of any kind. Small communities are scattered along the major river systems and along the coast of western Alaska. The communities are invariably located on or near water because of the importance of fish as a food source to native people historically and today. Native residents harvest a substantial amount of fish and game resources for personal subsistence use. Subsistence fishing is usually conducted using nylon gillnets or seines. Fishing with rod and reel is also practiced to some extent by rural residents, but most often as an extension of subsistence activities and less for recreational purposes. Consequently, harvest estimates of sport caught fish from rural Alaska are generally low, in part because local residents usually fish under subsistence regulations and because the small amount of sport fishing done by them is often considered as part of their normal subsistence activities. Since statewide harvest estimates are based upon surveys of licensed sport fishers, rural harvests may not be fully documented.

AYK SPORT FISHING REGULATIONS

Published regulations for the Northwestern Management Area for 2002 are reproduced as Appendix C.

COMMERCIAL FISHERIES

Although small when compared to the major commercial fisheries in southeast and southwest Alaska, the commercial fisheries in northwest Alaska form an economic base for income and employment in many local communities. Commercial harvests of salmon, herring, halibut and crab are usually much larger than sport harvests for those species. In addition, extremely limited commercial fisheries exist for freshwater species such as sheefish, Dolly Varden and whitefish. Although personal use fisheries are also allowed, there has been no participation in these fisheries in the NWMA largely because all Alaska residents qualify as subsistence users. Subsistence harvests of salmon, Dolly Varden, sheefish, whitefish and crab are very important to the economies of the many small villages in the NWMA, and in most cases, are much larger than the sport fish harvests which generally make up the smallest component of overall use in most years.

The Division of Commercial Fisheries Management and Development (CFMD) regulates commercial fisheries in the Northwestern Management Area. Commercial fisheries for salmon in the Norton Sound management district have been ongoing since 1961. The initial species of interest were chinook and coho, but fisheries have also developed for chum and pink salmon. The district is divided into six subdistricts to facilitate management of individual stocks or stock groups. Subdistricts include: 1) Nome, 2) Golovin, 3) Moses Point, 4) Norton Bay, 5) Shaktoolik, and 6) Unalakleet (Figure 8). Conservation concerns for chum salmon stocks have resulted in very little commercial salmon fishing in the Nome subdistrict since the early 1980s. There has likewise been little recent commercial fishing in the Norton Bay subdistrict, but this has largely been the result of limited markets in this remote area (Brennan et al. 2002). Average commercial harvests over the last five years (1997-2001) in the Norton Sound district

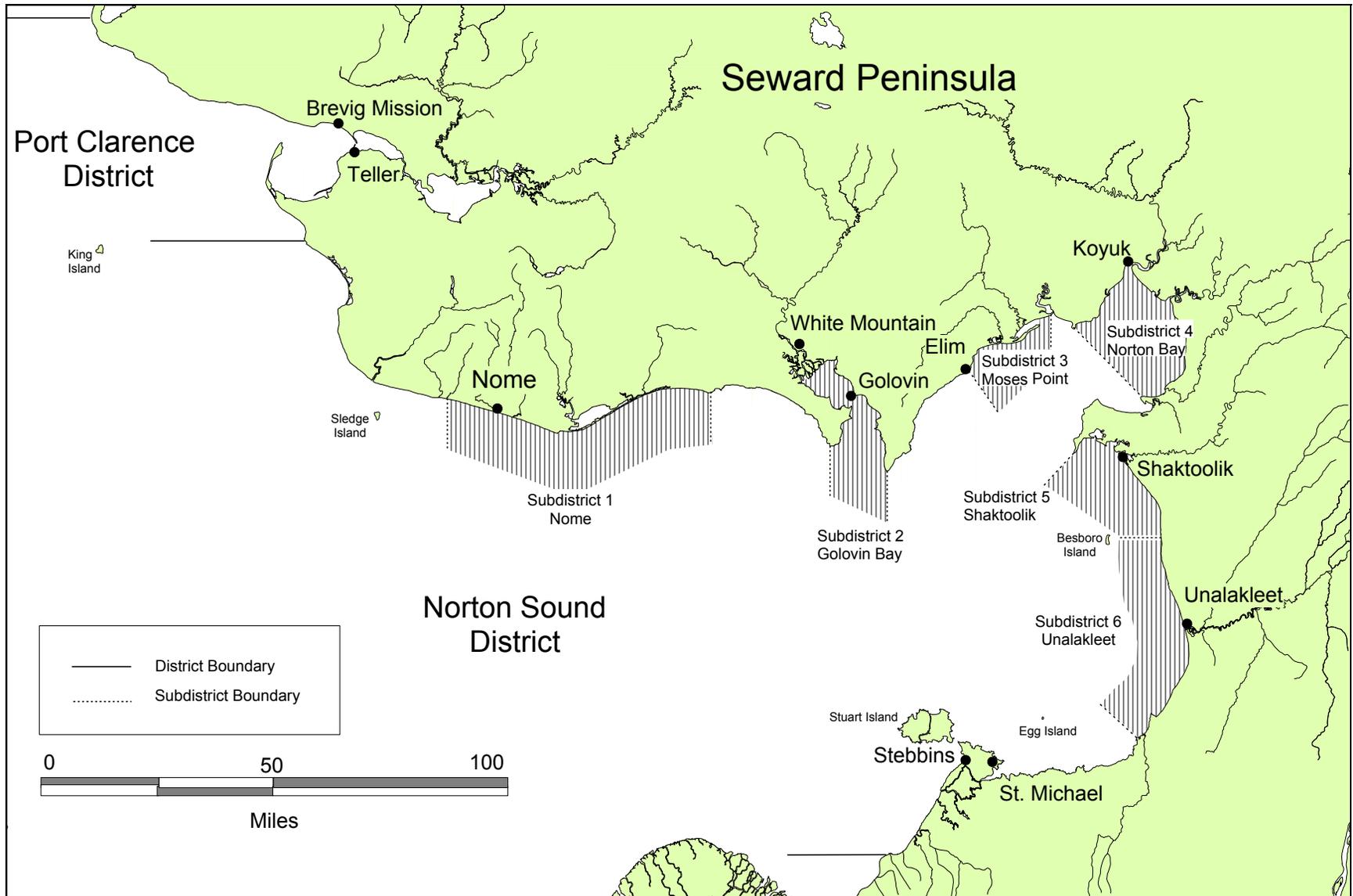


Figure 8.-Commercial salmon fishing subdistricts in Norton Sound.

have been 4,695 chinook, 27,649 coho, 15,117 chum, and 156,757 pink salmon (Table 1). Management actions because of weak runs resulted in commercial harvests in 2002 that were the lowest on record for these fisheries totaling 5 chinook, 1,769 coho, 600 chum, 0 pink and 1 sockeye salmon. The Port Clarence District includes all waters from Cape Douglas north to Cape Prince of Wales, including the drainages of the Pilgrim and Kuzitrin rivers (Figure 9). Commercial salmon fishing was prohibited in this district in 1967. Few stocks are present and their run sizes are relatively small, however, the sockeye run into Salmon Lake that passes through the district has increased to over 10,000 fish in recent years. Because of the existence of important subsistence fisheries on these stocks, commercial fishing has never reopened. The Kotzebue Sound District includes all waters from Cape Prince of Wales to Point Hope (Figure 10) and is the northern most commercial fishing district in Alaska. The current commercial fishery opened under state management in 1962, but there are documented sales of salmon in the Kotzebue area dating back to the early 1900s. This is primarily a chum salmon fishery with a few chinook taken annually and an incidental take of Dolly Varden that pass through the fishery in August. Average commercial harvests over the past five years (1997-2001) in the Kotzebue Sound District have been about 142,000 chum salmon and about 1,000 Dolly Varden (Table 2). Low fishing effort because of depressed prices resulted in a harvest of only 8,390 chum salmon in 2002. There is also a directed under ice commercial fishery on sheefish in Hotham Inlet. Documented annual harvests in this fishery have averaged only 250 fish over the past five years, and the harvest quota of 25,000 pounds has never been met. Brennan et al. (2002) documents these fisheries in greater detail.

The CFMD conducts annual assessments of salmon escapements using weirs, counting towers and aerial surveys (Table 3). The status of Norton Sound chum salmon stocks of concern was recently reviewed by the BOF and biological escapement goals (BEGs) for chum salmon based on aerial survey counts in Nome Subdistrict streams have been established (Table 4). In addition, Sustainable Escapement Goals (SEGs) have recently been developed for salmon stocks that lacked adequate data for the development of more formalized BEGs. Optimal Escapement Goals (OEG) have also been developed for some species/river combinations. An OEG is a specific management objective for escapement that considers biological and allocative factors and may differ from the SEG or BEG. The BOF places an OEG into regulation and the department manages to maintain escapements within the bounds of the OEG. With the exception of the goal for the Kwiniuk River that is based on a tower count, the escapement goals are based on aerial survey data, but these goals will likely be revised using tower or weir counts when sufficient data are available.

SUBSISTENCE FISHERIES

There are approximately 16,000 people in the NWMA. Except for the two larger communities of Nome and Kotzebue, the population is scattered among 26 small villages along the coast and the major area rivers (Alaska Dept. of Labor 1991). Most of the population is comprised of Alaska Natives, many of whom lead a relatively traditional lifestyle. Most area residents rely heavily on the subsistence use of fish and wildlife for their livelihood. Subsistence use of salmon is monitored in village surveys conducted by the Division of Subsistence. Recent subsistence salmon harvests (1997-2001) have averaged about 66,750 fish in the Norton Sound District (Table 5). This average harvest was composed of 5,583 chinook, 676 sockeye, 13,046 coho, 31,583 pink, and 15,852 chum salmon. The recent 5-y average subsistence salmon

Table 1.-Historic commercial salmon harvests by subdistrict from the Norton Sound district 1980-2002.

| Year | Nome (Subdistrict 1) | | | | | Golovin (Subdistrict 2) | | | | | Moses Point (Subdistrict 3) | | | | |
|-----------|----------------------|---------|-------|--------|--------|-------------------------|---------|-------|---------|--------|-----------------------------|---------|-------|---------|--------|
| | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum |
| 1980 | 8 | | | 10,007 | 23,937 | 36 | 36 | 328 | 10,744 | 52,609 | 502 | | | 1,435 | 14,755 |
| 1981 | 4 | | 508 | 3,202 | 22,380 | 23 | 5 | 13 | 49,755 | 58,323 | 198 | | 5 | 26,417 | 29,325 |
| 1982 | 20 | | 1,183 | 18,512 | 33,162 | 78 | 5 | 4,281 | 39,510 | 51,970 | 253 | | 318 | 9,849 | 40,030 |
| 1983 | 23 | | 261 | 308 | 12,283 | 52 | 10 | 295 | 17,414 | 48,283 | 254 | | | 17,027 | 65,776 |
| 1984 | 7 | | 820 | | 4,571 | 31 | | 2,462 | 88,588 | 54,153 | | | 5,959 | 28,035 | 9,477 |
| 1985 | 21 | | 356 | | 6,596 | 193 | 113 | 1,196 | 3,019 | 55,781 | 816 | 32 | 1,803 | 559 | 24,466 |
| 1986 | 6 | | 50 | | 8,216 | 81 | 8 | 958 | 25,425 | 68,725 | 600 | 41 | 5,847 | 15,795 | 20,668 |
| 1987 | 3 | | 577 | | 6,226 | 166 | 51 | 2,203 | 1,579 | 44,344 | 907 | 15 | 64 | 568 | 17,278 |
| 1988 | 2 | | 54 | 182 | 1,866 | 108 | 921 | 2,149 | 31,599 | 33,348 | 663 | 93 | 3,974 | 13,703 | 18,585 |
| 1989 | 2 | | | 123 | 617 | | | 0 | 0 | | 62 | | | 0 | 167 |
| 1990 | 0 | 0 | | | | 52 | 21 | 0 | 0 | 15,993 | 202 | 0 | 0 | 501 | 3,423 |
| 1991 | 0 | 0 | | | | 49 | 1 | 0 | 0 | 14,839 | 161 | 0 | 0 | 0 | 804 |
| 1992 | 1 | 2 | 693 | 185 | 1,762 | 6 | 9 | 2,085 | 0 | 1,002 | 0 | 0 | 3,531 | 0 | 6 |
| 1993 | 0 | 2 | 611 | 0 | 745 | 1 | 4 | 2 | 8,480 | 2,803 | 3 | 0 | 4,065 | 0 | 167 |
| 1994 | 0 | 1 | 287 | 0 | 354 | 0 | 0 | 3,424 | 0 | 111 | 0 | 0 | 5,345 | 0 | 414 |
| 1995 | 0 | 1 | 369 | 0 | 492 | 0 | 0 | 1,616 | 4,296 | 1,987 | 4 | 44 | 3,742 | 2,962 | 1,171 |
| 1996 | 0 | 0 | 9 | 13 | 25 | 0 | 0 | 638 | 0 | 0 | 0 | 0 | 1,915 | 68,609 | 0 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 19 | 2 | 102 | 20 | 8,003 | 844 | 0 | 1,409 | 0 | 2,683 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 106,761 | 723 | 105 | 0 | 1,462 | 145,699 | 2,311 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,645 | 17,408 | 164 | 10 | 0 | 5,182 | 46,369 | 535 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 30 | 0 | 7,094 | 7 | 0 | 1,696 | 0 | 681 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Avg 92-01 | 0 | 1 | 197 | 20 | 338 | 3 | 6 | 955 | 13,697 | 2,189 | 97 | 4 | 2,819 | 26,364 | 797 |
| Avg 97-01 | 0 | 0 | 0 | 0 | 0 | 4 | 9 | 356 | 24,838 | 3,197 | 193 | 0 | 3,197 | 38,414 | 1,242 |

-continued-

Table 1.-Page 2 of 2.

| Year | Norton Bay (Subdistrict 4) | | | | | Golovin (Subdistrict 2) | | | | | Unalakleet (Subdistrict 6) | | | | |
|-----------|----------------------------|---------|-------|-------|--------|-------------------------|---------|--------|---------|--------|----------------------------|---------|--------|---------|---------|
| | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum |
| 1980 | 340 | | | 47 | 7,855 | 1,086 | | 8,001 | 1,947 | 27,453 | 4,339 | 3 | 21,512 | 203,142 | 64,198 |
| 1981 | 63 | | | 177 | 3,111 | 1,484 | 4 | 1,191 | 29,695 | 21,097 | 6,157 | 47 | 29,845 | 123,233 | 39,186 |
| 1982 | 96 | | 2,332 | 2,535 | 7,128 | 1,677 | 3 | 22,233 | 17,019 | 26,240 | 3,768 | 2 | 61,343 | 142,856 | 44,520 |
| 1983 | 215 | | 204 | 3,935 | 17,157 | 2,742 | 4 | 12,877 | 12,031 | 67,310 | 7,022 | 13 | 36,098 | 26,198 | 109,220 |
| 1984 | | | | 1,162 | 3,442 | 1,613 | | 10,730 | 1,596 | 32,309 | 6,804 | 6 | 47,904 | | 43,317 |
| 1985 | 528 | | 384 | 68 | 9,948 | 5,312 | 29 | 2,808 | | 13,403 | 12,621 | 21 | 15,421 | 1 | 25,111 |
| 1986 | 139 | 2 | 1,512 | 40 | 1,994 | 1,075 | | 6,626 | | 16,126 | 4,494 | 153 | 20,580 | | 30,239 |
| 1987 | 544 | | 145 | 16 | 3,586 | 2,214 | 79 | 6,193 | | 14,088 | 3,246 | 141 | 15,097 | 97 | 17,525 |
| 1988 | 434 | 2 | 709 | 1,749 | 7,521 | 671 | 43 | 6,096 | 3,671 | 21,521 | 2,218 | 157 | 24,232 | 23,730 | 25,363 |
| 1989 | | | | | | 1,241 | 49 | 8,066 | | 19,641 | 4,402 | 222 | 36,025 | | 20,825 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 2,644 | 55 | 4,695 | | 21,748 | 5,998 | 358 | 52,015 | | 23,659 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 1,324 | 56 | 11,614 | | 31,619 | 4,534 | 147 | 52,033 | | 39,609 |
| 1992 | 27 | 0 | 0 | 0 | 1,787 | 1,098 | 20 | 14,660 | | 27,867 | 3,409 | 229 | 84,449 | 6,284 | 52,547 |
| 1993 | 267 | 0 | 0 | 290 | 1,678 | 3,756 | 8 | 11,130 | 106,743 | 20,864 | 5,944 | 251 | 26,290 | 42,061 | 28,156 |
| 1994 | 0 | 0 | 0 | 0 | 0 | 885 | 5 | 22,065 | 502,231 | 5,411 | 4,400 | 71 | 71,019 | 480,158 | 12,288 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 1,239 | 1 | 10,856 | 37,377 | 14,775 | 7,617 | 78 | 31,280 | 37,009 | 24,843 |
| 1996 | 0 | 0 | 0 | 0 | 0 | 1,340 | | 13,444 | 304,982 | 3,237 | 3,644 | | 52,200 | 113,837 | 7,369 |
| 1997 | 194 | 0 | 0 | 0 | 531 | 2,449 | | 4,694 | 0 | 5,747 | 9,067 | 159 | 26,079 | | 17,139 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 910 | | 3,624 | 236,171 | 7,080 | 6,413 | 7 | 24,534 | 99,412 | 6,210 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 581 | 0 | 2,398 | 0 | 2,181 | 1,927 | 0 | 10,264 | 0 | 5,700 |
| 2000 | 0 | 0 | 0 | 0 | 0 | 160 | 3 | 7,779 | 85,493 | 2,751 | 582 | 11 | 29,803 | 17,278 | 2,700 |
| 2001 | 0 | 0 | 0 | 0 | 0 | 90 | 0 | 2,664 | 0 | 1,813 | 116 | 0 | 15,102 | 0 | 1,512 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 680 | 0 | 261 | 4 | 1 | 1,079 | 0 | 339 |
| Avg 92-01 | 49 | 0 | 0 | 29 | 400 | 1,251 | 5 | 9,331 | 141,444 | 9,173 | 4,312 | 90 | 37,102 | 88,449 | 15,846 |
| Avg 97-01 | 39 | 0 | 0 | 0 | 106 | 838 | 1 | 4,232 | 64,333 | 3,914 | 3,621 | 35 | 21,156 | 29,173 | 6,652 |

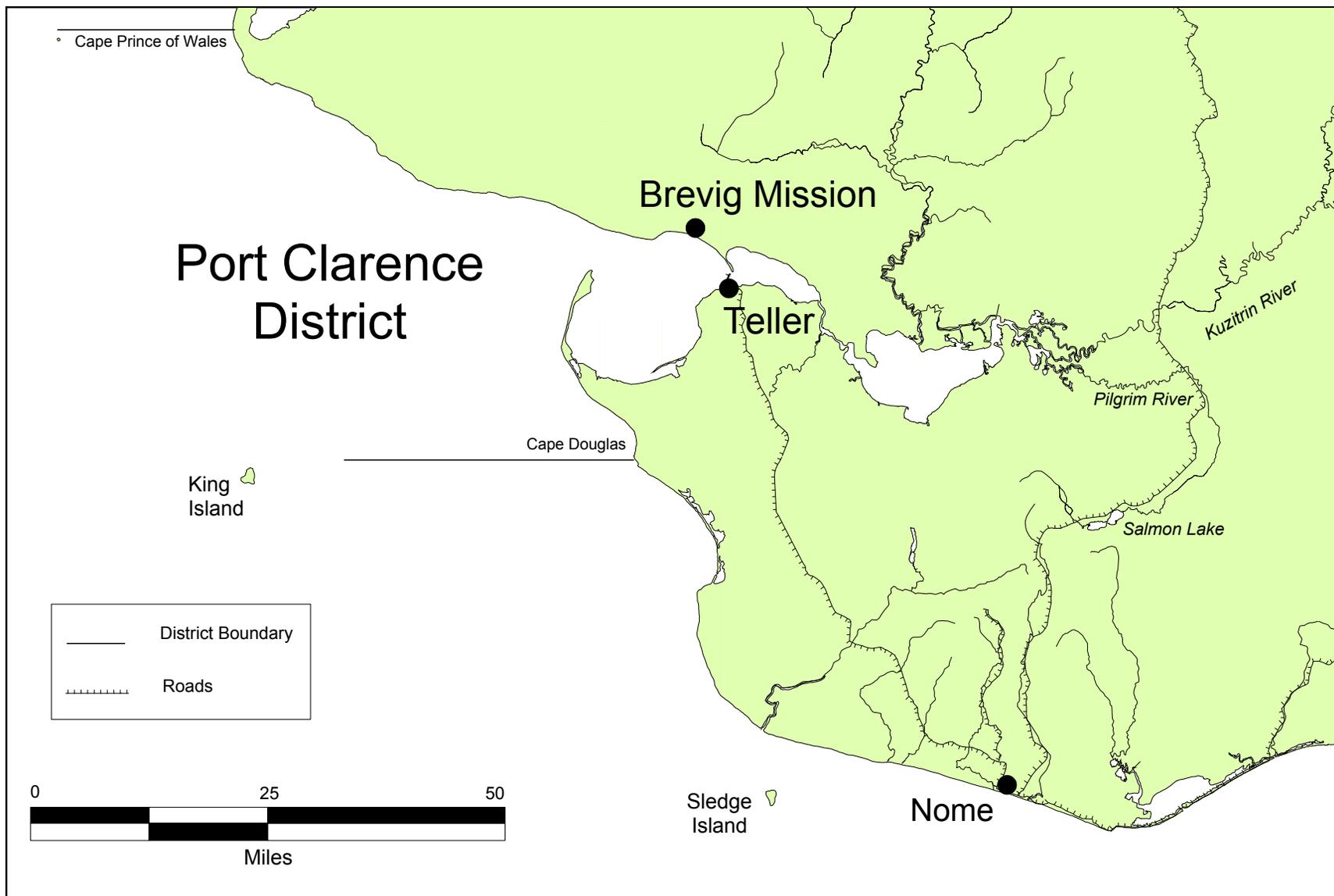


Figure 9.-Port Clarence commercial fishing district.

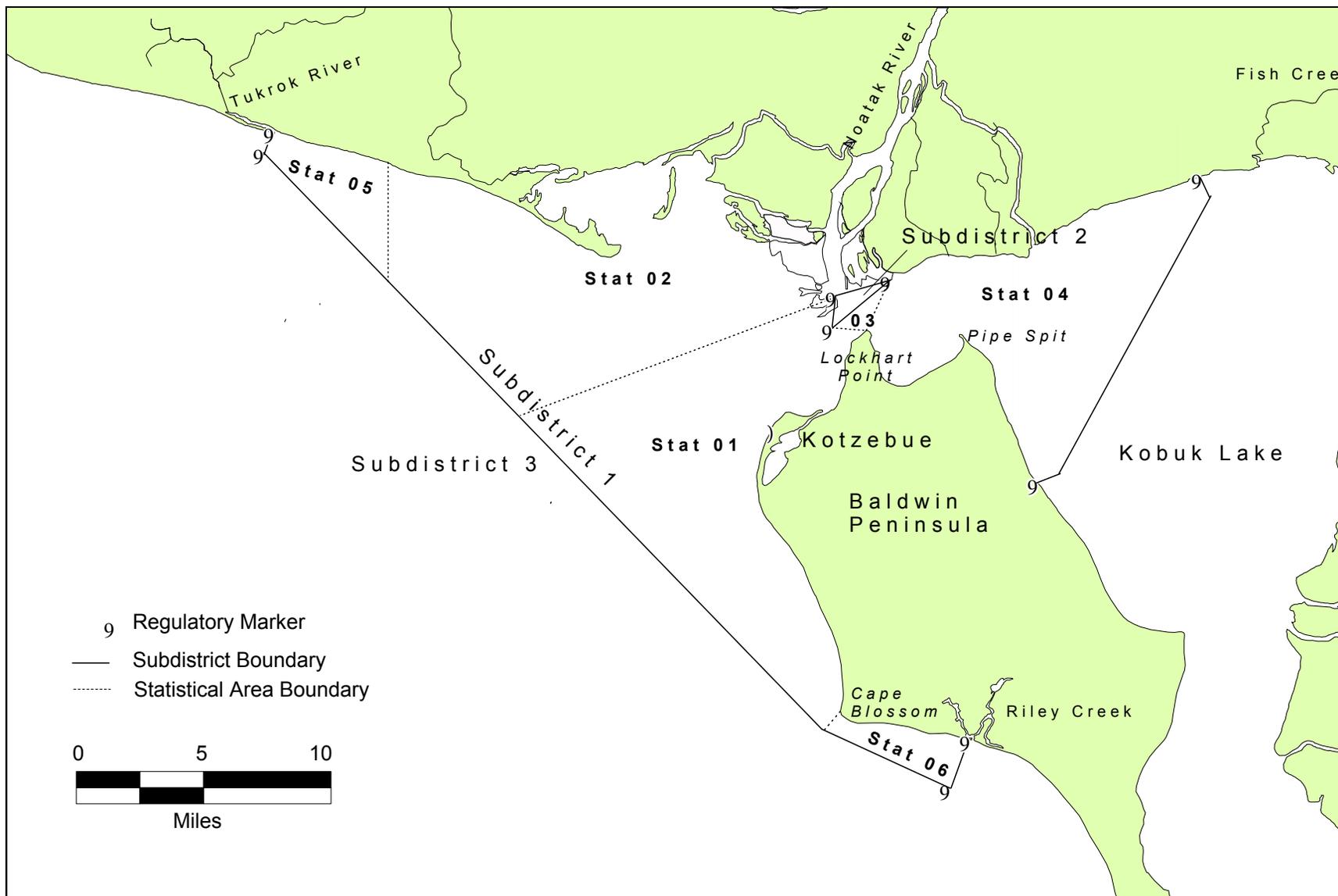


Figure 10.-Kotzebue commercial salmon fishing district.

Table 2.-Kotzebue district chum salmon commercial harvests and incidental Dolly Varden harvests 1980-2001.

| Year | Chum Salmon | Dolly Varden | |
|-----------|----------------|--------------|--------|
| | | Sold | Caught |
| 1980 | 367,284 | 3,049 | |
| 1981 | 677,239 | 3 | |
| 1982 | 417,790 | 3,447 | |
| 1983 | 175,762 | 190 | |
| 1984 | 320,206 | 347 | 1,090 |
| 1985 | 521,406 | 454 | 3,600 |
| 1986 | 261,436 | 5 | 2,373 |
| 1987 | 109,467 | 1,261 | |
| 1988 | 352,915 | 752 | |
| 1989 | 254,617 | 3,093 | |
| 1990 | 163,263 | 604 | |
| 1991 | 239,923 | 6,136 | |
| 1992 | 289,184 | 1,977 | |
| 1993 | 73,071 | 76 | |
| 1994 | 153,452 | 149 | |
| 1995 | 290,730 | 2,090 | |
| 1996 | 82,110 | 188 | |
| 1997 | 142,720 | 3,320 | |
| 1998 | 55,907 | 349 | |
| 1999 | 138,605 | 1,502 | |
| 2000 | 159,802 | 7 | |
| 2001 | 211,662 | 0 | |
| 2002 | 8,390 | 0 | |
| Avg 92-01 | 159,724 | 966 | |
| Avg 97-01 | 141,739 | 1,036 | |

Table 3.-Recent chum salmon escapements in Nome subdistrict streams, 1995-2002.

| Location | Escapement Goal (number of fish) | Year | | | | | | | |
|-----------------------|-------------------------------------|-------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|------------------|------------------|
| | | 1995 Estimate | 1996 Estimate | 1997 Estimate | 1998 Estimate | 1999 Estimate | 2000 Estimate | 2001 Estimate | 2002 Estimate |
| Sinuk River | 4,000-6,200 | | | | | | | | |
| Aerial Survey | | 3,110 | 1,815 (early) | 2,975 | 630 (incomplete) | no survey | 10 (incomplete) | 3746 | 1682 |
| Snake River | | | | | | | | | |
| Tower | 1,600-2,500 | 4,393 | 2,772 | 6,184 | 11,067 | 484 | 1,400 ^a | 2182 | 2669 |
| Nome River | | | | | | | | | |
| Tower/Weir | 2,900-4,300 | 5,092 | 3,339 | 5,131 | 976 | 1,048 | 4,051 ^a | 2859 | 1720 |
| Eldorado River | | | | | | | | | |
| Eldorado Tower | 6,000-9,000 | 39,867 | 12,655 | 14,302 | 13,808 | 4,218 | 10,604 ^a | 11635 | 10260 |
| Flambeau River | | | | | | | | | |
| Aerial Survey | 4,100-6,300 | 6,455 | 5,380 | 905 (Incomplete) | 2,828 (Incomplete) | No survey | 819 (Incomplete) | 3,612 | 1,876 |
| Bonanza River | | | | | | | | | |
| Aerial Survey | 1,000-1,900 | 0 (Incomplete) | 1,980 (Incomplete) | 881 (Incomplete) | no survey | 361 (Incomplete) | 1,130 (Incomplete) | 1,084 | 595 |
| Solomon River | | | | | | | | | |
| Aerial Survey | 1,100-1,600 | 315 | 323 | 316 (Incomplete) | 90 (Incomplete) | 51 (Incomplete) | 150 (Incomplete) | 280 | 325 |

-continued-

Table 3.-Page 2 of 2.

| Location | Escapement Goal (number of fish) | Year | | | | | | | |
|---|--|------------------|------------------------|------------------------|-----------------------|-----------------------|---------------------|-----------------------|---------------------|
| | | 1995 Estimate | 1996 Estimate | 1997 Estimate | 1998 Estimate | 1999 Estimate | 2000 Estimate | 2001 Estimate | 2002 Estimate |
| Fish River | | | | | | | | | |
| Niukluk Tower | (Goal not set) | 86,333 | 80,121 | 57,304 | 45,587 | 35,240 | 26,724 ^a | 30,662 | 33,979 |
| Fish River & Boston Cr. Combined Aerial Survey Index | 23,200-46,400 | 43,012 | 19,077 (Incomplete) | 40,500 (Incomplete) | 4,126 (Incomplete) | 640 (Incomplete) | No Survey | 6,753 (Incomplete) | No survey |
| Kwiniuk River | | | | | | | | | |
| Kwiniuk Tower | 11,500-23,000 | 42,703 | 28,493 | 20,118 | 24,248 | 8,763 | 12,251 ^a | 16,598 | 37,864 |
| Tubutulik River | | | | | | | | | |
| Aerial Survey | 8,000-16,000 | 16,518 | 10,790 | 3,105 | 10,060 | No survey | No Survey | 863 (Incomplete) | 180 (Incomplete) |
| Unalakleet River | | | | | | | | | |
| North Tower | (Goal not set) | no project | 9,789 (Incomplete) | 6,904 (Incomplete) | 5,421 (Incomplete) | 5,600 (Incomplete) | 3,717 ^a | 6,515 | 5,918 |
| Unalakleet Test Fish (Index) | 689 | 1,101 | 1,424 | 743 | 492 | 956 | 1,083 | 644 | 844 |
| Unalakleet, Old Woman Rivers Combined Aerial Survey Index | 2,400-4,800 (Goal) | 6,080 | 296 (Incomplete) | 4,840 (Incomplete) | 1,230 (Incomplete) | No survey | No survey | No survey | 1,335 |

Note: "Incomplete" survey indicates a survey was flown, but not used in the "Goal" assessment due to timing or survey conditions

Table 4.-Salmon escapement goals (SEG, BEG, or OEG) for Norton Sound area streams, 2002.

| Location | Type | Chum | Type | Chinook | Type | Sockeye | Type | Coho | Type | Pink |
|---------------------|--------|---------------|--------|-------------|--------|-------------|--------|-----------|--------|--------|
| Salmon Lake | | | | | | Combined | | | | |
| Grand Central River | | | | | | 4,000-8,000 | | | | |
| Pilgrim River | | | | | | | | | | |
| Glacial Lake | | | | | Aerial | 800-1,600 | | | | |
| Sinuk River | Aerial | 4,000-6,200 | | | | | | | | |
| Cripple River | | | | | | | | | | |
| Penny River | | | | | | | | | | |
| Snake River | Weir | 1,600-2,500 | | | | | | | | |
| Nome River | Weir | 2,900-4,300 | | | | | | | Weir | 13,000 |
| Flambeau River | | 4,100-6,300 | | | | | | | | |
| Eldorado River | Weir | 6,000-9,200 | | | | | | | | |
| Solomon River | | 1,100-1,600 | | | | | | | | |
| Ophir Creek | | | | | | | Aerial | Combined | | |
| Niukluk River | | | | | | | | 950-1,900 | Tower | 8,400 |
| Fish River | | Combined | Aerial | Combined | | | | | | |
| Boston Creek | | 23,200-46,400 | | 100-250 | | | | | | |
| Kwiniuk | Tower | 11,500-23,000 | Tower | 300-550 | | | Aerial | 650-1,300 | Tower | 12,500 |
| Tubutulik | Aerial | 9,200-18,400 | | | | | | | | |
| Inlitalik River | | | | | | | | | | |
| Ungalik River | | | | | | | | | | |
| Shaktookik | | | Aerial | 400-800 | | 400-800 | | | Aerial | 48,000 |
| Unalakleet River | | Combined | Aerial | Combined | | | | | | |
| Old Woman River | | 2,400-4,800 | | 550-1,100 | | | | | | |
| North River | | | Tower | 1,200-2,400 | | | Aerial | 550-1,100 | Tower | 8,500 |

Table 5.-Subsistence salmon harvests by subdistrict for the Norton Sound District 1980-2002.

| Year | Nome (Subdistrict 1) | | | | | Golovin (Subdistrict 2) | | | | | Moses Point (Subdistrict 3) | | | | |
|-----------|----------------------|---------|-------|--------|-------|-------------------------|---------|-------|--------|--------|-----------------------------|---------|-------|-------|-------|
| | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum |
| 1980 | 129 | | 2,157 | 22,246 | 5,983 | 12 | | 692 | 10,727 | 4,057 | 131 | | 229 | 4,232 | 1,393 |
| 1981 | 35 | 14 | 1,726 | 5,584 | 8,579 | 8 | | 1,520 | 5,158 | 5,543 | 32 | | 2,345 | 6,530 | 2,819 |
| 1982 | 21 | 6 | 1,829 | 19,202 | 4,831 | 7 | | 1,289 | 4,752 | 1,868 | 1 | | 1,835 | 3,785 | 3,537 |
| 1983 | 74 | 53 | 1,911 | 8,086 | 7,091 | | | | | | | | | | |
| 1984 | 83 | 16 | 1,795 | 17,182 | 4,883 | | | | | | | | | | |
| 1985 | 56 | 114 | 1,054 | 2,117 | 5,667 | 12 | 2 | 430 | 1,904 | 9,577 | 67 | | 1,389 | 1,212 | 947 |
| 1986 | 150 | 107 | 688 | 8,720 | 8,085 | | | | | | | | | | |
| 1987 | 200 | 107 | 1,100 | 1,251 | 8,394 | | | | | | | | | | |
| 1988 | 63 | 133 | 1,076 | 2,159 | 5,952 | | | | | | | | | | |
| 1989 | 24 | 131 | 469 | 924 | 3,399 | | | | | | | | | | |
| 1990 | 58 | 234 | 510 | 2,233 | 4,246 | | | | | | | | | | |
| 1991 | 83 | 166 | 1,279 | 194 | 3,715 | | | | | | 312 | | 2,153 | 3,555 | 2,660 |
| 1992 | 152 | 163 | 1,481 | 7,351 | 1,684 | | | | | | 100 | | 1,281 | 6,152 | 1,260 |
| 1993 | 52 | 80 | 2,070 | 873 | 1,766 | | | | | | 368 | | 1,217 | 1,726 | 1,635 |
| 1994 | 23 | 69 | 983 | 6,556 | 1,673 | 253 | 168 | 733 | 8,410 | 1,337 | 322 | 104 | 1,180 | 9,345 | 3,576 |
| 1995 | 36 | 211 | 1,897 | 486 | 5,344 | 165 | 34 | 1,649 | 7,818 | 10,373 | 284 | 17 | 1,353 | 2,046 | 3,774 |
| 1996 | 19 | 353 | 1,317 | 5,802 | 4,333 | 86 | 134 | 3,014 | 17,399 | 2,867 | 417 | 52 | 1,720 | 9,442 | 2,319 |
| 1997 | 19 | 99 | 534 | 287 | 4,996 | 138 | 427 | 555 | 4,570 | 4,891 | 619 | 50 | 1,213 | 1,314 | 2,064 |
| 1998 | 15 | 14 | 1,057 | 4,797 | 964 | 184 | 37 | 1,292 | 13,340 | 1,893 | 414 | 49 | 1,831 | 6,891 | 1,376 |
| 1999 | 11 | 85 | 161 | 58 | 337 | 60 | 48 | 1,234 | 469 | 3,656 | 424 | 13 | 975 | 1,564 | 744 |
| 2000 | 7 | 26 | 747 | 2,657 | 535 | 169 | 18 | 2,335 | 10,906 | 1,155 | 248 | 46 | 1,429 | 5,983 | 1,173 |
| 2001 | 2 | 92 | 425 | 113 | 858 | 89 | 72 | 880 | 1,665 | 3,291 | 427 | 70 | 1,352 | 1,390 | 898 |
| 2002 | 4 | 79 | 666 | 3,161 | 1,114 | 69 | 66 | 1,640 | 14,430 | 1,882 | 565 | 14 | 1,801 | 8,345 | 1,451 |
| Avg 92-01 | 34 | 119 | 1,067 | 2,898 | 2,249 | 143 | 117 | 1,462 | 8,072 | 3,683 | 362 | 50 | 1,355 | 4,585 | 1,882 |
| Avg 97-02 | 11 | 63 | 585 | 1,582 | 1,538 | 128 | 120 | 1,259 | 6,190 | 2,977 | 426 | 46 | 1,360 | 3,428 | 1,251 |

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Table 5.-Page 2 of 2.

| Year | Norton Bay (Subdistrict 4) | | | | | Shaktoolik (Subdistrict 5) | | | | | Unalakleet (Subdistrict 6) | | | | |
|-----------|----------------------------|---------|------|-------|-------|----------------------------|---------|-------|--------|-------|----------------------------|---------|--------|--------|--------|
| | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum | Chinook | Sockeye | Coho | Pink | Chum |
| 1980 | 22 | | 33 | 4,275 | 1,132 | 57 | | 756 | 3,227 | 1,827 | 1,046 | | 4,758 | 19,071 | 5,230 |
| 1981 | 7 | | 82 | 2,314 | 3,515 | 8 | | 525 | 2,225 | 3,490 | 869 | 24 | 5,808 | 5,750 | 4,235 |
| 1982 | 1 | | 484 | 2,600 | 2,485 | 68 | | 2,138 | 3,865 | 1,165 | 913 | 2 | 7,037 | 20,045 | 4,694 |
| 1983 | | | | | | | | | | | 1,868 | 33 | 6,888 | 13,808 | 4,401 |
| 1984 | | | | | | | | | | | 4,650 | 1 | 6,675 | 17,418 | 3,348 |
| 1985 | | | | | | 298 | | 1,379 | 24 | 298 | 1,397 | 3 | 2,244 | 55 | 1,968 |
| 1986 | | | | | | | | | | | | | | | |
| 1987 | | | | | | | | | | | | | | | |
| 1988 | | | | | | | | | | | | | | | |
| 1989 | | | | | | | | | | | | | 4,681 | 17,500 | 1,388 |
| 1990 | | | | | | | | | | | 2,476 | | | | |
| 1991 | | | | | | | | | | | | | | | |
| 1992 | | | | | | | | | | | | | | | |
| 1993 | | | | | | | | | | | | | | | |
| 1994 | 308 | 1 | 370 | 6,049 | 4,581 | 1,175 | 1 | 2,777 | 9,133 | 1,221 | 5,294 | 819 | 16,081 | 31,572 | 12,732 |
| 1995 | 475 | 46 | 985 | 3,514 | 5,828 | 1,275 | 2,480 | 2,626 | 7,024 | 2,480 | 5,049 | 807 | 13,110 | 17,246 | 13,460 |
| 1996 | 295 | 3 | 676 | 3,929 | 4,161 | 1,114 | 31 | 3,615 | 8,370 | 4,425 | 5,324 | 608 | 15,963 | 19,782 | 16,481 |
| 1997 | 656 | 54 | 322 | 1,795 | 4,040 | 1,146 | 62 | 2,761 | 5,779 | 1,612 | 6,325 | 353 | 9,120 | 10,804 | 7,646 |
| 1998 | 684 | 0 | 388 | 2,009 | 6,192 | 982 | 92 | 1,872 | 6,270 | 1,034 | 3,963 | 201 | 7,303 | 13,173 | 2,551 |
| 1999 | 327 | 0 | 167 | 1,943 | 4,153 | 818 | 183 | 1,556 | 5,092 | 467 | 2,691 | 537 | 8,140 | 10,067 | 3,692 |
| 2000 | 397 | 2 | 267 | 2,255 | 4,714 | 440 | 20 | 2,799 | 5,432 | 2,412 | 2,429 | 212 | 5,878 | 10,631 | 3,000 |
| 2001 | 460 | 14 | 276 | 5,203 | 4,445 | 963 | 143 | 2,090 | 10,172 | 1,553 | 2,810 | 359 | 6,270 | 11,279 | 2,918 |
| 2002 | 557 | 0 | 509 | 60,49 | 3,971 | 1,230 | 4 | 2,169 | 8,769 | 800 | 2,367 | 280 | 4,988 | 15,557 | 3,877 |
| Avg 92-01 | 450 | 15 | 431 | 3,337 | 4,764 | 989 | 977 | 2,512 | 7,159 | 1,901 | 4,236 | 487 | 10,233 | 15,569 | 7,810 |
| Avg 97-01 | 505 | 14 | 284 | 2,641 | 4,709 | 870 | 100 | 2,216 | 6,549 | 1,416 | 6,644 | 332 | 7,342 | 11,191 | 3,961 |

Table 6.-Subsistence salmon harvests for the Port Clarence and Kotzebue districts 1980-2002.

| Year | Port Clarence District | | | | | Kotzebue District Chum Salmon | | | |
|-----------|------------------------|---------|-------|-------|-------|-------------------------------|--------|----------|----------------|
| | Chinook | Sockeye | Coho | Pink | Coho | Kobuk R. Villages | Noatak | Kotzebue | Other Villages |
| 1980 | 7 | 3,195 | 5 | 3,170 | 1,715 | 8,494 | 2,135 | 2,387 | 455 |
| 1981 | 8 | 255 | 110 | 765 | 5,845 | 9,459 | 5,465 | 4,099 | 1,017 |
| 1982 | 23 | 405 | 100 | 4,345 | 684 | 19,648 | 5,479 | 347 | 419 |
| 1983 | 17 | 261 | | 615 | 299 | 5,486 | 4,035 | 88 | 2,140 |
| 1984 | | | | | | 7,231 | 6,049 | 13,494 | 573 |
| 1985 | | | | | | 17,411 | | 36,311 | |
| 1986 | | | | | | 12,901 | 1,246 | | |
| 1987 | | | | | | 7,067 | 2,921 | | |
| 1988 | | | | | | 13,723 | | | |
| 1989 | 28 | 535 | 472 | 395 | 410 | 3,894 | 1,595 | | |
| 1990 | | | | | | 4,353 | 3,921 | | |
| 1991 | | | | | | 11,103 | 3,637 | | |
| 1992 | | | | | | 12,260 | 2,043 | | |
| 1993 | | | | | | 12,160 | 3,270 | | |
| 1994 | 181 | 1,979 | 1,692 | 3,849 | 2,042 | 26,612 | 6,126 | | 3,488 |
| 1995 | 76 | 4,481 | 1,739 | 3,293 | 6,011 | 38,867 | 6,359 | 50,708 | 6,947 |
| 1996 | 195 | 4,558 | 2,079 | 2,587 | 1,264 | 39,076 | 10,091 | 50,573 | |
| 1997 | 158 | 3,177 | 829 | 755 | 2,099 | 26,242 | 5,309 | 26,355 | |
| 1998 | 287 | 1,665 | 1,759 | 7,812 | 2,621 | 21,398 | 2,614 | 24,986 | |
| 1999 | 89 | 2,392 | 1,030 | 786 | 1,936 | 14,264 | 1,616 | 64,768 | |
| 2000 | 72 | 2,851 | 935 | 1,387 | 1,275 | 21,538 | 7,293 | 37,144 | |
| 2001 | 74 | 3,692 | 1,299 | 1,183 | 1,910 | 28,975 | 2,326 | 17,713 | |
| 2002 | 133 | 3,732 | 2,194 | 3,394 | 2,699 | | 2,937 | | |
| Avg 92-01 | 142 | 3,066 | 1,420 | 2,707 | 2,395 | 24,139 | 4,705 | 42,422 | 5,218 |
| Avg 97-01 | 136 | 2,755 | 1,170 | 2,385 | 1,968 | 22,483 | 3,832 | 40,765 | |

harvest in the Port Clarence District was about 8,400 fish, composed of 136 chinook, 2,755 sockeye, 1,170 coho, 2,385 pink and 1,968 chum salmon (Table 6). In the Kotzebue Sound District, the recent 5-y subsistence salmon harvest has been about 67,100 chum salmon (Table 6). In 2002, subsistence fishing opportunity in the Nome sub-district of Norton Sound was severely restricted because of low salmon abundance. The total estimated subsistence harvest was 86,400 salmon for the Norton Sound District and 12,150 salmon in the Port Clarence District. Subsistence harvests surveys for the Kotzebue District were incomplete in 2002. In addition to salmon, saffron cod, rainbow smelt, Dolly Varden and whitefish are taken. In the Kotzebue District sheefish are also an important subsistence resource, especially in the villages along the Kobuk River, Kotzebue, and Selawik. The relative importance of whitefish is higher in the Kotzebue Sound District than in many areas of the state. The subsistence harvest of whitefish in 1997 was estimated at 84,851 for the village of Noatak and the five Kobuk River villages combined. In 1998, 1999, 2000 and 2001 the whitefish harvests were estimated at 39,754, 56,326, 70,097 and 30,976 respectively. In 2002, 25,607 were estimated to have been harvested (Brennan et al. 2002; Georgette et al. 2003 a, b). The 2001 and 2002 surveys did not include all the villages harvesting whitefish and are considered incomplete.

ALASKA BOARD OF FISHERIES ACTIVITIES

The development of regulations for recreational fisheries in the NWMA occurs within the established Alaska Board of Fisheries (BOF) process. Local fish and game advisory committees have been established throughout Alaska to assist the BOF by bringing local issues to their attention, and proposing or commenting on regulation changes proposed for upcoming meetings. Active committees meet at least once a year. The meeting is usually held in the fall prior to scheduled BOF meetings in order to provide timely information regarding regulation proposals or concerns that may affect a local area. Staff from the various divisions of ADF&G are often invited to attend committee meetings, to interact with the public, and to provide information to the committee regarding issues of local concern. Within the NWMA there are eight local advisory committees to serve resource users of the area: Kotzebue, Noatak/Kivalina, Upper Kobuk, Lower Kobuk, Northern Seward Peninsula, Norton Sound, Southern Norton Sound and St. Lawrence Island advisory committees.

The current BOF schedule provides for meetings rotated through areas of the state on a 3-year schedule. The last BOF meeting that addressed the NWMA occurred in December 2000. The BOF adopted several regulations that affected sport fisheries in the NWMA during that meeting.

Two regulations dealt with salmon fisheries in the Unalakleet River drainage, and one with sheefish in the Selawik River drainage. One statewide salmon regulation affected salmon fisheries in the NWMA. The statewide chinook salmon regulation set the daily bag and possession limit for chinook salmon less than 20 inches in length (jack kings) at 10 per day. In the Unalakleet River drainage, the daily bag and possession limit for salmon, other than king salmon, was reduced from 10 per day to five per day. To address potential of high catch and release mortality of coho salmon released in the estuary, a regulation was passed that prohibited an angler from fishing downstream from the South River after a bag limit of coho had been taken. In the Selawik River drainage, the daily bag and possession limit for sheefish upstream from the Tagagawik River (spawning area) was reduced from 10 fish to two fish. This action made the regulations on the Selawik River consistent with those on the Kobuk River. In addition, subsistence fishing for Arctic grayling was closed on the Nome and Solomon rivers.

The BOF will discuss NWMA fisheries proposals at their upcoming meeting on 12-15 January 2004. There are six proposals that pertain to the NWMA. Two of these are general in that they cover the all of Norton Sound. Proposal 124 would close all fishing when there is a subsistence closure. Proposal 125 would require a nontransferable harvest record for anyone sport fishing for salmon in Norton Sound unless they are a resident of a community where a post season subsistence survey is conducted. The other four proposals pertain only to the Unalakleet River drainage. Proposal 126 would set the daily bag and possession limit for salmon (other than king salmon) at four fish. Proposal 127 would set the daily bag and possession limit for king salmon at one fish. Proposal 128 would allow guided fishing from boats to occur only from 6:00 am to 6:00 pm Tuesday through Saturday during June, August and September. Proposal 129 would set an annual limit for king salmon at four fish. These proposals will be further discussed in following sections of this report.

The area management biologist has EO authority (5AAC 75.003) that allows the in-season modification of time, area, and bag/possession limit regulations as necessary to address conservation concerns on a species, area or fishery basis. EOs issued in the NWMA during the reporting period are summarized in Appendix D, and mentioned in the following sections of this document addressing specific fisheries.

ESTABLISHED MANAGEMENT PLANS AND POLICIES

There are presently no specific BOF adopted management plans that pertain to the NWMA sport fisheries. However, the Division of Sport Fisheries has developed objectives for the region or its constituent areas and has identified them in fishery based management plans. A management plan for Nome area roadside Arctic grayling fisheries was finalized in 2001, and plan for Kotzebue Sound/Chukchi Sea Dolly Varden fisheries is currently under review. The Nome area roadside Arctic grayling plan will fall under a Regional Arctic grayling plan that is in development. In addition, a series of general divisional criteria that have been prepared to guide the establishment of fishery objectives which are listed below:

1. **Protection and management of existing fish resources.** Divisional activities should strive to manage and protect Alaska's wild stocks of fish resources for future generations.
2. **Public use and benefits of existing fish resources.** Alaska's fishery resources should be made available for public use and benefit on a sustained yield basis.
3. **Rehabilitation of depressed stocks and damaged habitat.** Division activities should strive to restore and maintain fish stocks and habitat damaged by man's activities.
4. **Enhancement of natural production or creation of new opportunities.** The Division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively affect other fisheries.

Management plans prepared for specific NWMA fisheries also identify a series of fishery objectives. While in some cases the objectives are different, objectives that recur frequently in the plans include:

1. management of sport fisheries so that harvests do not jeopardize sustained yield of the harvested stocks;
2. management of fisheries to maintain historic stock abundance and size composition;

3. maintenance, and/or improvement of public access to fishing opportunities; and,
4. promote awareness of sport fishing opportunities that exist.

Existing management plans are under review, and a region wide Arctic grayling management plan is being developed.

MAJOR ISSUES FOR THE NORTHWESTERN MANAGEMENT AREA

1. Nome Subdistrict salmon. Chum salmon stocks in the Nome Subdistrict have been depressed since the mid 1980s. Fisheries divisions of the department have been cooperating in the recovery of these stocks. Efforts, including egg incubation boxes, fishery closures and increased escapement monitoring are ongoing. The Bureau of Land Management is operating a weir to count sockeye as they migrate into Glacial Lake. In addition, a lake fertilization project on Salmon Lake to increase zooplankton production for rearing sockeye has also been undertaken. Sport Fish Division has participated in these efforts through the Regional Planning Team (RPT), and through cooperation with other divisions. Chum salmon sport fisheries in the Nome Subdistrict remain closed.
2. Wulik River Dolly Varden. Development of a world-class zinc deposit at the Red Dog site in the upper Wulik River drainage carries the risk of heavy metal contamination on one of the most important streams in Northwest Alaska for Dolly Varden. There has been concern that heavy metal contamination of Red Dog and Ikalukrok creeks would occur both from natural leaching of the ore body as it was stripped for ore production and from discharge of contaminated waters into the river. A contamination problem in 1989 and 1990 has been controlled with additional waste water treatment and the construction of a clean water bypass system in Red Dog Creek. Water quality is monitored by the Department of Natural Resources and mine personnel. Contamination along the road corridor has recently been documented by the NPS. The Division of Sport Fish counts Dolly Varden overwintering in the Wulik River annually and collects fish from which tissues are excised for heavy metal analyses.
3. Nome area gold mining. The future development of large-scale lode deposits of gold near Nome has the potential to degrade fish habitat in the Snake, Cripple and Solomon River drainages. Interest in mining is directly related to the world price of gold. In the recent past, development interest had declined with the price of gold, but in the past two years interest has escalated.
4. Rural resentment of sport fishing and sport anglers. Rural Alaskans often feel resentment toward "outsiders" who come into remote areas traditionally used by local people for subsistence hunting or fishing. There is sometimes a cultural bias against the concept of "sport fishing" and local residents feel that people do not have the right to "play" with food resources. The bias can be particularly strong towards catch-and-release practices and has led to some resentment of sport anglers who wish to fish in remote waters of NWMA, and to proposals before the BOF that would have eliminated catch-and-release in some fisheries.
5. Effects of federal subsistence fisheries management on sport fishing opportunity in the NWMA. During October 1999, the federal government through the US Fish and

Wildlife Service (USFWS) Office of Subsistence Management took over management of subsistence fisheries on waters within or adjacent to Federal Conservation units. There is concern that a result of this action will be reduced opportunity for sport fishing throughout much of Alaska. Since there is a large amount of Federal Public land within the NWMA that is used by local residents for subsistence purposes, the potential loss of opportunity in remote areas of the NWMA is of acute concern to anglers and sport fish managers. The ADF&G continues to work with federal managers and Rural Advisory Councils to address fisheries issues as they arise.

ACCESS PROGRAM

The Sport Fish Access Program was initiated nation-wide in 1984 as a result of the Wallop-Breaux Amendment to the Sport Fish Restoration (Dingell-Johnson or D-J) Act. The Sport Fish Access program is comprised of two parts. The first involves major capital improvement projects, such as boat launches, parking areas, camping areas handicap-accessible public fishing docks, access roads and trails, and the purchase or lease of lands or right-of-ways to ensure public access to fishing sites. The second portion of the program is called the Small Access Site Maintenance Project. This annually funded program involves maintaining and upgrading existing angler access sites. Activities include placing and maintaining signs at lake and river access sites, constructing and maintaining trails, and securing public rights-of way to fishing sites. Portable toilets, picnic tables and trash removal are provided at heavily used roadside sites. At remote sites, this project provides tent platforms and outhouses; it also publishes brochures on fishing and boating opportunities.

To date, few access projects have been proposed for the rural areas of the NWMA, however, a boat launching facility was recently built in the village of Unalakleet using Access funding.

SECTION II: SEASON SUMMARY FOR 2003

NORTON SOUND

Salmon returns to northern Norton Sound were the weakest on record and a number of in-season restrictions were necessary in 2003. The only bright spot was the Pilgrim River (Port Clarence district) where over 42,000 sockeye were counted past the weir. The Pilgrim River also had a good escapement of chum and chinook. Except for an unusually strong pink salmon return, salmon runs in eastern Norton Sound were also weak, but not as poor as those to the north. Arctic grayling and Dolly Varden stocks appear to be in reasonably good shape and were able to sustain normal fishing.

Pink Salmon

Because of the early season subsistence salmon closure, sport fisheries for all salmon in the Nome Subdistrict were also closed by EO no. 3-S-01-03 (Appendix D). In addition, the Nome River was closed to all fishing for the entire season. Escapement of pink salmon in the Nome subdistrict during 2003 was weak, and sport fishing remained closed for this species until July 31 by which time most of the run had entered area rivers. Tower or weir count totals for drainages upstream from these facilities were: 2,829 in the Snake River, 173 in the Eldorado River, and 11,402 in the Nome River, all higher than the parent year escapements, but still very low even for weak year returns. Farther east in Norton Sound, the runs were stronger; 75,111 pink salmon were counted past the Niukluk Tower, and the Unalakleet River had a very strong run with over

280,000 counted past the tower on the North River. Sport fishing in these areas remained open, and no in-season adjustments to the fisheries were necessary.

Chum Salmon

Chum salmon runs remained depressed throughout the Nome Subdistrict in 2003. Sport fisheries remained closed by regulation, no commercial fishing occurred, and subsistence fisheries were regulated under Tier II management. Even with these restrictions in place, escapements of chum salmon in Nome subdistrict streams in 2003 were the lowest on record. In the Nome River, 1,985 were counted past the weir, 2,197 were counted past the Snake River tower, and 3,589 counted past the Eldorado River tower. Escapement in the Pilgrim River was somewhat better with 15,192 counted through the weir. Escapement of chum salmon counted past the tower on the Niukluk River was 19,681, the weakest run on record in that system. The North River tower (Unalakleet River) obtained a count of 9,859 chum salmon in 2003. The Kwiniuk River with 12,117 chum salmon counted past the tower in 2003 just reached its OEG range of 11,500 – 23,000. Sport fishing for chum salmon remained closed in the Nome Subdistrict, and the Niukluk and Fish Rivers were closed to the retention of chum salmon from July 19- August 31 (EO 3CS-01-03). EO 3KS-02-03 closed sport fisheries to the retention of chum salmon in the Unalakleet and Shaktooklik Rivers from July 3 - August 15 (Appendix D).

Chinook Salmon

The chinook salmon fishery in Norton Sound is functionally confined to the Unalakleet River with only a little effort or harvest elsewhere. During 2003, 1,452 chinook were counted past the tower on the North River, and in general, chinook escapement was considered weak even though the escapement goal in the North River (1,200-2,400 fish) was met. The average count past the tower for all years (1972-1974, 1984-1986, and 1996-1999) has been 2,622 chinook. There was no commercial chinook fishery in Unalakleet or Shaktoolik, and the sport fishery was closed to harvest in these rivers (EO 3-KS-02-03) from July 3 through August 15. Data collected during 1997 and 1998 in a radio tagging study indicated that about 40% of the Unalakleet River chinook run migrated past the counting tower on the North River. Therefore, it is estimated that about 3,650 chinook spawned in the Unalakleet River during 2003. The commercial harvest of chinook, incidental to other commercial fishing, in the Unalakleet Subdistrict was only 12 fish in 2003.

Coho Salmon

Coho returns to northern Norton Sound streams were also very weak in 2003. In the Nome River, 548 were counted past the weir, while 489 were estimated to have passed the tower on the Snake River. In the Solomon, Sinuk and Bonanza rivers, 105, 190 and 100 coho were observed respectively in aerial surveys. The count past the tower on the Eldorado River was 71 coho, and only 1,275 coho were counted past the tower on the Niukluk River. Farther to the east, runs were somewhat better. In the Kwiniuk River 5,484 were estimated past the tower, and 5,837 were estimated past the North River tower (Unalakleet drainage). On August 21, EO 3-SS-01-03 closed all the waters of northern Norton Sound from Cape Douglas to Cape Darby, including the Fish and Niukluk rivers and the Pilgrim and Kuzitrin rivers to coho salmon fishing (Appendix D). This EO remained in effect for the remainder of the season. No management actions were taken in other drainages. In 2001 a research project was conducted on the Unalakleet River to assess whether catch-and-release mortality of coho varied as fish moved from brackish water to upriver areas. Results of this study suggested that the current regulations

may be conservative, and are likely effective in reducing the catch-and-release mortality of coho salmon in the lower Unalakleet River.

Arctic Grayling

Arctic grayling fisheries in the Norton Sound sub-area in 2003 progressed without the need for in-season management actions. A stock assessment project was conducted to estimate abundance and size composition of Arctic grayling in the Sinuk River. Preliminary results suggest that the Arctic grayling population in the Sinuk River is similar in abundance and size composition to what was found in 1994, and that recent harvests have been sustainable. Final results of this project will be compared to past data to determine if management objectives are being met under the current sport fishing regulatory framework in accordance with the management plan for Arctic grayling sport fisheries along the Nome road system (Appendix E). Sport and subsistence fishing for Arctic grayling remained closed in the Nome and Solomon rivers. A project to restore the Arctic grayling population in the Nome River began in 2002 and continued in 2003. In the fall of 2002, 698 age-0 pen reared fish were marked and released into the Nome River. During 2003, 84 age-1 fish were released into the Nome River in June, and in September, 794 age-0 fish were released into the river. In 2003 a region-wide management plan for Arctic grayling sport fisheries will be brought before the BOF. The existing Nome roadside Arctic grayling plan will fall under the umbrella of the region-wide plan should it be adopted.

Dolly Varden

Dolly Varden fisheries in Norton Sound are very seasonal in nature. Fish overwinter in fresh water and migrate to sea by early June. They are not available in reasonable numbers again until September or October when they return from the sea to spawn and overwinter. The 2003 fishing season progressed without need for in-season management actions. Angler reports suggested that Dolly Varden fishing in 2003 was very good in a number of Norton Sound streams.

KOTZEBUE SOUND/CHUKCHI SEA

The chum salmon return to Kotzebue Sound was relatively weak, but the commercial fishery only had limited participation and escapements were thought to have been average. Dolly Varden fisheries proceeded normally, but spawning escapements were low. Sheefish and Arctic grayling fisheries proceeded without the need for in-season management action.

Arctic Grayling

Kotzebue Sound/Chukchi Sea sub-area Arctic grayling fisheries are geographically dispersed over a wide area. Harvests are typically low, and although Arctic grayling abundance has not been estimated in streams in this region, the dispersed nature of harvests suggests that no single stock is being overly exploited.

Sheefish

Sheefish fisheries in northwestern Alaska proceeded without the need for in-season management actions in 2003. Spawner abundance was estimated in the Kobuk River during 1996-1998 and ranged from about 32,000 to 43,000. The sport harvest of sheefish has averaged only a few hundred fish annually and is considered insignificant to the population. A site visit in 2003 and angler reports suggested that the abundance of sheefish spawning in the Kobuk has remained relatively stable. However, there are still some social problems associated with this fishery. Upper Kobuk River residents have commented about increasing use of the upper Kobuk River by sport fishers and other visitors. In addition, catch-and-release fishing is considered disrespectful

by some local residents. A brochure dealing with sheefish catch and release is available at ADF&G offices and is distributed through the NPS to anglers bound for the upper Kobuk River.

Dolly Varden

Dolly Varden populations in the Kotzebue/Chukchi Sea sub-area are monitored with aerial counts of spawners in selected spawning streams, and counts of overwintering aggregations in the Wulik River. Spawners were counted in July and August of 2003. On the Kelly River, 1,519 spawners were counted on July 16, and 1,671 were counted in August. This is about half the number counted in the mid to late 1990's. Similarly low numbers were seen on the Kugururok River. This is the second year in a row that low numbers of spawners were seen in these drainages. Inclement weather precluded fall overwintering counts from being conducted in the Wulik River in 2003. In October 2003, 15 Dolly Varden in the Wulik River were implanted with radio transmitters. They had not been relocated prior to the writing of this report. Subsistence harvests in Kivalina were not documented in 2003, but traditional fishing took place on the Wulik River and catches were thought to have been good. Increased sport fishing use of the Wulik River was reported during 2003. This was likely due to the new state of Alaska record Dolly Varden of over 27 pounds that was taken there in 2002. There are no stock concerns regarding Dolly Varden in the sub-area and no stock assessment projects are ongoing, however the lower numbers of spawners noted in 2002 and 2003 may indicate a change in population size and production. No regulatory proposals are being considered by the BOF regarding Dolly Varden in the NWMA, and no in-season management actions were taken regarding Dolly Varden in the NWMA during 2003. A project to describe genetic relationships among Dolly Varden stocks north and south of the Bering Strait was begun in 2000 and should be completed in the summer of 2004.

COMMERCIAL AND SUBSISTENCE FISHERIES

The 2003 commercial salmon fishery in Norton Sound was one of the poorest on record for all species. There were no directed chinook or chum fisheries. Commercial fisheries were not opened in the Unalakleet and Shaktookik subdistricts until July 31. The overall Norton Sound commercial harvest in 2003 was 20,503 salmon composed of 12 chinook, 15 sockeye, 16,925 coho and 3,551 chum. The harvest was 22% below the recent 5-year average, and 58% below the recent 10-year average. The commercial chum harvest of 3,551 fish and was 58% below the recent 5-year average for that species. No commercial harvest of pink salmon occurred in 2003 even though there were large numbers available in eastern Norton Sound. Subsistence fisheries in eastern Norton Sound were allowed to proceed normally through the chinook season, but in-river gillnet fishing was closed for most of July to allow chum salmon to escape. Beach seining for pink salmon was still allowed with the stipulation that chum salmon be released. In 1999 the BOF designated the Nome Subdistrict as a Tier II chum salmon management area. Permits were initially issued to 20 qualified fishers for the 2003 season, and another 10 permits were issued in mid-July. The season in the Nome Subdistrict began with a total subsistence salmon closure. Tier II subsistence fishing was allowed in marine waters east of Cape Nome for three days each week beginning on June 24. This fishery was closed after three weeks when it became obvious that the chum salmon escapement goal would not be met. Tier I and Tier II subsistence fisheries were opened on August 2 to target coho. The Nome River remained closed to all fishing during the entire season. The coho return in the Nome Subdistrict was very poor and all coho fishing was closed from mid-August through September. Due to a week run in the Golovin Subdistrict, subsistence fishing for chum salmon was closed in mid-July. Beach seining for pink salmon was

allowed with the stipulation that chum salmon be released. The coho run was also weak, and subsistence fishing was closed from mid-August until October.

SECTION III: SPORT FISHING EFFORT IN THE NORTHWESTERN MANAGEMENT AREA

SPORT ANGLING EFFORT

Recreational angler effort has been estimated for the Northwest Management Area with a mail survey since 1977 (Mills 1979-1994, Howe et al. 1995, 1996, 2000a-d, Walker et al. 2003, Jennings et al. *In prep a and b.*). The results of this survey indicate that effort in the Northwest Management Area has remained more or less stable since 1982, with a slight decline in recent years that increased in 2002. Effort over this period has ranged from 20,000 to 30,000 angler days during most years (Table 7; Figure 11). During 2002, the total sport fishing effort for the Northwest Management Area was estimated at 24,742 angler days. The fraction of the entire AYK Region (excluding the Upper Copper/ Upper Susitna Area) effort expended in the Northwest Management Area has declined from over 15% in 1992 to approximately 10% between 1995 and 1999. In 2000, effort increased to about 14%, in 2001 it dropped to about 12% and increased in 2002 to about 14% (Table 7). Effort in NWMA increased by 8.5% in 2000, dropped in 2001 and regained previous levels in 2003. Excellent summer weather in 2002 may have accounted for the increase in angler effort over the levels documented in 2001. When the Upper Copper/Upper Susitna Area is included in the AYK total, the fraction of effort from the NWMA is about 6%.

The Seward Peninsula and Norton Sound sub-area accounts for most of the sport fishing in the NWMA. Effort in the sub-area has averaged around 18,500 angler days over the past 10 years showing a decline to 13,934 angler days from 1996-1998. The effort increased to about 15,000 angler days in 1999. This trend continued in 2000 with 18,559 angler days of effort. After dropping to about 11,000 angler days in 2001, it rebounded to previous levels in 2002 with 18,325 estimated angler days of effort. Part of the reason for the increase in angling is likely the prolonged period of good weather that existed during the summer of 2002. Rivers supporting the most sport fishing effort in the NWMA have been the Nome, Unalakleet and Fish/Niukluk rivers. The Nome River has sustained more fishing effort than any other stream in the NWMA for four of the past 10 years. In 1995, the Unalakleet River surpassed the Nome River as the most popular single stream in the management area with 3,832 estimated angler days. This pattern has continued in 2002. Angler effort was estimated at 8,195 angler days for the Unalakleet River in 2002, approximately 45% of the total effort in the sub-area (Table 8). This is a substantial increase in effort, about 1.3 times the estimated effort in 2000 and almost three times the effort estimated in 2001. The Nome River has been closed to fishing for Arctic grayling and chum salmon since the early 1990s, and it is likely that these closures have contributed to a reduction of fishing effort on this stream. Annual effort in the Nome River has averaged around 1,425 angler days over the past five years and was estimated at 1,901 angler days in 2002. The Fish/Niukluk river system has sustained an annual average of about 2,900 angler days of effort for the past 5 years. In 2002, effort on this river system was estimated at 1,805 angler days. Estimated effort on the Sinuk River increased to over 1,300 angler days in 2002 from fewer than 500 angler days over the previous 4 years.

In the Kotzebue/Chukchi Sea sub-area, sport fishing effort has been more variable, ranging from 3,700 to 10,200 angler days per year over the past 10 years. After showing a decline to about

Table 7.-Sport fishing effort in the A-Y-K region by management sub-area, 1982-2002.

| Year | Arctic-Yukon-Kuskokwim Region ^a | | | | | | | | | | | | |
|------------|--|----------|----------------------------|----------|----------------------|----------|--------------------------|----------|---------------------------|----------|-------------------------|----------|--------------------|
| | Tanana Area | | AYK Area | | | | | | Northwest Alaska | | | | AYK Angler-Days |
| | Tanana Angler-Days | % AYK | North Slope Angler-Days | % AYK | Yukon Angler-Days | % AYK | Kuskokwim Angler-Days | % AYK | Seward Pen Angler-Days | % AYK | Kotzebue Angler-Days | % AYK | |
| 1982 | 150,530 | 75.7 | 4,879 | 2.5 | 11,034 | 5.6 | 12,244 | 6.2 | 13,198 | 6.6 | 6,906 | 3.5 | 198,791 |
| 1983 | 144,981 | 72.8 | 5,738 | 2.9 | 11,070 | 5.6 | 12,429 | 6.2 | 16,944 | 8.5 | 7,963 | 4.0 | 199,125 |
| 1984 | 145,142 | 72.9 | 8,344 | 4.2 | 6,358 | 3.2 | 13,970 | 7.0 | 17,436 | 8.8 | 7,791 | 3.9 | 199,041 |
| 1985 | 135,745 | 72.6 | 4,490 | 2.4 | 8,670 | 4.6 | 11,358 | 6.1 | 19,919 | 10.7 | 6,701 | 3.6 | 186,883 |
| 1986 | 144,814 | 74.4 | 4,779 | 2.5 | 9,381 | 4.8 | 11,319 | 5.8 | 18,107 | 9.3 | 6,313 | 3.2 | 194,713 |
| 1987 | 155,346 | 71.6 | 5,256 | 2.4 | 7,017 | 3.2 | 17,856 | 8.2 | 21,413 | 9.9 | 10,221 | 4.7 | 217,109 |
| 1988 | 173,706 | 74.4 | 2,541 | 1.1 | 8,261 | 3.5 | 23,494 | 10.1 | 20,278 | 8.7 | 5,279 | 2.3 | 233,559 |
| 1989 | 185,715 | 77.5 | 4,118 | 1.7 | 10,712 | 4.5 | 16,457 | 6.9 | 17,692 | 7.4 | 4,932 | 2.1 | 239,626 |
| 1990 | 184,887 | 75.3 | 3,764 | 1.5 | 15,539 | 6.3 | 15,858 | 6.5 | 21,799 | 8.9 | 3,782 | 1.5 | 245,629 |
| 1991 | 155,662 | 70.8 | 7,291 | 3.3 | 10,749 | 4.9 | 13,055 | 5.9 | 23,622 | 10.7 | 9,543 | 4.3 | 219,922 |
| 1992 | 120,848 | 66.5 | 4,940 | 2.7 | 12,831 | 7.1 | 14,404 | 7.9 | 22,684 | 12.5 | 6,145 | 3.4 | 181,852 |
| 1993 | 160,117 | 72.5 | 5,600 | 2.5 | 14,011 | 6.3 | 14,505 | 6.6 | 18,930 | 8.6 | 7,809 | 3.5 | 220,972 |
| 1994 | 148,633 | 70.8 | 5,407 | 2.6 | 12,872 | 6.1 | 18,117 | 8.6 | 18,922 | 9.0 | 6,036 | 2.9 | 209,987 |
| 1995 | 201,389 | 74.5 | 5,644 | 2.1 | 18,677 | 6.9 | 16,289 | 6.0 | 19,647 | 7.3 | 8,495 | 3.1 | 270,141 |
| 1996 | 150,227 | 54.7 | 4,487 | 1.6 | 10,678 | 3.9 | 16,420 | 6.0 | 13,783 | 5.0 | 5,571 | 2.0 | 274,566 |
| 1997 | 119,699 | 65.6 | 5,278 | 2.9 | 12,725 | 7.0 | 27,318 | 15.0 | 13,850 | 7.6 | 3,729 | 2.0 | 182,599 |
| 1998 | 112,025 | 65.5 | 3,653 | 2.1 | 10,127 | 5.9 | 27,913 | 16.3 | 13,616 | 8.0 | 3,801 | 2.2 | 171,135 |
| 1999 | 160,427 | 70.7 | 5,230 | 2.3 | 12,906 | 5.7 | 26,563 | 11.7 | 15,006 | 6.6 | 6,771 | 3.0 | 226,903 |
| 2000 | 121,785 | 66.3 | 4,739 | 2.6 | 11,327 | 6.2 | 20,030 | 10.9 | 18,559 | 10.1 | 7,129 | 3.9 | 183,569 |
| 2001 | 91,226 | 62.6 | 6,061 | 4.2 | 10,531 | 7.2 | 21,087 | 14.5 | 10,954 | 7.5 | 5,900 | 4.0 | 145,759 |
| 2002 | 108,462 | 62.5 | 4,770 | 2.7 | 15,044 | 8.7 | 20,645 | 11.9 | 18,325 | 10.6 | 6,417 | 3.7 | 173,663 |
| 92-01 Avg. | 138,638 | 67 | 5,104 | 3 | 12,669 | 6 | 20,265 | 10 | 16,595 | 8 | 6,139 | 3 | 206,748 |
| 97-01 Avg. | 121,032 | 66 | 4,992 | 3 | 11,523 | 6 | 24,582 | 14 | 14,397 | 8 | 5,466 | 3 | 181,993 |

a AYK total does not include Copper River drainage.

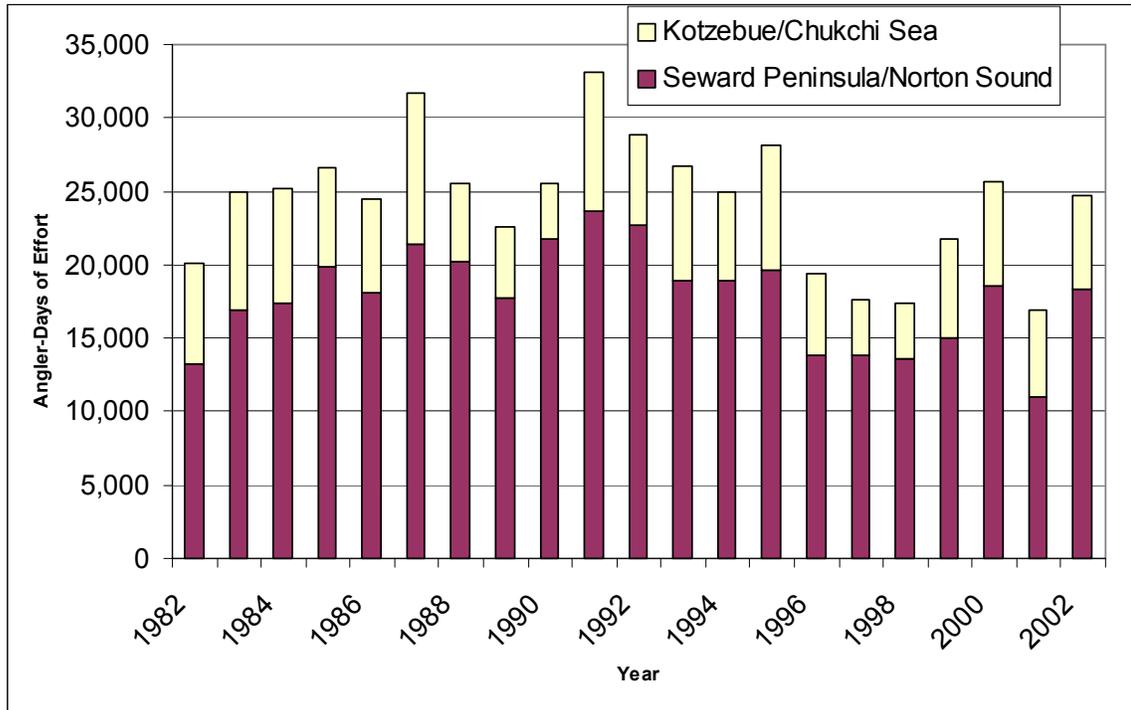


Figure 11.-Sport fishing effort in angler-days in the NWMA by sub-area, 1982-2002

Table 8.-Sport fishing effort in angler-days for major rivers and by sub-area in the Northwest Management Area, 1983-2002.

| Year | Seward Peninsula/Norton Sound Sub-Area | | | | | | | Kotzebue/Chukchi Sea Sub-Area | | | | | MWMA |
|------------|--|--------------|------------|-------|---------|--------|--------|-------------------------------|-------|-------|-------|--------|--------|
| | Nome | Fish/Niukluk | Unalakleet | Snake | Pilgrim | Others | Total | Noatak | Kobuk | Wulik | Other | Total | Total |
| 1983 | 3,908 | 1,999 | 4,146 | 119 | 597 | 6,175 | 16,944 | 1,372 | 3,609 | 805 | 2,177 | 7,963 | 24,907 |
| 1984 | 5,714 | 1,115 | 2,421 | 418 | 732 | 7,036 | 17,436 | 1,805 | 2,834 | 677 | 2,475 | 7,791 | 25,227 |
| 1985 | 6,514 | 889 | 5,750 | 361 | 375 | 6,030 | 19,919 | 3,470 | 2,297 | 550 | 384 | 6,701 | 26,620 |
| 1986 | 6,023 | 1,888 | 6,457 | 850 | 868 | 2,021 | 18,107 | 2,141 | 2,646 | 168 | 1,358 | 6,313 | 24,420 |
| 1987 | 1,865 | 2,473 | 942 | | 1,159 | 14,974 | 21,413 | 3,584 | 5,133 | 303 | 1,201 | 10,221 | 31,634 |
| 1988 | 6,058 | 2,245 | 1,219 | 2,128 | 4,822 | 3,806 | 20,278 | 2,492 | 2,100 | 455 | 232 | 5,279 | 25,557 |
| 1989 | 6,569 | 2,124 | 1,701 | 436 | 1,678 | 5,184 | 17,692 | 2,552 | 1,729 | 107 | 544 | 4,932 | 22,624 |
| 1990 | 7,194 | 2,059 | 3,957 | 775 | 1,710 | 6,104 | 21,799 | 1,423 | 1,306 | 285 | 768 | 3,782 | 25,581 |
| 1991 | 4,646 | 2,524 | 5,616 | 2,384 | 3,183 | 5,269 | 23,622 | 4,235 | 2,353 | 93 | 2,862 | 9,543 | 33,165 |
| 1992 | 6,455 | 2,742 | 2,433 | 2,379 | 1,184 | 7,491 | 22,684 | 2,611 | 2,095 | 469 | 970 | 6,145 | 28,829 |
| 1993 | 3,633 | 3,962 | 2,153 | 1,468 | 1,195 | 6,519 | 18,930 | 3,013 | 2,604 | 350 | 1,842 | 7,809 | 26,739 |
| 1994 | 5,116 | 3,082 | 2,349 | 880 | 844 | 6,651 | 18,922 | 2,747 | 1,153 | 762 | 1,374 | 6,036 | 24,958 |
| 1995 | 3,044 | 2,603 | 3,832 | 1,968 | 1,253 | 6,947 | 19,647 | 2,504 | 3,681 | 647 | 1,663 | 8,495 | 28,142 |
| 1996 | 2,920 | 2,120 | 2,539 | 1,269 | 840 | 4,095 | 13,783 | 2,039 | 1,358 | 274 | 1,900 | 5,571 | 19,354 |
| 1997 | 1,914 | 3,017 | 4,393 | 445 | 820 | 3,261 | 13,850 | 1,159 | 825 | 553 | 1,192 | 3,729 | 17,579 |
| 1998 | 1,371 | 1,344 | 3,795 | 376 | 546 | 6,184 | 13,616 | 765 | 2,053 | 202 | 781 | 3,801 | 17,417 |
| 1999 | 1,463 | 4,916 | 4,176 | 977 | 433 | 3,041 | 15,006 | 3,142 | 2,099 | 737 | 793 | 6,771 | 21,777 |
| 2000 | 1,455 | 3,451 | 6,257 | 377 | 753 | 3,385 | 15,678 | 1,713 | 2,298 | 336 | 878 | 5,225 | 20,903 |
| 2001 | 1,045 | 2,822 | 2,793 | 853 | 491 | 1,899 | 9,903 | 2,702 | 925 | 592 | 1,275 | 5,494 | 15,397 |
| 2002 | 1,901 | 1,805 | 8,195 | 514 | 562 | 3,604 | 16,581 | 1,218 | 3,286 | 610 | 1,171 | 6,285 | 22,866 |
| 92-01 Avg. | 2,842 | 3,006 | 3,472 | 1,099 | 836 | 4,947 | 16,202 | 2,240 | 1,909 | 492 | 1,267 | 5,908 | 22,110 |
| 97-01 Avg. | 1,450 | 3,110 | 4,283 | 606 | 609 | 3,554 | 13,611 | 1,896 | 1,640 | 484 | 984 | 5,004 | 18,615 |

3,800 angler days in 1997 and 1998 effort nearly doubled to 6,771 angler days in 1999. In 2000, effort dropped to an estimated 5,225 and in 2001, effort was estimated at 5,904 angler days. This trend continued in 2002 with effort estimated at 6,417 angler days (Table 8). The large drainages of the Kobuk and Noatak rivers support more than half of the freshwater effort in this sub-area during most years while the remainder is dispersed among smaller drainages such as the Wulik, Kivalina and Selawik rivers, and many of the area's lakes. Expense of travel, difficulty of access and small human population likely account for the low levels of sport fishing effort reported in this region.

SECTION IV: MAJOR NORTHWESTERN AREA FISHERIES OVERVIEW

NWMA waters offer some of the most remote and diverse angling opportunities available in Alaska. Opportunities to fish for Dolly Varden, sheefish and Arctic grayling in pristine areas without encountering other anglers are widespread. Angling opportunities for salmon, especially chum and coho are not as well known but can be excellent. Marine sport fisheries have been practically non-existent although in 2002, more saltwater sport fishing effort was documented in Norton Sound than ever before. Guided fishing comprises a small amount of the effort in northwestern Alaska. An unpublished survey conducted by the Division of Sport Fish for the 1994 season estimated that only about 1% of the total sport fishing effort in the Seward Peninsula-Norton Sound sub-area was by guided anglers while about 5% of the effort in the Kotzebue-Chukchi Sea sub-area was guided. Through the ice jigging for saffron cod, smelt, flounder, sheefish, and other species are common near settlements, but these fisheries generally operate under subsistence fishing regulations. The following sections discuss the major sport fisheries in the NWMA by species and area. Discussion of each fishery will deal with: 1) historical perspective; 2) recent fishery performance; 3) fishery objectives; 4) fishery outlook; 5) in-season management and recent BOF actions; 6) current issues; and, 7) recommended management and research programs. Recent fishery performance will focus on data from 2002. Observations regarding the 2003 season may be included for some fisheries, but data on harvest are not yet available. Summaries of historic sport fish harvests and catches are provided by fishery.

NORTHWESTERN ALASKA SALMON FISHERIES

Guided and unguided sport fishing for salmon takes place throughout the management area, however the vast majority of salmon fishing occurs in the Seward Peninsula/Norton Sound sub-area with concentrations near Unalakleet, and in waters accessible from the Nome area road system. Some salmon fishing effort occurs in association with wilderness float trips in Kotzebue Sound drainages, but the amount of sport fishing effort expended toward salmon in the northern part of the management area is very light, consequently, harvests are very small.

Total fishing effort estimated for all species of fish in the NWMA has ranged from about 11,000 angler-days in the late 1970s to 33,000 angler-days in 1991 (Table 8). Effort declined in late 1990s showed a slight increase in recent years, and was estimated at 24,500 angler days in 2002. Salmon harvests were estimated to have ranged from 3,800 fish in 1977 to 20,000 fish in 1982 (Table 9). Mean annual harvest of salmon of all species from 1992 to 2001 was about 11,000 fish, with 93% of the harvest reported from Seward Peninsula and Norton Sound, and only about 6.0% from Kotzebue drainages. Over the past five years (1997-2001), about 40% of the total

Table 9.-Northwestern management area historic salmon harvests by sub-area, 1977-2002.

| Year | Norton Sound/ Seward Peninsula | | NW Management Area | | Norton Sound/ Seward Peninsula | | NW Management Area | | Norton Sound/ Seward Peninsula | | NW Management Area | |
|-------------|-----------------------------------|--------|--------------------|--------|-----------------------------------|-------|--------------------|----|-----------------------------------|-------|--------------------|-------|
| | Effort | Effort | Effort | Effort | KS | KS | KS | KS | Coho | Coho | Chum | Chum |
| 1977 | 7,828 | 3,487 | 11,315 | 197 | 16 | 213 | 449 | 0 | 449 | 670 | 28 | 698 |
| 1978 | 8,379 | 4,997 | 13,376 | 303 | 0 | 303 | 742 | 0 | 742 | 546 | 254 | 800 |
| 1979 | 8,725 | 2,593 | 11,318 | | 10 | | | 0 | | | 27 | |
| 1980 | 7,958 | 3,841 | 11,799 | 52 | 9 | 61 | 1,455 | 0 | 1,455 | 1,601 | 86 | 1,687 |
| 1981 | 10,879 | 5,284 | 16,163 | 70 | 22 | 92 | 1,504 | 0 | 1,504 | 1,889 | 32 | 1,921 |
| 1982 | 13,198 | 6,906 | 20,104 | 409 | 0 | 409 | 2,986 | 0 | 2,986 | 2,620 | 346 | 2,966 |
| 1983 | 16,944 | 7,963 | 24,907 | 687 | 0 | 687 | 3,823 | 0 | 3,823 | 2,042 | 463 | 2,505 |
| 1984 | 17,436 | 7,791 | 25,227 | 247 | 13 | 260 | 7,582 | 0 | 7,582 | 1,481 | 312 | 1,793 |
| 1985 | 19,919 | 6,701 | 26,620 | 239 | 0 | 239 | 1,177 | 51 | 1,228 | 1,036 | 310 | 1,346 |
| 1986 | 18,107 | 6,313 | 24,420 | 1,077 | 0 | 1,077 | 3,926 | 0 | 3,926 | 1,719 | 749 | 2,468 |
| 1987 | 20,413 | 9,288 | 29,701 | 615 | 95 | 710 | 2,319 | 11 | 2,330 | 814 | 402 | 1,216 |
| 1988 | 20,278 | 5,279 | 25,557 | 400 | 18 | 418 | 5,038 | 0 | 5,038 | 1,583 | 236 | 1,819 |
| 1989 | 17,692 | 4,932 | 22,624 | 203 | 0 | 203 | 4,158 | 0 | 4,158 | 1,497 | 41 | 1,538 |
| 1990 | 21,799 | 3,782 | 25,581 | 364 | 0 | 364 | 3,305 | 0 | 3,305 | 925 | 0 | 925 |
| 1991 | 23,622 | 9,543 | 33,165 | 404 | 0 | 404 | 5,800 | 0 | 5,800 | 1,415 | 59 | 1,474 |
| 1992 | 22,684 | 6,145 | 28,829 | 204 | 8 | 212 | 4,671 | 0 | 4,671 | 523 | 220 | 743 |
| 1993 | 18,930 | 7,809 | 26,739 | 595 | 0 | 595 | 3,783 | 9 | 3,792 | 691 | 443 | 1,134 |
| 1994 | 18,922 | 6,036 | 24,958 | 600 | 0 | 600 | 5,547 | 0 | 5,547 | 536 | 248 | 784 |
| 1995 | 19,647 | 8,495 | 28,142 | 438 | 0 | 438 | 3,705 | 0 | 3,705 | 394 | 321 | 715 |
| 1996 | 13,783 | 5,571 | 19,354 | 662 | 0 | 662 | 7,289 | 40 | 7,329 | 662 | 576 | 1,238 |
| 1997 | 13,850 | 3,729 | 17,579 | 1,106 | 0 | 1,106 | 4,393 | 0 | 4,393 | 278 | 272 | 550 |
| 1998 | 13,616 | 3,801 | 17,417 | 590 | 0 | 590 | 4,441 | 0 | 4,441 | 682 | 177 | 859 |
| 1999 | 15,006 | 6,771 | 21,777 | 630 | 20 | 650 | 5,582 | 0 | 5,582 | 211 | 392 | 603 |
| 2000 | 18,559 | 7,129 | 25,688 | 889 | 6 | 895 | 7,441 | 10 | 7,451 | 1,097 | 719 | 1,816 |
| 2001 | 10,955 | 5,904 | 16,859 | 271 | 0 | 271 | 4,802 | 29 | 4,831 | 1,709 | 1,671 | 3,380 |
| 2002 | 18,325 | 6,417 | 24,742 | 802 | 12 | 814 | 4,211 | 20 | 4,231 | 818 | 601 | 1,419 |
| Avg (92-01) | 16,595 | 6,139 | 22,734 | 599 | 3 | 602 | 5,165 | 9 | 5,174 | 678 | 504 | 1,182 |
| Avg (97-01) | 14,397 | 5,467 | 19,864 | 697 | 5 | 702 | 5,332 | 8 | 5,340 | 795 | 646 | 1,442 |

Table 9.-Page 2 of 2.

| Year | Norton Sound/Seward Peninsula | | | Norton Sound/Seward Peninsula | | | Norton Sound/Seward Peninsula | | |
|-------------|-------------------------------|----------|--------------------|-------------------------------|----------|--------------------|-------------------------------|-------|--------|
| | Pink | Kotzebue | NW Management Area | Sockeye | Kotzebue | NW Management Area | Total | Total | Total |
| 1977 | 2,402 | 8 | 2,410 | 0 | 0 | 0 | 3,718 | 52 | 3,770 |
| 1978 | 7,399 | 0 | 7,399 | 0 | 0 | 0 | 8,990 | 254 | 9,244 |
| 1979 | | 0 | | | 0 | | | 37 | |
| 1980 | 7,732 | 0 | 7,732 | 0 | 0 | 0 | 10,840 | 95 | 10,935 |
| 1981 | 3,101 | 0 | 3,101 | 0 | 0 | 0 | 6,564 | 54 | 6,618 |
| 1982 | 13,742 | 0 | 13,742 | 0 | 0 | 0 | 19,757 | 346 | 20,103 |
| 1983 | 4,583 | 0 | 4,583 | 0 | 0 | 0 | 11,135 | 463 | 11,598 |
| 1984 | 8,322 | 0 | 8,322 | 351 | 0 | 351 | 17,983 | 325 | 18,308 |
| 1985 | 1,138 | 68 | 1,206 | 20 | 0 | 20 | 3,610 | 429 | 4,039 |
| 1986 | 3,172 | 62 | 3,234 | 19 | 0 | 19 | 9,913 | 811 | 10,724 |
| 1987 | 1,304 | 0 | 1,304 | 924 | 21 | 945 | 5,976 | 529 | 6,505 |
| 1988 | 2,912 | 0 | 2,912 | 782 | 0 | 782 | 10,715 | 254 | 10,969 |
| 1989 | 3,564 | 10 | 3,574 | 165 | 0 | 165 | 9,587 | 51 | 9,638 |
| 1990 | 7,647 | 0 | 7,647 | 198 | 0 | 198 | 12,439 | 0 | 12,439 |
| 1991 | 1,738 | 91 | 1,829 | 237 | 0 | 237 | 9,594 | 150 | 9,744 |
| 1992 | 6,403 | 293 | 6,696 | 131 | 0 | 131 | 11,932 | 521 | 12,453 |
| 1993 | 2,250 | 0 | 2,250 | 10 | 0 | 10 | 7,329 | 452 | 7,781 |
| 1994 | 7,051 | 51 | 7,102 | 18 | 0 | 18 | 13,752 | 299 | 14,051 |
| 1995 | 928 | 38 | 966 | 104 | 0 | 104 | 5,569 | 359 | 5,928 |
| 1996 | 5,972 | 10 | 5,982 | 100 | 0 | 100 | 14,685 | 626 | 15,311 |
| 1997 | 1,458 | 0 | 1,458 | 30 | 0 | 30 | 7,265 | 272 | 7,537 |
| 1998 | 6,939 | 13 | 6,952 | 16 | 0 | 16 | 12,668 | 190 | 12,858 |
| 1999 | 3,039 | 12 | 3,051 | 0 | 0 | 0 | 9,462 | 424 | 9,886 |
| 2000 | 2,886 | 0 | 2,886 | 45 | 0 | 45 | 12,358 | 735 | 13,093 |
| 2001 | 360 | 0 | 360 | 39 | 0 | 39 | 7,181 | 1,700 | 8,881 |
| 2002 | 4,303 | 0 | 4,303 | 0 | 0 | 0 | 10,134 | 633 | 10,767 |
| Avg (92-01) | 3,729 | 42 | 3,770 | 49 | 0 | 49 | 10,220 | 558 | 10,778 |
| Avg (97-01) | 2,936 | 5 | 2,941 | 26 | 0 | 26 | 9,787 | 664 | 10,451 |

average harvest has been coho salmon, 28% pink salmon, 14% chum salmon, and 7% chinook salmon. During years of high pink salmon abundance such as 1992, 1994, 1996, and 1998, harvests of this species have comprised about 50% of the total annual salmon harvest. However, during years of low pink salmon abundance such as 1993, 1995, 1997 and 1999 coho salmon have accounted for about 60% of the total salmon harvest (Table 9).

Regulatory History

Prior to 1966, the daily bag limit was 15 fish (of all species) in freshwaters of western Alaska. From 1966 through 1970 an exception was made in the Unalakleet River where the daily bag limit was 6 salmon (all species). In 1970, the 6 salmon limit on the Unalakleet River was dropped, and a 15 salmon limit was adopted for the entire AYK Region with exceptions outside the NWMA. Salmon Lake and its tributaries were closed to salmon fishing in 1980. The general 15 salmon daily bag limit in the NWMA remained in effect until 1985 when the king salmon limit was set at 5 per day and the “other salmon” limit was set at 10 per day. An exception was made for the Snake and Nome rivers where the “other salmon” limit was 15 per day of which only 5 could be chum or coho. In 1987 emergency regulations were adopted that set the king salmon daily bag limit at 1 fish and the “other salmon” limit at 10 per day. In 1988, the king salmon daily bag limit for the AYK Region outside the Tanana River drainage was set at 3 per day with only 2 over 28 inches and the “other salmon” limit was retained at 10 per day, however, in Seward Peninsula waters, the king salmon limit was 1 per day with 10 “other salmon” of which only 3 could be chum or coho, and in the Unalakleet River, the king salmon limit was set at 1 per day. Also in 1988, chum salmon fishing was closed by EO on the Nome River. This closure was extended to all rivers from the Sinuk to the Solomon in 1991. In 1992, this closure was adopted into regulation by the BOF. These regulations remained in effect until 1997 when the BOF broke out the “other salmon” bag limits for Northern Norton Sound and adopted daily bag limits of 10 pink, 3 coho, 3 sockeye, and 3 chum salmon. However, the chum salmon closure in the Nome subdistrict remains in effect. In 2000, the “other salmon” daily bag and possession limit was reduced from 10 salmon to 5 salmon in the Unalakleet River. In addition, a regulation to address the possible high catch-and-release mortality of coho in the estuary of the Unalakleet River was adopted. This regulation closed the area downstream from the South River for the remainder of that day, to all sport fishing for those anglers that had harvested a bag limit of coho salmon. In addition, a statewide daily bag limit of 10 jack chinook (under 20 inches in length) was adopted.

UNALAKLEET RIVER SALMON FISHERIES

Fishery Description and Historical Perspective

The Unalakleet River supports substantial runs of chinook, chum, coho and pink salmon. Guided and unguided fishing effort is primarily focused on chinook and coho salmon, but chum and pink salmon are also harvested. The City of Unalakleet with a population of about 800 is located on the shore of Norton Sound at the mouth of the river. Daily air service from Anchorage and Nome provides access for anglers visiting the Unalakleet area. The U. S. Air Force operated a sport fishing recreational camp on the Unalakleet River during the 1960s, and a commercial sportfishing lodge was constructed there in the late 1960s. This fishing lodge is still being operated, although it has expanded in size and has had several owners. The Unalakleet Native Corporation owned the lodge for several years and contracted operations, however, the lodge is currently in private ownership. It is located about 8 miles upstream on the river. Several local residents also guide anglers on the river, and guiding operations from the Yukon River

drainage sometimes visit the river during the peak of the chinook and coho salmon runs. The majority of angling, however, is by unguided anglers. An unpublished survey by the Division of Sport Fish in the 1990s estimated that only about 8.5% of salmon anglers on the Unalakleet River were guided. Based on estimated effort levels and known effort by the largest guiding business, it is likely that guiding accounts for about 18-20% of the angling effort on the Unalakleet River. Most of the angling effort on the Unalakleet River is directed toward chinook and coho salmon. The chinook salmon run usually begins in mid-June, peaks during the last week of June and continues through mid-July. Anglers access the river by boat from the village of Unalakleet and are composed of a mix of local residents, visitors who rent boats or fish with friends, and visitors who either stay at the Unalakleet Lodge or are guided by local resident guides. Most sport fishing effort occurs in the lower 15 miles of the Unalakleet River and in the lower 5 miles of the North River which enters the Unalakleet about 7 miles upstream from its mouth.

Recent Fishery Performance

Since 1995, the Unalakleet River sustained the highest sport fishing effort of any single river in the NWMA in all but three years. In 2000, estimated effort on the Unalakleet River was 6,257 angler days, a 50% increase from 4,176 angler days in 1999 (Table 8), and in 2002 effort was estimated at 8,195 angler days. Unalakleet River salmon harvests have been trending upward since 1990 (Figure 12). The average annual sport harvest of salmon of all species from the Unalakleet River between 1992 and 2001 has been about 3,682 fish. Coho comprised about 61% of the average harvest while chinook made up about 10% (Mills 1991-1994; Howe et al. 1995, 1996, 2001a-d). Estimated harvests increased from about 4,800 salmon in 1997 to 6,263 salmon in 1999, declining to 5,859 in 2000 (Table 10). Coho comprised 56% of the 1997 harvest and 43% of the 1999 harvest, and 71% of the 2000 harvest. In 2002, an estimated total of 5,466 salmon were harvested of which 54% (2,937) were coho, and about 10% (544) were chinook, and 25% (1,378) were pink salmon. Approximately 68% of the entire NWMA harvest of chinook salmon, and 70% of the coho harvest were taken from the Unalakleet River in 2002. The harvest of coho would likely have been higher in 2002 if the daily bag limit had not been reduced by EO to one fish for most of the coho season.

In 2003, the Unalakleet and Shaktoolik rivers were closed to the retention of chinook and chum salmon because fewer than 100 of either species had been counted fish past the counting tower on the North River by June 30. This EO remained in effect from July 3 through August 15. The North River just reached the lower end of its escapement goal (1200-2400 chinook) with a total escapement of 1,224 chinook in 2003. No other management actions were necessary on the Unalakleet River in 2003.

During 1998, the estimated harvest was 513 chinook, dropping to 415 in 1999, 345 in 2000 and 250 in 2001 (Table 10). In 2002, the harvest was estimated at 544 chinook. The goal for escapement of chinook past the tower on the North River is from 1,200 to 2,400 fish. The total escapements of chinook into the Unalakleet River were estimated for the first time in 1997 and 1998 by expanding the tower estimate from the North River to include the entire drainage based on proportions of radio tagged fish moving up each drainage. In 1997 and 1998 about 40% of the radio-tagged chinook swam past the North River tower, and chinook escapement into the Unalakleet River was estimated at 11,204 and 5,220 respectively. A similar expansion would give an estimate of 5,673 chinook for 1999, 2,615 for 2000, and 3,343 for 2001, 3,710 for 2002 and 3,060 for 2003.

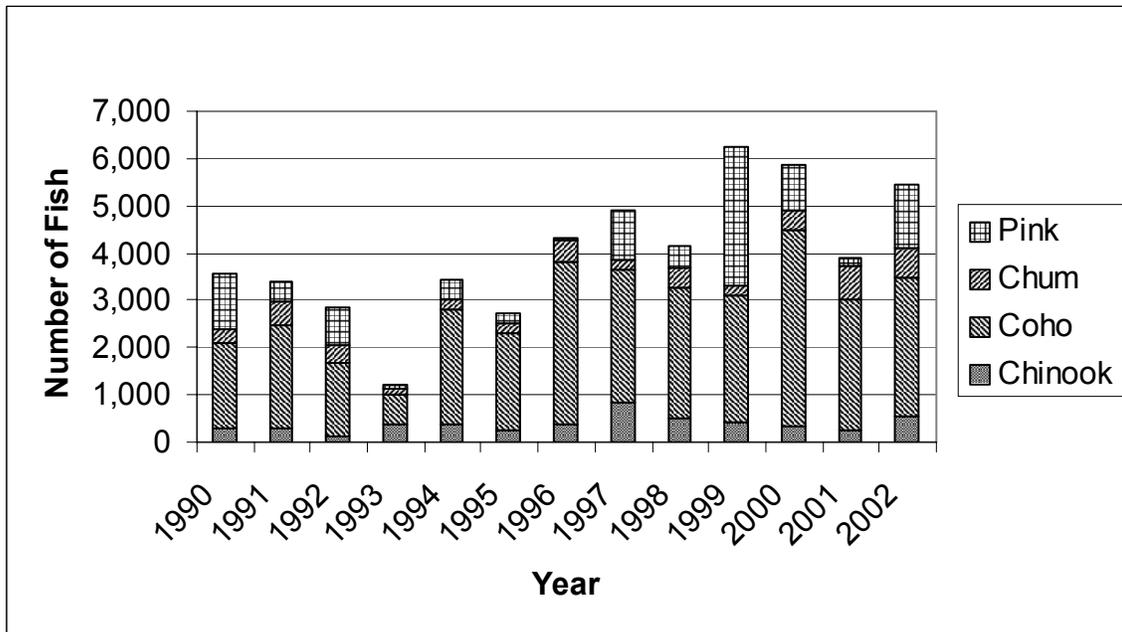


Figure 12.-Estimated sport fish harvests of salmon from the Unalakleet River, 1990-2002.

Over the past five years (1997-2001) the commercial harvests of chinook salmon in the Unalakleet subdistrict have been declining and have averaged 3,621 fish (Table 1). Since 1961, harvests have ranged from 960 in 1969 to 12,621 in 1985. Commercial fish managers believe that some of the chinook harvest in Unalakleet is composed of Yukon River stocks. In 1998, 6,413 chinook were harvested in this fishery, in 1999, 1,927 were taken, in 2000, 582 were taken, and in 2001, only 213 were commercially harvested. In 2002 and 2003 there were no directed commercial openings for chinook in Unalakleet. Incidental harvests were four chinook in 2002 and 10 chinook in 2003. Records of subsistence harvests of chinook salmon in Unalakleet have ranged from 90 fish in 1966 to 6,325 fish in 1997 (Table 5). The recent five-year average (1997-2001) harvest was 3,644 fish. The 2002 subsistence harvest was 2,367 chinook. The sport fish harvest over the same 5-year period has averaged 473 fish or about 7% of the total Unalakleet harvest. In 2002 the sport fish harvest of 544 fish was about 19% of the total Unalakleet chinook harvest .

Table 10.-Sport fish effort, catch and harvest estimates by species for the Unalakleet River, 1990-2002.

| | Year | | | | | | | | | |
|--------------------|----------------|-------|--------|-------|-------|-------|--------|--------|--------|--------|
| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| | <u>Effort</u> | | | | | | | | | |
| Number of Anglers | 482 | 917 | 685 | 625 | 777 | 1,009 | 695 | 941 | 835 | 995 |
| Number of Trips | 1,642 | 3,236 | 2,256 | 1,398 | 2,192 | 3,376 | 1,886 | 3,366 | 3,197 | 1,726 |
| No. Angler Days | 3,974 | 5,616 | 2,433 | 2,153 | 2,349 | 3,832 | 2,539 | 4,393 | 3,795 | 4,176 |
| | <u>Harvest</u> | | | | | | | | | |
| Chinook Salmon | 276 | 296 | 117 | 382 | 379 | 259 | 384 | 842 | 513 | 415 |
| Coho Salmon | 1,826 | 2,180 | 1,555 | 643 | 2,425 | 2,033 | 3,411 | 2,784 | 2,742 | 2,691 |
| Chum Salmon | 298 | 497 | 379 | 116 | 220 | 207 | 463 | 228 | 447 | 211 |
| Pink Salmon | 1,180 | 437 | 779 | 89 | 402 | 222 | 59 | 1,055 | 434 | 2,946 |
| Dolly Varden | 614 | 1,648 | 746 | 602 | 679 | 1,061 | 1,506 | 936 | 588 | 2,384 |
| Arctic Grayling | 99 | 1,909 | 114 | 131 | 353 | 300 | 420 | 210 | 144 | 277 |
| Total Fish Harvest | 4,293 | 6,967 | 3,690 | 1,963 | 4,458 | 4,082 | 6,243 | 6,055 | 4,868 | 8,924 |
| | <u>Catch</u> | | | | | | | | | |
| Chinook Salmon | 361 | 375 | 476 | 2,340 | 517 | 588 | 2,059 | 5,144 | 1,539 | 669 |
| Coho Salmon | 3,396 | 2,882 | 2,802 | 1,572 | 2,488 | 3,086 | 5,863 | 4,020 | 3,213 | 9,593 |
| Chum Salmon | 379 | 692 | 1,412 | 515 | 561 | 966 | 1,589 | 1,323 | 2,218 | 1,916 |
| Pink Salmon | 1,513 | 559 | 6,503 | 605 | 1,020 | 799 | 2,594 | 4,101 | 4,853 | 3,475 |
| Dolly Varden | 2,222 | 2,267 | 1,942 | 964 | 1,253 | 2,732 | 3,170 | 4,400 | 2,336 | 10,460 |
| Arctic Grayling | 448 | 2,813 | 1,022 | 874 | 1,476 | 1,332 | 1,694 | 4,918 | 3,256 | 6,089 |
| Total Fish Catch | 8,319 | 9,588 | 14,157 | 6,870 | 7,315 | 9,503 | 16,969 | 23,906 | 17,415 | 32,202 |

-continued-

Table 10.-Page 2 of 2.

| | Year | | | Average (92-01) | Average (97-01) |
|--------------------|---------|--------|--------|-----------------|-----------------|
| | 2000 | 2001 | 2002 | | |
| | Effort | | | | |
| Number of Anglers | 1,002 | 918 | 1,093 | 848 | 938 |
| Number of Trips | 3,415 | 1,365 | 4,314 | 2,418 | 2,614 |
| No. Angler Days | 6,257 | 2,793 | 8,195 | 3,472 | 4,283 |
| | Harvest | | | | |
| Chinook Salmon | 345 | 250 | 544 | 389 | 473 |
| Coho Salmon | 4,150 | 2,766 | 2,937 | 2,520 | 3,027 |
| Chum Salmon | 403 | 714 | 607 | 339 | 401 |
| Pink Salmon | 961 | 188 | 1,378 | 714 | 1,117 |
| Dolly Varden | 4,462 | 1,002 | 789 | 1,397 | 1,874 |
| Arctic Grayling | 538 | 247 | 773 | 273 | 283 |
| Total Fish Harvest | 10,859 | 5,167 | 7,028 | 5,631 | 7,175 |
| | Catch | | | | |
| Chinook Salmon | 1,045 | 542 | 835 | 1,492 | 1,788 |
| Coho Salmon | 9,287 | 5,399 | 3,691 | 4,732 | 6,302 |
| Chum Salmon | 3,652 | 2,030 | 1,653 | 1,618 | 2,228 |
| Pink Salmon | 3,982 | 1,197 | 2,463 | 2,913 | 3,522 |
| Dolly Varden | 10,293 | 2,769 | 2,593 | 4,032 | 6,052 |
| Arctic Grayling | 6,814 | 2,331 | 4,229 | 2,981 | 4,682 |
| Total Fish Catch | 35,073 | 14,268 | 15,464 | 17,768 | 24,573 |

Coho are the most sought after salmon species in the Unalakleet drainage. The run usually begins around August 1, peaks during mid-August and continues through mid September. The sport harvest of coho, from 1997 to 2001, has averaged 3,027 fish, and has remained relatively stable since 1997, however there was a marked increase in estimated harvest to 4,150 coho in 2000 (Table 10). The estimated harvest of coho in the Unalakleet River was 2,766 fish in 2001 and 2,937 in 2002 (Table 10). The coho sport fishery is more consumptive than most other Unalakleet salmon fisheries. Approximately 48% of coho caught are harvested while about 26% of chinook, 18% of chum, and 52% of pink salmon (1997-2001 average) caught are harvested.

From 1997-2001 commercial harvests of coho salmon in the Unalakleet subdistrict have averaged 21,156 fish (Table 1). Since 1961, commercial harvests of coho have ranged from 79 in 1964 to 71,019 in 1994 (Table 1). In 1998, 24,534 were harvested, and in 1999, 10,264 were taken. This trend reversed in the 2000 season when 29,803 coho were harvested. The commercial harvest took a drastic drop in 2002 when only 1,079 coho were harvested after averaging over 20,000 fish during the previous 5 years. However, in 2002 the run was very late entering the river due to very low river conditions, and most fishing had ceased by the time fish entered from the sea. The tower on the North River had a total passage of 2,966 coho in 2002 but ceased counting on August 28 as the run was increasing. Between 1997 and 2001, subsistence harvests of coho salmon in the community of Unalakleet averaged 7,342 fish and the 2002 subsistence harvest was estimated at 4,988 coho (Table 5). The sport fish harvest over the same period has averaged 3,027 fish, or about 10% of the total Unalakleet harvest (Table 10). Reliable escapement data for coho salmon in the Unalakleet drainage are not available, however North River tower counts likely give an indication of run strength. The counts from 2000 and 2001 indicated fairly strong runs suggesting that the 2004 and 2005 runs may also be fairly strong. A project to estimate the proportion of the Unalakleet River coho run moving past the North River tower is being planned, and may be initiated in 2004.

Sport Fishery Management Objectives

There have been no specific management objectives identified for salmon fisheries on the Unalakleet River. In comparison to commercial and subsistence salmon harvests, sport harvests are small and have a limited impact on salmon stocks. The only possible exception is the coho harvest, however, complete escapement data are lacking, and it is not presently possible to determine the impact of the sport harvest on the spawning escapement. The goal of sport fishery management in the Unalakleet River is to maintain opportunity for anglers to participate in the fisheries and maintain adequate escapements of salmon into the system. Emergency actions to restrict harvest are generally not considered unless other harvests, and escapement monitoring projects indicate that a particular run is small or that restrictions in subsistence fisheries may be necessary in order to allow for sufficient spawning escapement. Biological Escapement Goals (BEGs) based on tower estimates are being developed, but will not be established until an adequate history of reliable tower count data have been accumulated. An SEG for chinook between 1,200 and 2,600 is being recommended for the North River. When escapement goals are in place, more precise management to attain those goals will become possible.

Current Issues

Although sport fishing has been ongoing in the Unalakleet River drainage for many years, there is some local resentment of visiting anglers because some Unalakleet residents feel that “outsiders” are competing for the local salmon resources. Declines in chum and coho salmon runs throughout western Alaska have impacted the Unalakleet River drainage, although the

effect appears to be less dramatic than in Nome Subdistrict streams where chum runs have a long history of being depressed. While the commercial harvests of chinook and coho in the Unalakleet Subdistrict have declined during the past five years, sport harvests have stayed fairly consistent. The upper reaches of the Unalakleet River are a National Wild and Scenic River under federal management. With the recent federal takeover of subsistence management on federal waters, the possibility exists that subsistence management in the upper reaches of the river could affect sport fishing opportunity in the Unalakleet River.

Four proposals regarding sport fisheries on the Unalakleet River are being brought before the BOF in January 2004. Three of these regard salmon daily bag and possession limits. Proposal 126 would decrease the “other salmon” (other than king salmon) daily limit from five fish to four fish. The Southern Norton Sound Advisory Committee recommended that this proposal be amended to allow a more liberal pink salmon bag of 10 fish. Proposal 127 would set the daily bag and possession limit for king salmon in the Unalakleet River at one fish. This proposal would eliminate the 10 king salmon under 20 inches statewide bag limit in the Unalakleet River. Proposal 129 would set a seasonal bag limit of four king salmon for the Unalakleet River. Proposal 128 would reduce the time that guides operating from boats could serve clients on the Unalakleet River to 6:00 am through 6:00 pm five days per week during June, August and September. Staff comments have been prepared for these proposals and will be presented to the BOF during their January 2004 meeting.

Recent and Ongoing Research and Management Activities

Salmon escapements in the Unalakleet River are monitored using a counting tower in the North River, a test net in the Unalakleet River downstream from the mouth of the North River, and by aerial surveys. The tower is a cooperative project funded and operated by the Kawarek Corporation with guidance by the ADF&G, CFMD. Aerial surveys are difficult in the Unalakleet River because of its dark bottom and tannic stained water. These surveys provide a minimum escapement, but are unreliable as an indicator of total escapement in this river. Water in the North River is clear, and the tower provides a reliable estimate of escapement into that system in years for which counts are obtained.

A two-year research project was initiated on the Unalakleet River in 1997 to estimate the proportions of the chinook salmon escapement that spawn in the North River and the main Unalakleet River upstream from the North River. In 1997, 37.2% of the radio tagged chinook spawned in the North River, and 62.8% spawned in the remainder of the drainage (Wuttig 1998). Proportions estimated in 1998 were similar, 40.1% in the North River and 59.9% in the remainder of the Unalakleet drainage. These relative proportions can now be used to expand the North River tower estimate to allow estimation of the escapement in the entire system. The sport fish staff have frequently assisted and cooperated informally with the Commercial Fisheries Division on projects, including the partial funding of counting towers from which spawning escapements are estimated, surveys for abundance, and observation of spawning concentrations. EOs restricting the harvest of salmon are usually coordinated with the Commercial Fisheries Division.

Two EOs were issued that affected the Unalakleet River during the reporting period. Because of a very weak return of coho salmon in eastern Norton Sound through mid August 2002, EO No. 3-SS-01-02 reduced the daily bag and possession limit of coho to one fish in eastern Norton Sound including the Unalakleet River. This order became effective on August 17, 2002 (Appendix D). In June 2003, low catches of chum and chinook salmon in the CFMD test net in

the Unalakleet River suggested a very weak chum salmon run and it appeared that the lower end of the escapement goal for chinook salmon would not be reached at the North River counting tower. Because of these indicators, EO No. 3-KS-03-03 was issued on June 3, 2003 eliminating the use of bait while sport fishing in the Unalakleet and Shaktoolik rivers and prohibiting the retention of chinook and chum salmon. This order remained in effect until August 15, 2003 (Appendix D).

NOME AREA ROADSIDE SALMON FISHERIES

Fishery Description and Historical Perspective

Nine rivers accessible from the road system near Nome sustain some level of sport fishing effort for salmon. Over the past five years (1997-2001) estimated harvests from these rivers have averaged about 2,707 salmon annually, of which coho have composed about 54% and pink salmon have about 39% (Tables 11-18). Sport fishing on the Nome River has accounted for an annual average of about 18% of all the fishing effort in the entire northwestern management area during the last five years (Table 8). An average of about 800 salmon have been harvested annually from the Nome River over the past 5 years, a considerable decline in harvest when compared to the previous 5-year average harvest of 3,049 salmon (Table 11). The decline in salmon harvests from the Nome River in the past five years is likely due to recent fishery restrictions.

The Niukluk and Fish rivers are also popular sport fishing locations for salmon. Two guiding operations with small lodges are located on the Niukluk River. In addition, Nome based guides fish these rivers as well as other road accessible waters. Many residents of Nome have summer cabins on the Niukluk River at Council or fish camps along the river. Since the construction of the bridge over Safety Sound in 1980, and improvements to the road, access to the Niukluk and Fish rivers has increased, and this area has become a prime destination for the road bound angler. The drainage sustains an average annual effort of about 3,100 angler days, and about 1,100 salmon are harvested annually from the Fish and Niukluk rivers (Table 12). The Pilgrim River, with its headwaters at Salmon Lake is somewhat less popular salmon fishery. All five species of North American Pacific salmon occur in the Pilgrim River. Sockeye spawn in Salmon Lake and the runs appear to be responding positively to lake fertilization restoration efforts underway for the past six years. The escapement of sockeye past the weir in the lower Pilgrim River was 42,729 fish in 2003, the largest recorded in that system. There is a Bureau of Land Management (BLM) campground at the outlet of Salmon Lake, and from there the river can be floated for about 25 river miles to the bridge at mile 65 of the Kougarok Road. Riverboats can be launched at the bridge for access to downstream locations. The Pilgrim River sustains an average annual effort of about 600 angler days and about 80 salmon have been harvested annually between 1997 and 2001 (Table 13). The Fish/Niukluk and the Pilgrim rivers are the only road accessible rivers where fishing for chum salmon is still allowed, however annual (1997-2001 average) harvests from these drainages have been only about 80 chum salmon (Tables 12 and 13). The mouth of the Snake River is in downtown Nome. This small stream can also be accessed from a bridge at about mile 8 of the Teller Road and from the Glacier Creek Road. Over the past five years (1997-2001) the Snake River sustains an average annual effort of about 600 angler days, with an annual harvest of about 250 salmon, about 55% coho and 45% pink salmon (Table 14). Other road accessible waters include the Solomon, Kuzitrin, Penny, Cripple and Sinuk rivers (Tables 15-19). The annual harvests in these rivers combined for the past five years (1997-2001) have

Table 11.—Sport fish effort, and harvests by species from the Nome River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | Salmon | | | | | All Salmon | Dolly Varden | Arctic Grayling | Whitefish |
|-----------------------|-------------------|-------------|--------|-------|-----|-------|------|------------|--------------|-----------------|-----------|
| | | | King | Coho | Red | Pink | Chum | | | | |
| <u>Harvest</u> | | | | | | | | | | | |
| 1983 | 0 | 3,908 | 93 | 204 | 0 | 1,782 | 538 | 2,617 | 2,468 | 464 | 0 |
| 1984 | 1,288 | 5,714 | 13 | 2,648 | 0 | 4,128 | 325 | 7,114 | 935 | 376 | 13 |
| 1985 | 1,220 | 6,514 | 20 | 209 | 0 | 349 | 189 | 767 | 1,236 | 528 | 0 |
| 1986 | 1,087 | 6,023 | 0 | 415 | 0 | 491 | 76 | 982 | 1,057 | 491 | 0 |
| 1987 | 674 | 1,865 | 0 | 163 | 0 | 235 | 0 | 398 | 906 | 344 | 0 |
| 1988 | 1,733 | 6,058 | 0 | 1,455 | 0 | 528 | 273 | 2,256 | 2,365 | 946 | 18 |
| 1989 | 1,231 | 6,569 | 19 | 1,233 | 0 | 1,573 | 495 | 3,320 | 3,551 | 2,032 | 131 |
| 1990 | 1,625 | 7,194 | 39 | 407 | 35 | 2,651 | 122 | 3,254 | 1,078 | 33 | 0 |
| 1991 | 1,277 | 4,646 | 22 | 417 | 0 | 356 | 241 | 1,036 | 1,220 | 186 | 13 |
| 1992 | 1,433 | 6,455 | 16 | 713 | 0 | 4,397 | 0 | 5,126 | 573 | 0 | 0 |
| 1993 | 1,181 | 3,633 | 93 | 602 | 0 | 723 | 0 | 1,418 | 917 | 0 | 0 |
| 1994 | 1,025 | 5,116 | 0 | 326 | 0 | 4,103 | 0 | 4,429 | 431 | 16 | 0 |
| 1995 | 859 | 3,044 | 0 | 143 | 0 | 230 | 0 | 373 | 462 | 0 | 0 |
| 1996 | 947 | 2,920 | 0 | 598 | 0 | 3,280 | 0 | 3,878 | 873 | 0 | 0 |
| 1997 | 691 | 1,914 | 10 | 295 | 0 | 83 | 0 | 388 | 328 | 0 | 0 |
| 1998 | 636 | 1,371 | 0 | 189 | 0 | 1,985 | 0 | 2,174 | 302 | 0 | 0 |
| 1999 | 564 | 1,463 | 0 | 219 | 0 | 0 | 0 | 219 | 791 | 0 | 0 |
| 2000 | 450 | 1,455 | 0 | 342 | 0 | 578 | 0 | 920 | 340 | 0 | 0 |
| 2001 | 312 | 1,045 | 0 | 297 | 0 | 0 | 0 | 297 | 43 | 0 | 0 |
| 2002 | 606 | 1,901 | 0 | 217 | 0 | 312 | 0 | 529 | 511 | 0 | 0 |
| Avg 92-01 | 810 | 2,842 | 12 | 372 | 0 | 1,538 | 0 | 1,922 | 506 | 2 | 0 |
| Avg 97-01 | 531 | 1,450 | 2 | 268 | 0 | 529 | 0 | 800 | 361 | 0 | 0 |
| <u>Catches</u> | | | | | | | | | | | |
| 1990 | 1,625 | 7,194 | 48 | 896 | 35 | 5,483 | 825 | 7,287 | 2,271 | 613 | 0 |
| 1991 | 1,277 | 4,646 | 22 | 869 | 0 | 894 | 389 | 2,174 | 3,725 | 1,363 | 13 |
| 1992 | 1,433 | 6,455 | 23 | 1,466 | 0 | 9,810 | 266 | 11,565 | 1,130 | 90 | 9 |
| 1993 | 1,181 | 3,633 | 121 | 764 | 0 | 1,756 | 175 | 2,816 | 5,153 | 569 | 0 |
| 1994 | 1,025 | 5,116 | 0 | 386 | 0 | 6,190 | 36 | 6,612 | 631 | 1,111 | 0 |
| 1995 | 859 | 3,044 | 0 | 228 | 0 | 980 | 478 | 1,686 | 1,474 | 571 | 0 |
| 1996 | 947 | 2,920 | 21 | 788 | 0 | 5,898 | 432 | 7,139 | 1,311 | 497 | 0 |
| 1997 | 691 | 1,914 | 20 | 447 | 0 | 190 | 113 | 770 | 873 | 569 | 0 |
| 1998 | 636 | 1,371 | 19 | 863 | 0 | 3,482 | 8 | 4,372 | 319 | 207 | 0 |
| 1999 | 564 | 1,463 | 0 | 231 | 0 | 13 | 0 | 244 | 1,486 | 300 | 0 |
| 2000 | 450 | 1,455 | 0 | 385 | 0 | 876 | 20 | 1,281 | 431 | 10 | 0 |
| 2001 | 312 | 1,045 | 0 | 377 | 0 | 32 | 13 | 422 | 94 | 60 | 0 |
| 2002 | 606 | 1,901 | 24 | 549 | 0 | 3,090 | 220 | 3,883 | 543 | 735 | 0 |
| Avg 92-01 | 810 | 2,842 | 20 | 594 | 0 | 2,923 | 154 | 3,691 | 1,290 | 398 | 1 |
| Avg 97-01 | 531 | 1,450 | 8 | 461 | 0 | 919 | 31 | 1,418 | 641 | 229 | 0 |

Table 12.—Sport fish effort, and harvests by species from the Fish/Niukluk River 1983-2002, and catches 1990-2002.

| Year | Num. Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Northern Pike | Whitefish | Burbot |
|----------------|--------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|---------------|-----------|--------|
| Harvest | | | | | | | | | | | | | |
| 1983 | 0 | 1,999 | 0 | 1,355 | 0 | 631 | 371 | 2,357 | 2,208 | 5,160 | 557 | 0 | 0 |
| 1984 | 521 | 1,115 | 0 | 1,090 | 0 | 78 | 52 | 1,220 | 325 | 376 | 13 | 0 | 13 |
| 1985 | 466 | 889 | 0 | 40 | 0 | 70 | 10 | 120 | 195 | 945 | 0 | 0 | 35 |
| 1986 | 850 | 1,888 | 189 | 1,359 | 0 | 415 | 0 | 1,963 | 1,359 | 1,114 | 19 | 0 | 0 |
| 1987 | 809 | 2,473 | 36 | 1,032 | 0 | 127 | 72 | 1,267 | 1,376 | 2,119 | 471 | 0 | 0 |
| 1988 | 866 | 2,245 | 0 | 800 | 0 | 73 | 127 | 1,000 | 891 | 1,237 | 0 | 0 | 0 |
| 1989 | 641 | 2,124 | 0 | 728 | 0 | 233 | 107 | 1,068 | 734 | 808 | 0 | 70 | 0 |
| 1990 | 580 | 2,059 | 0 | 267 | 0 | 638 | 216 | 1,121 | 348 | 415 | 17 | 0 | 0 |
| 1991 | 881 | 2,524 | 14 | 977 | 0 | 356 | 272 | 1,619 | 1,474 | 1,320 | 283 | 13 | 35 |
| 1992 | 773 | 2,742 | 0 | 753 | 0 | 357 | 15 | 1,125 | 303 | 158 | 43 | 0 | 0 |
| 1993 | 832 | 3,962 | 9 | 1,185 | 0 | 278 | 514 | 1,986 | 1,003 | 619 | 75 | 9 | 21 |
| 1994 | 766 | 3,082 | 10 | 1,122 | 0 | 231 | 119 | 1,482 | 708 | 644 | 99 | 0 | 0 |
| 1995 | 918 | 2,603 | 18 | 818 | 0 | 136 | 27 | 999 | 368 | 430 | 0 | 37 | 34 |
| 1996 | 692 | 2,120 | 11 | 1,652 | 0 | 404 | 166 | 2,233 | 402 | 313 | 145 | 0 | 24 |
| 1997 | 722 | 3,017 | 71 | 462 | 0 | 58 | 0 | 591 | 2,071 | 734 | 30 | 131 | 148 |
| 1998 | 229 | 1,344 | 0 | 316 | 0 | 0 | 0 | 316 | 160 | 16 | 0 | 0 | 84 |
| 1999 | 819 | 4,825 | 44 | 1,365 | 0 | 80 | 0 | 1,489 | 1,952 | 860 | 28 | 0 | 89 |
| 2000 | 534 | 3,451 | 174 | 1,165 | 0 | 51 | 0 | 1,390 | 1,687 | 442 | 57 | 0 | 0 |
| 2001 | 875 | 2,822 | 0 | 969 | 0 | 161 | 439 | 1,569 | 1,197 | 430 | 297 | 129 | 43 |
| 2002 | 542 | 1,805 | 75 | 298 | 0 | 254 | 45 | 672 | 259 | 452 | 51 | 16 | 0 |
| Avg 92-01 | 716 | 2,997 | 34 | 981 | 0 | 176 | 128 | 1,318 | 985 | 465 | 77 | 31 | 44 |
| Avg 97-01 | 636 | 3,092 | 58 | 855 | 0 | 70 | 88 | 1,071 | 1,413 | 496 | 82 | 52 | 73 |

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Table 12.–Page 2 of 2.

| Year | Num. Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Northern Pike | Whitefish | Burbot |
|----------------|--------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|---------------|-----------|--------|
| Catches | | | | | | | | | | | | | |
| 1990 | 580 | 2,059 | 0 | 1,140 | 0 | 2,096 | 487 | 3,723 | 912 | 2,189 | 133 | 0 | 0 |
| 1991 | 881 | 2,524 | 22 | 1,417 | 0 | 579 | 521 | 2,539 | 3,439 | 7,261 | 764 | 39 | 35 |
| 1992 | 773 | 2,742 | 0 | 1,555 | 0 | 1,969 | 326 | 3,850 | 1,041 | 2,171 | 256 | 0 | 0 |
| 1993 | 832 | 3,962 | 9 | 1,804 | 0 | 909 | 945 | 3,667 | 6,130 | 5,976 | 75 | 44 | 21 |
| 1994 | 766 | 3,082 | 29 | 1,448 | 0 | 2,052 | 1,271 | 4,800 | 2,125 | 2,398 | 596 | 56 | 0 |
| 1995 | 918 | 2,603 | 18 | 1,401 | 0 | 300 | 428 | 2,147 | 662 | 1,169 | 137 | 65 | 34 |
| 1996 | 692 | 2,120 | 64 | 3,348 | 0 | 3,512 | 1,660 | 8,584 | 1,872 | 4,653 | 513 | 94 | 24 |
| 1997 | 722 | 3,017 | 125 | 1,751 | 106 | 1,209 | 714 | 3,905 | 9,952 | 10,452 | 423 | 315 | 277 |
| 1998 | 229 | 1,344 | 15 | 772 | 0 | 3,252 | 822 | 4,861 | 1,390 | 8,159 | 189 | 198 | 84 |
| 1999 | 819 | 4,825 | 55 | 2,151 | 0 | 187 | 265 | 2,658 | 5,601 | 7,245 | 264 | 0 | 101 |
| 2000 | 534 | 3,451 | 207 | 2,952 | 0 | 3,989 | 952 | 8,100 | 2,261 | 1,701 | 114 | 210 | 0 |
| 2001 | 875 | 2,822 | 21 | 1,739 | 0 | 279 | 543 | 2,582 | 3064 | 3972 | 538 | 416 | 43 |
| 2002 | 542 | 1,805 | 111 | 1,549 | 0 | 772 | 747 | 3,179 | 854 | 6,587 | 211 | 148 | 0 |
| Avg 92-01 | 716 | 2,997 | 54 | 1,892 | 11 | 1,766 | 793 | 4,515 | 3,410 | 4,790 | 311 | 140 | 58 |
| Avg 97-01 | 636 | 3,092 | 85 | 1,873 | 21 | 1,783 | 659 | 4,421 | 4,454 | 6,306 | 306 | 228 | 101 |

Table 13.–Page 2 of 2.

| Year | Number of Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Northern Pike | Whitefish | Burbot |
|-----------------------|-------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|---------------|-----------|--------|
| <u>Catches</u> | | | | | | | | | | | | | |
| 1990 | 862 | 1,710 | 57 | 186 | 198 | 736 | 460 | 1,637 | 845 | 1,476 | 2,918 | 0 | 33 |
| 1991 | 1,169 | 3,183 | 65 | 476 | 374 | 406 | 194 | 1,515 | 3,155 | 4,463 | 1,499 | 13 | 0 |
| 1992 | 686 | 1,184 | 55 | 162 | 90 | 714 | 197 | 1,218 | 279 | 526 | 863 | 18 | 0 |
| 1993 | 570 | 1,195 | 92 | 325 | 106 | 392 | 254 | 1,169 | 3,038 | 2,362 | 959 | 0 | 11 |
| 1994 | 323 | 844 | 0 | 436 | 18 | 350 | 146 | 950 | 180 | 266 | 358 | 0 | 0 |
| 1995 | 531 | 1,253 | 19 | 472 | 163 | 58 | 232 | 944 | 294 | 370 | 656 | 27 | 11 |
| 1996 | 445 | 840 | 0 | 265 | 235 | 364 | 133 | 997 | 509 | 785 | 334 | 0 | 0 |
| 1997 | 456 | 820 | 90 | 49 | 115 | 0 | 15 | 269 | 254 | 429 | 262 | 0 | 0 |
| 1998 | 392 | 546 | 32 | 65 | 145 | 263 | 44 | 549 | 41 | 65 | 77 | 0 | 0 |
| 1999 | 283 | 433 | 20 | 77 | 177 | 0 | 0 | 274 | 585 | 694 | 104 | 9 | 0 |
| 2000 | 177 | 753 | 0 | 200 | 32 | 109 | 24 | 365 | 0 | 221 | 596 | 0 | 0 |
| 2001 | 207 | 491 | 0 | 29 | 14 | 0 | 11 | 54 | 439 | 402 | 0 | 0 | 0 |
| 2002 | 303 | 562 | 0 | 5 | 0 | 0 | 0 | 5 | 75 | 144 | 157 | 0 | 0 |
| Avg 92-01 | 407 | 836 | 31 | 208 | 110 | 225 | 106 | 679 | 562 | 612 | 421 | 5 | 2 |
| Avg 97-01 | 303 | 609 | 28 | 84 | 97 | 74 | 19 | 302 | 264 | 362 | 208 | 2 | 0 |

Table 14.—Sport fish effort and harvests by species from the Snake River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Whitefish |
|-----------|-------------------|-------------|-------------|-------------|----------------|-------------|-------------|------------|--------------|-----------------|-----------|
| | | | | | Harvest | | | | | | |
| 1983 | 0 | 119 | 19 | 0 | 0 | 37 | 0 | 56 | 223 | 278 | 0 |
| 1984 | 245 | 418 | 0 | 273 | 0 | 143 | 0 | 416 | 65 | 26 | 0 |
| 1985 | 129 | 361 | 0 | 120 | 0 | 0 | 0 | 120 | 0 | 139 | 0 |
| 1986 | 136 | 850 | 0 | 94 | 0 | 378 | 94 | 566 | 57 | 378 | 0 |
| 1987 | | | | | | | | | | | |
| 1988 | 340 | 2,128 | 0 | 800 | 0 | 546 | 437 | 1,783 | 218 | 709 | 0 |
| 1989 | 148 | 436 | 0 | 10 | 0 | 291 | 97 | 398 | 44 | 101 | 0 |
| 1990 | 298 | 775 | 10 | 47 | 0 | 111 | 41 | 209 | 66 | 116 | 0 |
| 1991 | 647 | 2,384 | 7 | 798 | 62 | 71 | 93 | 1,031 | 1,252 | 402 | 0 |
| 1992 | 461 | 2,379 | 8 | 510 | 0 | 183 | 0 | 701 | 115 | 16 | 0 |
| 1993 | 622 | 1,468 | 9 | 248 | 0 | 151 | 0 | 408 | 331 | 467 | 0 |
| 1994 | 341 | 880 | 0 | 145 | 0 | 452 | 7 | 604 | 117 | 32 | 0 |
| 1995 | 640 | 1,968 | 0 | 85 | 0 | 19 | 0 | 104 | 131 | 18 | 9 |
| 1996 | 433 | 1,269 | 0 | 426 | 0 | 659 | 0 | 1,085 | 97 | 121 | 0 |
| 1997 | 235 | 445 | 0 | 98 | 0 | 0 | 0 | 98 | 81 | 0 | 0 |
| 1998 | 164 | 376 | 0 | 0 | 0 | 463 | 0 | 765 | 0 | 8 | 0 |
| 1999 | 313 | 977 | 0 | 209 | 0 | 0 | 0 | 209 | 44 | 113 | 0 |
| 2000 | 185 | 377 | 0 | 209 | 0 | 103 | 0 | 312 | 199 | 16 | 0 |
| 2001 | 329 | 853 | 0 | 175 | 0 | 0 | 0 | 175 | 108 | 63 | 0 |
| 2002 | 263 | 514 | 0 | 35 | 0 | 0 | 0 | 35 | 18 | 110 | 0 |
| Avg 92-01 | 372 | 1,099 | 2 | 211 | 0 | 203 | 1 | 416 | 122 | 85 | 1 |
| Avg 97-01 | 245 | 606 | 0 | 138 | 0 | 113 | 0 | 251 | 86 | 40 | 0 |

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Table 14.–Page 2 of 2.

| Year | Number of Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Whitefish |
|----------------|-------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|-----------|
| Catches | | | | | | | | | | | |
| 1990 | 298 | 775 | 29 | 58 | 0 | 222 | 122 | 431 | 315 | 199 | 0 |
| 1991 | 647 | 2,384 | 14 | 1,798 | 73 | 234 | 109 | 2,228 | 3,471 | 2,096 | 0 |
| 1992 | 461 | 2,379 | 8 | 640 | 0 | 1,182 | 0 | 1,830 | 180 | 158 | 0 |
| 1993 | 622 | 1,468 | 9 | 306 | 0 | 429 | 37 | 781 | 1,003 | 1,614 | 0 |
| 1994 | 341 | 880 | 60 | 235 | 0 | 648 | 37 | 980 | 420 | 377 | 0 |
| 1995 | 640 | 1,968 | 0 | 245 | 0 | 300 | 189 | 734 | 507 | 887 | 9 |
| 1996 | 433 | 1,269 | 0 | 530 | 0 | 967 | 111 | 1,608 | 255 | 1,055 | 0 |
| 1997 | 235 | 445 | 0 | 118 | 0 | 0 | 9 | 127 | 243 | 123 | 135 |
| 1998 | 164 | 376 | 0 | 64 | 0 | 463 | 0 | 527 | 0 | 218 | 0 |
| 1999 | 313 | 977 | 0 | 606 | 0 | 0 | 0 | 606 | 257 | 723 | 0 |
| 2000 | 185 | 377 | 0 | 209 | 0 | 103 | 0 | 312 | 199 | 449 | 0 |
| 2001 | 329 | 853 | 0 | 214 | 0 | 21 | 78 | 313 | 108 | 1,385 | 0 |
| 2002 | 263 | 514 | 0 | 156 | 0 | 0 | 0 | 156 | 18 | 279 | 0 |
| Avg 92-01 | 372 | 1,099 | 8 | 317 | 0 | 411 | 46 | 782 | 317 | 699 | 14 |
| Avg 97-01 | 245 | 606 | 0 | 242 | 0 | 117 | 17 | 377 | 161 | 580 | 27 |

Table 15.—Sport fish effort and harvests by species from the Solomon River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Whitefish |
|-----------------|-------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|-----------|
| Harvests | | | | | | | | | | | |
| 1983 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 0 |
| 1984 | 215 | 766 | 0 | 299 | 0 | 0 | 0 | 299 | 221 | 0 | 0 |
| 1985 | 391 | 2,667 | 0 | 80 | 0 | 120 | 219 | 419 | 611 | 0 | 0 |
| 1986 | 102 | 102 | 0 | 0 | 0 | 38 | 0 | 38 | 0 | 0 | 0 |
| 1987 | 270 | 272 | 0 | 109 | 0 | 0 | 72 | 181 | 1,576 | 91 | 0 |
| 1988 | 155 | 309 | 0 | 18 | 0 | 0 | 0 | 18 | 36 | 127 | 0 |
| 1989 | 263 | 492 | 10 | 136 | 0 | 243 | 49 | 438 | 745 | 152 | 0 |
| 1990 | 216 | 458 | 0 | 12 | 0 | 361 | 14 | 387 | 182 | 17 | 0 |
| 1991 | 593 | 1,057 | 7 | 83 | 0 | 173 | 0 | 263 | 2,219 | 158 | 0 |
| 1992 | 685 | 962 | 0 | 316 | 0 | 210 | 0 | 526 | 131 | 0 | 0 |
| 1993 | 317 | 1,404 | 28 | 420 | 0 | 259 | 0 | 707 | 893 | 0 | 61 |
| 1994 | 328 | 1,193 | 0 | 235 | 0 | 256 | 0 | 491 | 269 | 0 | 19 |
| 1995 | 426 | 781 | 0 | 38 | 0 | 87 | 0 | 125 | 366 | 0 | 0 |
| 1996 | 230 | 335 | 0 | 142 | 0 | 0 | 0 | 142 | 49 | 0 | 0 |
| 1997 | 250 | 434 | 0 | 10 | 0 | 15 | 0 | 25 | 186 | 0 | 26 |
| 1998 | 245 | 340 | 0 | 0 | 16 | 154 | 0 | 170 | 383 | 0 | 0 |
| 1999 | 193 | 438 | 0 | 22 | 0 | 0 | 0 | 22 | 154 | 0 | 0 |
| 2000 | 88 | 242 | 0 | 32 | 0 | 113 | 0 | 145 | 0 | 0 | 0 |
| 2001 | 254 | 615 | 0 | 39 | 0 | 0 | 0 | 39 | 162 | 0 | 0 |
| 2002 | 144 | 475 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 |
| Avg 92-01 | 302 | 674 | 3 | 125 | 2 | 109 | 0 | 239 | 259 | 0 | 11 |
| Avg 97-01 | 206 | 414 | 0 | 21 | 3 | 56 | 0 | 80 | 177 | 0 | 5 |

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Table 16.–Page 2 of 2.

| Year | Number of Anglers | Days Fished | King Salmon | Coho Salmon | Red Salmon | Pink Salmon | Chum Salmon | All Salmon | Dolly Varden | Arctic Grayling | Northern Pike | Whitefish | Burbot |
|-----------------------|-------------------|-------------|-------------|-------------|------------|-------------|-------------|------------|--------------|-----------------|---------------|-----------|--------|
| <u>Catches</u> | | | | | | | | | | | | | |
| 1990 | 282 | 572 | 0 | 0 | 0 | 194 | 27 | 221 | 0 | 298 | 1,094 | 0 | 0 |
| 1991 | 414 | 836 | 0 | 0 | 10 | 41 | 0 | 51 | 333 | 1,349 | 1,937 | 0 | 0 |
| 1992 | 287 | 469 | 0 | 89 | 0 | 82 | 0 | 171 | 8 | 481 | 1,956 | 37 | 0 |
| 1993 | 293 | 463 | 0 | 0 | 0 | 0 | 0 | 0 | 263 | 288 | 751 | 9 | 0 |
| 1994 | 267 | 643 | 0 | 109 | 0 | 16 | 0 | 125 | 0 | 351 | 722 | 0 | 0 |
| 1995 | 214 | 413 | 0 | 0 | 0 | 0 | 40 | 40 | 54 | 192 | 1,005 | 0 | 11 |
| 1996 | 230 | 483 | 0 | 0 | 0 | 49 | 11 | 60 | 85 | 388 | 2,015 | 0 | 0 |
| 1997 | 236 | 440 | 0 | 0 | 64 | 0 | 0 | 64 | 85 | 1,068 | 1,503 | 0 | 0 |
| 1998 | 122 | 122 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 38 | 0 | 0 |
| 1999 | 197 | 355 | 0 | 7 | 7 | 0 | 0 | 14 | 176 | 158 | 1,840 | 0 | 0 |
| 2000 | 111 | 373 | 0 | 0 | 0 | 103 | 0 | 103 | 0 | 859 | 578 | 36 | 0 |
| 2001 | 186 | 297 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 760 | 2,738 | 646 | 7 |
| Avg 92-01 | 214 | 406 | 0 | 21 | 7 | 25 | 5 | 58 | 70 | 455 | 1315 | 73 | 2 |
| Avg 97-01 | 170 | 317 | 0 | 1 | 14 | 21 | 0 | 36 | 58 | 569 | 1339 | 136 | 1 |

Table 17.—Sport fish effort and harvests by species from the Penny River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | Salmon | | | | | All Salmon | Dolly Varden | Arctic Grayling |
|----------------|-------------------|-------------|--------|------|-----|------|------|------------|--------------|-----------------|
| | | | King | Coho | Red | Pink | Chum | | | |
| Harvest | | | | | | | | | | |
| 1983 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1984 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1985 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1986 | 306 | 396 | 0 | 113 | 0 | 396 | 189 | 698 | 189 | 189 |
| 1987 | 34 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 31 | 91 | 0 | 73 | 0 | 0 | 0 | 73 | 73 | 0 |
| 1989 | 33 | 34 | 0 | 10 | 0 | 0 | 0 | 10 | 99 | 30 |
| 1990 | 66 | 343 | 0 | 35 | 0 | 416 | 0 | 451 | 0 | 0 |
| 1991 | 36 | 61 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 0 |
| 1992 | 37 | 37 | 0 | 16 | 0 | 0 | 0 | 16 | 0 | 0 |
| 1993 | nd | nd | nd | nd | nd | nd | Nd | nd | nd | Nd |
| 1994 | 78 | 101 | 0 | 0 | 9 | 34 | 0 | 43 | 46 | 0 |
| 1995 | 42 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 40 | 80 | 0 | 95 | 0 | 0 | 0 | 95 | 12 | 0 |
| 1997 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1999 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2000 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2001 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2002 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| Avg 92-01 | 42 | 55 | 0 | 22 | 2 | 7 | 0 | 31 | 12 | 0 |
| Avg 97-01 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catches | | | | | | | | | | |
| 1990 | 66 | 343 | 0 | 35 | 0 | 416 | 0 | 451 | 0 | 0 |
| 1991 | 36 | 61 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 0 |
| 1992 | 37 | 37 | 0 | 16 | 0 | 0 | 0 | 16 | 0 | 0 |
| 1993 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1994 | 78 | 101 | 0 | 20 | 87 | 341 | 0 | 448 | 84 | 0 |
| 1995 | 42 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 40 | 80 | 0 | 95 | 0 | 0 | 0 | 95 | 61 | 73 |
| 1997 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 1998 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 1999 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2000 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2001 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| 2002 | nd | nd | nd | nd | nd | nd | nd | nd | nd | Nd |
| Avg 92-01 | 42 | 55 | 0 | 26 | 17 | 68 | 0 | 112 | 29 | 19 |
| Avg 97-01 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |

Table 18.—Sport fish effort and harvests by species from the Cripple River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | Salmon | | | | All Salmon | Dolly Varden | Arctic Grayling | |
|-----------------------|-------------------|-------------|--------|-------|-----|-------|------------|--------------|-----------------|------|
| | | | King | Coho | Red | Pink | | | | Chum |
| <u>Harvest</u> | | | | | | | | | | |
| 1983 | 0 | 179 | 0 | 37 | 0 | 93 | 0 | 130 | 111 | 0 |
| 1984 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd |
| 1985 | nd | nd | nd | nd | nd | nd | nd | nd | nd | nd |
| 1986 | 102 | 170 | 0 | 113 | 0 | 189 | 189 | 491 | 57 | 0 |
| 1987 | 101 | 181 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 155 | 509 | 0 | 528 | 0 | 0 | 0 | 528 | 127 | 127 |
| 1989 | 66 | 257 | 0 | 78 | 0 | 165 | 39 | 282 | 0 | 0 |
| 1990 | 66 | 813 | 0 | 140 | 0 | 1,138 | 41 | 1,319 | 663 | 0 |
| 1991 | 108 | 221 | 0 | 24 | 0 | 0 | 0 | 24 | 0 | 0 |
| 1992 | 37 | 149 | 0 | 32 | 0 | 92 | 0 | 124 | 0 | 0 |
| 1993 | 125 | 1,121 | 0 | 57 | 0 | 212 | 0 | 269 | 0 | 0 |
| 1994 | 91 | 320 | 0 | 122 | 0 | 85 | 0 | 207 | 27 | 0 |
| 1995 | 78 | 272 | 0 | 10 | 0 | 84 | 0 | 94 | 38 | 0 |
| 1996 | 164 | 307 | 0 | 134 | 0 | 156 | 0 | 290 | 24 | 0 |
| 1997 | 75 | 166 | 0 | 11 | 0 | 11 | 0 | 22 | 0 | 0 |
| 1998 | 513 | 2,303 | 0 | 366 | 0 | 1,141 | 0 | 1,507 | 272 | 0 |
| 1999 | 64 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 452 | 0 |
| 2000 | 120 | 614 | 0 | 149 | 0 | 177 | 0 | 326 | 100 | 0 |
| 2001 | 44 | 205 | 0 | 117 | 0 | 0 | 0 | 117 | 32 | 0 |
| 2002 | 20 | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 |
| Avg 92-01 | 131 | 552 | 0 | 100 | 0 | 196 | 0 | 0 | 27 | 0 |
| Avg 97-01 | 163 | 671 | 0 | 129 | 0 | 266 | 0 | 394 | 171 | 0 |
| <u>Catches</u> | | | | | | | | | | |
| 1990 | 66 | 813 | 0 | 314 | 0 | 2,665 | 162 | 3,141 | 1,492 | 0 |
| 1991 | 108 | 221 | 0 | 24 | 0 | 0 | 0 | 24 | 0 | 0 |
| 1992 | 37 | 149 | 0 | 49 | 0 | 1,053 | 0 | 1,102 | 0 | 0 |
| 1993 | 125 | 1,121 | 0 | 57 | 0 | 403 | 0 | 460 | 44 | 0 |
| 1994 | 91 | 320 | 0 | 268 | 0 | 426 | 0 | 694 | 27 | 0 |
| 1995 | 78 | 272 | 0 | 10 | 0 | 225 | 22 | 257 | 38 | 0 |
| 1996 | 164 | 307 | 0 | 219 | 0 | 435 | 318 | 972 | 110 | 0 |
| 1997 | 75 | 166 | 0 | 11 | 0 | 22 | 290 | 323 | 0 | 20 |
| 1998 | 513 | 2,303 | 0 | 4,178 | 0 | 6,808 | 1,331 | 12,317 | 570 | 52 |
| 1999 | 64 | 66 | 0 | 72 | 0 | 0 | 0 | 72 | 965 | 0 |
| 2000 | 120 | 614 | 0 | 239 | 0 | 711 | 66 | 1,016 | 100 | 0 |
| 2001 | 44 | 205 | 0 | 117 | 0 | 34 | 0 | 151 | 32 | 0 |
| 2002 | 20 | 51 | 0 | 0 | 0 | 24 | 0 | 27 | 27 | 0 |
| Avg 92-01 | 131 | 552 | 0 | 522 | 0 | 1,012 | 203 | 1,736 | 189 | 7 |
| Avg 97-01 | 163 | 671 | 0 | 923 | 0 | 1,515 | 337 | 2,776 | 333 | 14 |

averaged 165 coho and 295 pink salmon. During years of high pink salmon abundance (even years) this species has dominated catches and harvests in most Nome roadside streams. Since 1998, strong returns of even year pink salmon have declined in the Nome sub-district, and catches in even years have also declined.

Recent Fishery Performance

The alternate year strong pink salmon run in Norton Sound have strongly influenced the salmon harvests in sport fisheries on road accessible streams prior to 2000. This relationship was strongest in the Nome River because of its proximity to Nome and ease of access to visitors and residents alike. Salmon harvests from the Nome River increased 10 fold between 1997 and 1998, and dropped 10 fold in 1999, reflecting the strong even-year pink salmon run in spite of a reduced amount of angler effort. Effort on the Nome River has dropped continuously from a high of 7,200 angler days in 1990 to about 1,000 angler days in 2001 (Table 11). Estimated effort nearly doubled to over 1,900 angler days in 2002. The increase in effort in 2002 may have been the result of an extended period of good weather during the summer of 2002. The pink salmon harvest of about 1,985 fish in 1998 was likely influenced by a strong run of 359,469 fish and reduced subsistence opportunity on depressed chum salmon stocks that likely focused local sport fishing effort on the abundant pink salmon, in part to meet the local need for salmon. In 2000 and 2002, only 578 and 312 pink salmon were estimated harvested from the Nome River. These lower harvests were likely influenced by the early season fishery closure in order to implement Tier II subsistence chum salmon fisheries, and lower escapements of 41,673 pink salmon in 2000 and 35,057 in 2002. The estimated harvest of coho salmon in the Nome River was about 220 fish, about 81% of the recent five-year average harvest of about 268 fish. The coho harvest has remained relatively stable over the past five years in spite of several emergency closures (Table 11). Chum salmon fishing has been closed for many years because of depressed stocks and both runs and harvests of sockeye and chinook salmon in the Nome River are negligible.

A declining trend in sport fishing effort was seen in the Fish/Niukluk River system from a high of about 4,000 angler days in 1993 to 1,344 angler days in 1998 (Table 12). However, in 1999, and 2000 effort increased to 4,825 angler days and 3,451 angler days respectively, suggesting a shift in effort away from the Nome subdistrict. Since then, estimated effort has declined to 2,526 angler days in 2001 and 1,805 angler days in 2002. Although sport fishing for chum salmon is allowed in this drainage, harvests of all salmon species were small in 2002. The estimated coho harvest in 2002 was about 300 fish from an estimated catch of 1,549 fish. The estimated chinook harvest was 75 fish, and the estimated pink salmon harvest was about 250 fish (Table 12). Negligible harvest of pink salmon occurred in 1998 and 2000 in spite of an abundant run of this species with over 1,500,000 counted past the tower in 1998, and 962,000 past the tower in 2000. The Pilgrim River is the other road accessible water where chum salmon fishing is still allowed. Effort there in 2002 was estimated at 562 angler days near the recent five-year average of about 600 angler days (Table 13). Recent harvests of salmon have been small, and no salmon were estimated harvested in 2002.

Sport Fishery Management Objectives

There have been no specific management objectives identified for salmon fisheries on the in Nome roadside streams. The goal of sport fishery management in the in these waters is to

Table 19.—Sport fish effort and harvests by species from the Sinuk River 1983-2002, and catches 1990-2002.

| Year | Number of Anglers | Days Fished | Salmon | | | | | All Salmon | Dolly Varden | Arctic Grayling | Whitefish |
|-----------------------|-------------------|-------------|--------|------|-----|-------|------|------------|--------------|-----------------|-----------|
| | | | King | Coho | Red | Pink | Chum | | | | |
| <u>Harvest</u> | | | | | | | | | | | |
| 1983 | 0 | 477 | 0 | 0 | 0 | 0 | 19 | 19 | 1,132 | 130 | 0 |
| 1984 | 306 | 366 | 0 | 234 | 26 | 1,272 | 143 | 1,675 | 844 | 428 | 0 |
| 1985 | 311 | 806 | 0 | 10 | 0 | 120 | 0 | 130 | 292 | 0 | 0 |
| 1986 | nd | Nd | nd | nd | nd | nd | nd | nd | nd | nd | nd |
| 1987 | 405 | 5,198 | 0 | 0 | 380 | 91 | 72 | 543 | 652 | 724 | 0 |
| 1988 | 464 | 1,055 | 73 | 91 | 0 | 946 | 146 | 1,256 | 146 | 73 | 0 |
| 1989 | 230 | 906 | 0 | 10 | 0 | 0 | 10 | 20 | 175 | 51 | 104 |
| 1990 | 116 | 343 | 0 | 12 | 0 | 0 | 14 | 26 | 17 | 0 | 0 |
| 1991 | 557 | 885 | 0 | 71 | 41 | 51 | 47 | 210 | 729 | 129 | 0 |
| 1992 | 436 | 1,504 | 0 | 40 | 0 | 293 | 0 | 333 | 139 | 0 | 0 |
| 1993 | 463 | 874 | 9 | 96 | 0 | 115 | 0 | 220 | 536 | 37 | 0 |
| 1994 | 463 | 1,132 | 0 | 109 | 0 | 145 | 0 | 254 | 305 | 8 | 0 |
| 1995 | 485 | 1,295 | 0 | 19 | 21 | 28 | 0 | 68 | 158 | 18 | 0 |
| 1996 | 376 | 553 | 0 | 189 | 8 | 285 | 0 | 482 | 485 | 97 | 0 |
| 1997 | 235 | 443 | 0 | 0 | 0 | 54 | 0 | 54 | 346 | 0 | 0 |
| 1998 | 75 | 123 | 0 | 0 | 0 | 0 | 0 | 0 | 311 | 8 | 0 |
| 1999 | 78 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 11 | 0 |
| 2000 | 155 | 294 | 0 | 11 | 0 | 10 | 0 | 21 | 59 | 0 | 0 |
| 2001 | 240 | 490 | 0 | 62 | 39 | 0 | 0 | 101 | 86 | 43 | 0 |
| 2002 | 191 | 1,324 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 103 | 0 |
| Avg 92-01 | 301 | 695 | 1 | 53 | 7 | 93 | 0 | 153 | 251 | 22 | 0 |
| Avg 97-01 | 157 | 319 | 0 | 15 | 8 | 13 | 0 | 35 | 178 | 12 | 0 |
| <u>Catches</u> | | | | | | | | | | | |
| 1990 | 116 | 343 | 0 | 12 | 0 | 0 | 406 | 418 | 66 | 232 | 0 |
| 1991 | 557 | 885 | 0 | 167 | 41 | 224 | 186 | 618 | 2,584 | 1,291 | 0 |
| 1992 | 436 | 1,504 | 0 | 65 | 0 | 1,429 | 15 | 1,509 | 770 | 300 | 0 |
| 1993 | 463 | 874 | 9 | 143 | 10 | 547 | 28 | 737 | 1,179 | 879 | 0 |
| 1994 | 463 | 1,132 | 0 | 172 | 0 | 348 | 22 | 542 | 830 | 417 | 0 |
| 1995 | 485 | 1,295 | 0 | 113 | 66 | 125 | 44 | 348 | 723 | 498 | 9 |
| 1996 | 376 | 553 | 0 | 246 | 8 | 736 | 200 | 1,190 | 618 | 339 | 0 |
| 1997 | 235 | 443 | 0 | 196 | 10 | 76 | 160 | 442 | 1,249 | 1,464 | 0 |
| 1998 | 75 | 123 | 0 | 0 | 0 | 0 | 0 | 0 | 311 | 25 | 0 |
| 1999 | 78 | 244 | 0 | 0 | 0 | 0 | 0 | 0 | 198 | 22 | 0 |
| 2000 | 155 | 294 | 0 | 21 | 0 | 21 | 12 | 54 | 95 | 26 | 0 |
| 2001 | 240 | 490 | 0 | 96 | 39 | 11 | 0 | 146 | 108 | 218 | 0 |
| 2002 | 191 | 1,324 | 0 | 53 | 0 | 0 | 23 | 76 | 74 | 432 | 20 |
| Avg 92-01 | 301 | 695 | 1 | 105 | 13 | 329 | 48 | 497 | 608 | 419 | 1 |
| Avg 97-01 | 157 | 319 | 0 | 63 | 10 | 22 | 34 | 128 | 392 | 351 | 0 |

maintain opportunity for anglers to participate in the fisheries and to assure that escapement goals are met. Sport fishery harvests are small, and emergency actions to restrict harvest are generally not contemplated unless escapement-monitoring projects indicate that the particular run is small and that restrictions in subsistence fisheries may be necessary. Biological Escapement Goals (BEGs) based aerial surveys are in place, and goals based on tower estimates (Snake and Pilgrim rivers), and weir counts (Nome River and Pilgrim River) will not be established until more years of reliable data have been accumulated.

Management History and Recent Board of Fisheries and Management Actions

Chum salmon stocks in the Nome area are depressed, and an effort to restore these runs is ongoing. Salmon sport fisheries in northwestern Alaska are managed in cooperation with the Division of Commercial Fisheries and subsistence uses are given priority. Since the availability of salmon resources is limited and local chum salmon populations are depressed, particularly in the Nome area where sport fishing effort is greatest, the Nome area has most often required restrictive management measures.

In 1984 the BOF reduced the bag and possession limits in the Nome and Snake rivers to 15 salmon other than king salmon, only 5 of which could be chum and coho in combination, and in 1985 all but the lower 2 miles of the Nome River was closed to all sport fishing for salmon by EO.

In 1987, additional regulations were adopted in Seward Peninsula drainages (Cape Prince of Wales to Cape Darby), which reduced the bag and possession limit for salmon other than chinook to 10 per day, 10 in possession, only 3 of which could be chum or coho salmon in combination. The limit for chinook salmon was set at 1 per day and in possession in Seward Peninsula drainages and in the Unalakleet River.

The Nome River was closed in July 1990 to the taking of chum salmon on sport fishing gear by EO, and in 1991, another EO closed Nome area waters to the retention of both chum and pink salmon. The area affected by this action was more widespread than in previous years and included all waters from the Sinuk River in the west to the Solomon River in the east.

Due to continued low escapements of chum salmon in Nome area streams, a proposal to close sport fishing for chum salmon in the rivers addressed in the 1991 EO was brought before the BOF and enacted into regulation. This regulation is intended to protect chum salmon stocks and will remain in effect until stocks recover and surpluses above the escapement goals and subsistence needs are available for harvest by sport anglers.

Two EOs were issued addressing salmon in the Nome area in 1992. The first closed the Tubutulik and Kwiniuk rivers to sport fishing for chum salmon. The second, because of near record pink salmon runs, increased the bag and possession limits for pink salmon from 10 per day to 20 per day in Nome area streams.

During the December 1997 meeting the BOF adopted two salmon regulation changes for the NWMA. The first established a uniform daily bag and possession limit for chinook salmon in the entire NWMA at one fish. This replaced a three fish (only one over 28 inches) daily bag and possession except for the Unalakleet River where a one fish limit was already in place. Since the Unalakleet River has the strongest chinook run in the NWMA, having a more liberal limit in other parts of the area where chinook runs were small made little sense. The other change was for northern Norton Sound and includes the streams accessible from the Nome road system. The

“other salmon” aggregate limit of 10 fish per day only 3 of which could be chum or coho was split out to provide separate daily bag and possession limits by species. The new limits were set at 10 pink, 3 coho, 3 chum, and 3 sockeye. The new regulation will provide for more precise management by species, and is less ambiguous for the inexperienced angler. Nome subdistrict streams still remain closed to fishing for chum salmon.

Because of weak coho runs throughout northern Norton Sound, an EO was issued on August 15, 1997 that mandated the release of all coho caught while sport fishing in northern Norton Sound waters, in addition, bait was eliminated as a legal gear while fishing for coho. This action remained in effect until September 30, 1997.

The BOF scheduled a special meeting in Nome for March 1998 to discuss the chum salmon situation in the Nome subdistrict. The BOF directed Nome area residents to create a Subsistence Salmon Working Group to address the issue of the chronic chum salmon shortage and consider the possibility of Tier-II management. The group did not recommend Tier-II management, however in the March 1999 meeting, the BOF directed the department to implement Tier II subsistence management for chum salmon in the Nome subdistrict.

In 2000, one EO affecting sport fishing for salmon was issued in northern Norton Sound. EO No. 3-SS-01-00 reduced the daily bag and possession limit for coho in most Nome Subdistrict streams and the Pilgrim River and closed the Eldorado, Flambeau and Solomon rivers to fishing for coho.

In 2001, four EOs were issued in the NWMA that affected salmon sport fishing. EO 3-S-01-01, effective June 15, closed the Nome Subdistrict to all sport fishing for salmon through July 31 in order that CFMD could implement a preseason subsistence closure prior to opening selected locations for Tier II subsistence fishing. EO 3-SS-01-01 reduced the coho salmon daily bag and possession limit from three salmon to one salmon in all waters between Cape Rodney and Topkok, and in the Pilgrim River effective August 21. On August 24, EO 3-SS-02-01 closed the Nome River to coho salmon fishing, and on August 28 because fish began to move into the Nome River in reasonable numbers, EO 3-SS-03-01 reopened the Nome River to a daily bag limit of one coho (Appendix D).

In 2002, four EOs were issued regarding sport fishing for salmon in the NWMA. EO 3-S-01-01, effective June 15, closed the Nome Subdistrict to all sport fishing for salmon through July 31 in order that CFMD could implement a preseason subsistence closure prior to opening selected locations for Tier II subsistence fishing. EO 3-PS-01-02 rescinded a portion of the former EO thereby opening pink salmon fishing east of Cape Nome with a normal daily bag and possession limit of 10 pink salmon. EO 3-SS-01-02, effective August 15, closed coho fishing in all Norton Sound drainages between Rocky Point and Cape Prince of Wales including the Pilgrim and Kuzitrin rivers, and reduced the daily bag and possession limit to one coho in the Fish/Niukluk drainage and the Unalakleet River. Effective August 31, EO 3-SS-02-02 opened the Nome River to coho fishing with a daily bag and possession limit of one fish (Appendix D).

In 2003, four EOs were issued regarding sport fishing for salmon in the NWMA. EO 3-S-01-01, effective June 10, closed the Nome Subdistrict to all sport fishing for salmon through July 31 in order that CFMD could implement a preseason subsistence closure prior to opening selected locations for Tier II subsistence fishing. EO KS-03-03, effective on July 3, prohibited the retention of king and chum salmon in the Unalakleet and Shaktoolik river drainages. EO 3-CS-01-03, effective July 19, prohibited the retention of chum salmon in the Fish and Niukluk river

drainages. EO 3-SS-01-03, effective August 21, closed coho fishing in all waters of Norton Sound from the Tisuk River to and including the Fish and Niukluk rivers, and in the Pilgrim and Kuzitrin rivers (Appendix D).

Current Issues

Chum salmon stocks have steadily declined on the Seward Peninsula since the early 1980s, as evidenced by failure to achieve desired spawning escapements in many key streams where spawners are enumerated. This has created the need for increasingly restrictive sport, commercial and even subsistence fishing regulations. It is anticipated that until chum salmon populations recover, there will be a need to continue with very restrictive measures to protect local stocks. All rivers in northern Norton Sound from the Sinuk in the west to Topkok in the east are closed to fishing for chum salmon, and will remain closed until runs rebuild. In addition, restrictions to the sport harvest of coho salmon in the Nome area have been necessary during recent years. Increased effort is being directed at the enumeration of coho salmon escapements in Nome area streams using tower and weir projects.

Ongoing Research and Management Activities

Current research and management activities on Nome roadside salmon populations are primarily conducted by the CFMD in conjunction with Kawarek Corporation's fisheries office. These groups cooperatively staff and manage escapement enumeration projects on the Niukluk, Eldorado, Pilgrim and Snake rivers. All projects are counting towers except the Nome River and Pilgrim rivers where weirs are operated by CFMD throughout the salmon runs. The weirs obstructs the movement of all fish, and fish are counted as they are permitted to pass through an opening in the weir several times each day. In addition, the BLM has operated a weir at the outlet of Glacial Lake from 2001 through 2003 to enumerate sockeye migrating into the lake.

NORTHWESTERN ALASKA DOLLY VARDEN AND ARCTIC CHAR

Fishery Description and Historical Perspective

In the Northwestern Management Area, Arctic char occur in lakes in the Kigluaik Mountains and in some headwater lakes in the Kobuk and Noatak river drainages, while Dolly Varden are common inhabitants of most coastal streams and large rivers (Figure 13). Although the department groups Dolly Varden and Arctic char for bag limits and record keeping, the two species are separate. Arctic char present only as lake resident populations, while Dolly Varden may be present as lake resident, stream resident, or anadromous populations. Arctic char distribution is very limited in the NWMA and the vast majority of char fisheries are directed toward Dolly Varden.

Many northwestern Alaska residents maintain a traditional lifestyle, and are dependent to some degree on locally harvested fish resources. Dolly Varden make up an important part of this traditional harvest, and in Kivalina they outrank salmon and whitefish in importance to the subsistence economy. The number of Dolly Varden harvested for subsistence purposes in northwestern Alaska vastly exceeds the number taken by sport anglers. Intermittent community subsistence harvest estimates dating to 1959 for Kivalina and Noatak (Table 20) and personal observation of the area biologist suggest that 15,000 to 25,000 Dolly Varden are harvested annually in this area, however, the actual magnitude of the annual harvests throughout the NWMA is not known. Fish are captured with gill nets or beach seines during open water periods, and with hook and line during winter. Dolly Varden are also an important subsistence resource in Norton Sound, however their relative importance is minor compared to salmon.

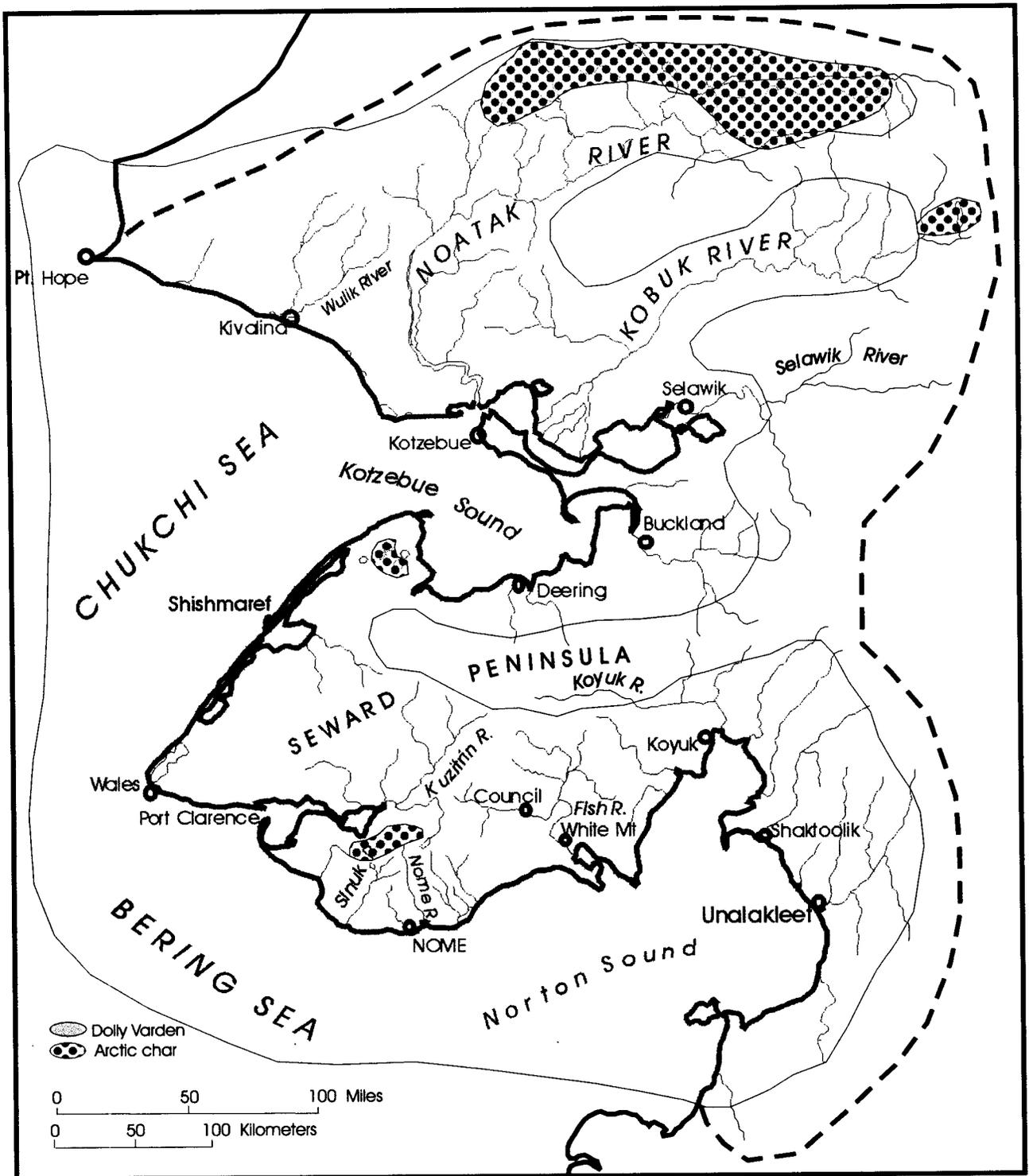


Figure 13.-Dolly Varden and Arctic char distribution in the NWMA.

Estimated harvests of Dolly Varden by sport anglers in the Seward Peninsula/Norton Sound sub-area have averaged about 4,600 fish over the past 10 years (Table 21). Observations and aerial surveys suggest that Dolly Varden spawner abundance is low in most rivers, however, spawning occurs in almost all drainages of Norton Sound, some northern Seward Peninsula rivers, and the major drainages of Kotzebue Sound and the Chukchi Sea. Aerial surveys of spawning Dolly Varden conducted during the mid 1980s indicated that about 12,000-15,000 spawn annually in the Noatak drainage (Table 22). Total abundance of spawning Dolly Varden in northwestern Alaska is unknown, however, recent surveys suggest that spawner abundance in Noatak River streams may be declining.

Drainages of Kotzebue Sound and the Chukchi Sea are known for the large size of anadromous Dolly Varden available to the sport angler. Since the inception of ADF&G's Trophy Fish Program in 1967, out of 219 qualifying fish in the Dolly Varden/Arctic char category, 140 (66%) have come from the NWMA, and in the past 10 years (1992-2001) 107 out of 119 (90%) have come from northwestern Alaska. In addition, the current Alaska sport fish angling record for Arctic char/Dolly Varden (27 lbs. 4 oz.) was a Dolly Varden taken from the Wulik River in 2002, surpassing the previous record of 20 lbs. 12 oz taken from the same river in 2000.

During summer, spawning Dolly Varden are caught in some northwestern Alaskan streams, however, most sport fisheries for char target overwintering populations of Dolly Varden either in the fall as they enter freshwater from the sea, or in the spring as they move toward the sea for feeding. Since overwintering populations are composed of mixed stocks, potentially from a wide geographic area, harvests in the few rivers with good angler access have been sustainable. In some streams along the Nome road system, if similar harvests were directed towards a single stock they would likely not be sustainable. Movements of Norton Sound Dolly Varden are tied to those of salmon, and Dolly Varden are sometimes present in streams during late summer to feed on salmon eggs, especially during years of high pink salmon abundance. They are likely to remain in streams during the spring following a large pink salmon run in order to feed on abundant outmigrating fry. The timing of the fall movement of Dolly Varden into Seward Peninsula streams has varied widely over the past 10 years resulting in annual changes in the availability of Dolly Varden to the fall fishery. Fisheries and harvests in this area follow these patterns of availability. In 1988, the BOF adopted the bag limit of 10 Dolly Varden/Arctic char per day with 10 in possession with exceptions for the Noatak, Wulik, and Kivalina rivers where only 2 of the 10 fish could be over 20 inches in length. In 1994, the BOF adopted the current daily bag and possession limits for char in the AYK region with 10 fish per day, only 2 over 20 inches allowed in marine or flowing waters; and 2 fish per day (no size limit) allowed in lakes. Due to habitat preferences, these regulations allow a liberal limit for Dolly Varden while protecting spawning fish, and a conservative limit for Arctic char without the need for anglers to differentiate between these two closely related species.

Recent Fishery Performance

Sport harvests of Dolly Varden/Arctic char have averaged about 1,000 Dolly Varden annually in the Kotzebue/Chukchi Sea sub-area, and about 4,500 in the Seward Peninsula/Norton Sound sub-area (Table 23). Estimated mean annual catch (which includes fish that are kept and those released) since 1992 has been about 12,100 Dolly Varden in the Seward Peninsula/Norton Sound area, and 7,500 in the Kotzebue/Chukchi Sea area (Table 21). During the past 5-years, data

Table 20.-Documented subsistence harvests of Dolly Varden in Noatak and Kivalina.

| Year | Kivalina | | Noatak Number |
|-------------------|-----------|----------------------|---------------------|
| | Number | Pounds | |
| 1959 | 34,240 | 85,600 ^a | |
| 1960 | 49,720 | 124,300 ^a | |
| 1962 | | | 27,623 ^b |
| 1963 | | | 4,130 |
| 1964 | | 93,995 | |
| 1965 | | 28,140 | |
| 1968 | 49,512 | 120,214 | |
| 1969 | 64,970 | 152,750 | 32,350 |
| 1970 | 33,820 | 79,420 | 3,700 |
| 1971 | 29,281 | 68,518 | 5,320 |
| 1972 | 48,807 | 114,637 | 1,492 |
| 1979 ^c | 14,600 | | |
| 1980 | | | 9,060 |
| 1981 ^c | 15-18,000 | | 7,220 |
| 1982 ^c | 18,438 | 69,059 | 3,056 |
| 1983 ^c | 16,270 | 68,467 | 2,676 |
| 1984 ^c | 12,000 | | 4,545 |
| 1985 ^c | 10,500 | | 2,542 |
| 1986 ^c | 7,436 | | |
| 1991 | | | 4,814 ^d |
| 1992 | | | 4,395 ^d |
| 1993 | | | 4,275 ^d |
| 1995 | | | 5,762 ^d |
| 1996 | | | 5,031 ^d |
| 1997 | | | 4,763 ^d |
| 1998 | | | 3,872 ^d |
| 1999 | | | |
| 2000 | | | 3,315 |
| 2001 | | | 2,702 |
| 2002 | | | 3,242 |

^a Sarrio and Kessel 1966

^b Foote and Williamson 1966

^c Data from Sport Fish Division surveys.

^d Data from ADF&G Subsistence Division household surveys Georgette and Utermohle 1998.

Table 21.—Historic Dolly Varden harvests and catches in NWMA by sub-area, 1977-2002.

| Year | Seward Peninsula/Norton Sound | | | | | Kotzebue/Chukchi Sea | | | | |
|-------------|-------------------------------|--------------------|----------------------|--------------------|-------------|----------------------|--------------------|----------------------|--------------------|-------------|
| | Number of Anglers | Effort Angler Days | Dolly Varden Harvest | Dolly Varden Catch | % Harvested | Number of Anglers | Effort Angler Days | Dolly Varden Harvest | Dolly Varden Catch | % Harvested |
| 1977 | | 7,828 | 1,621 | | | | 3,487 | 469 | | |
| 1978 | | 8,379 | 1,690 | | | | 4,997 | 199 | | |
| 1979 | | 8,725 | | | | | 2,593 | 1,772 | | |
| 1980 | | 7,958 | 5,811 | | | | 3,841 | 301 | | |
| 1981 | | 10,879 | 3,981 | | | | 5,284 | 1,177 | | |
| 1982 | | 13,198 | 6,498 | | | | 6,906 | 1,531 | | |
| 1983 | | 16,944 | 9,779 | | | | 7,963 | 2,192 | | |
| 1984 | 1,597 | 17,436 | 4,260 | | | 696 | 7,791 | 3,804 | | |
| 1985 | 2,854 | 19,919 | 5,695 | | | 1,788 | 6,701 | 1,557 | | |
| 1986 | 2,872 | 18,107 | 5,381 | | | 1,570 | 6,313 | 1,300 | | |
| 1987 | 2,528 | 20,413 | 5,506 | | | 2,090 | 9,288 | 1,072 | | |
| 1988 | 2,661 | 20,278 | 4,437 | | | 959 | 5,279 | 983 | | |
| 1989 | 2,560 | 17,692 | 7,003 | | | 1,028 | 4,932 | 999 | | |
| 1990 | 2,686 | 21,799 | 3,765 | 9,118 | 41 | 991 | 3,782 | 806 | 3,747 | 22 |
| 1991 | 3,236 | 23,622 | 10,365 | 25,425 | 41 | 1,606 | 9,543 | 1,149 | 1,658 | 69 |
| 1992 | 3,540 | 22,684 | 2,382 | 6,012 | 40 | 1,421 | 6,145 | 582 | 7,054 | 8 |
| 1993 | 3,134 | 18,930 | 5,907 | 22,166 | 27 | 1,575 | 7,809 | 914 | 7,190 | 13 |
| 1994 | 3,016 | 18,922 | 3,071 | 7,344 | 42 | 1,100 | 6,036 | 2,365 | 10,733 | 22 |
| 1995 | 3,719 | 19,647 | 2,908 | 7,921 | 37 | 1,957 | 8,495 | 939 | 7,804 | 12 |
| 1996 | 2,958 | 13,783 | 4,285 | 8,427 | 51 | 1,407 | 5,571 | 913 | 5,376 | 17 |
| 1997 | 2,773 | 13,850 | 4,467 | 17,988 | 25 | 824 | 3,729 | 598 | 7,346 | 8 |
| 1998 | 3,206 | 13,616 | 2,240 | 5,711 | 39 | 1,089 | 3,801 | 440 | 8,606 | 5 |
| 1999 | 3,124 | 15,006 | 6,708 | 21,428 | 31 | 1,313 | 6,771 | 796 | 8,259 | 10 |
| 2000 | 2,713 | 18,559 | 7,952 | 16,348 | 49 | 1,387 | 7,129 | 1,599 | 8,031 | 20 |
| 2001 | 2,371 | 10,955 | 3,174 | 7,395 | 43 | 1,177 | 5,904 | 1,693 | 4766 | 36 |
| 2002 | 2,743 | 18,325 | 2,252 | 7,877 | 29 | 1,064 | 6,417 | 1,884 | 6,552 | 29 |
| Avg (92-01) | 3,055 | 16,595 | 4,309 | 12,074 | 38 | 1,325 | 6,139 | 1,084 | 7,517 | 29 |
| Avg (97-01) | 2,837 | 14,397 | 4,908 | 13,774 | 37 | 1,158 | 5,467 | 1,025 | 7,402 | 16 |

Table 22.—Aerial counts of Dolly Varden spawning in the Noatak River and overwintering in the Wulik and Kivalina rivers, 1968-2002.

| Year | Spawners | | Nonspawners | |
|------|--------------------|-------------|----------------|--|
| | Noatak River | Wulik River | Kivalina River | |
| 1968 | | 90,286 | 27,640 | |
| 1969 | | 297,257 | nd | |
| 1976 | | 68,300 | 12,600 | |
| 1979 | | 55,030 | 15,744 | |
| 1980 | | 113,553 | 39,692 | |
| 1981 | 7,922 | 101,826 | 45,355 | |
| 1982 | 8,275 | 65,581 | 10,932 | |
| 1984 | 9,290 | 30,923 | 5,474 | |
| 1985 | 11,073 | nd | nd | |
| 1986 | nd | 5,590 | 5,030 | |
| 1988 | nd | 80,000 | nd | |
| 1989 | nd | 56,384 | nd | |
| 1990 | 7,261 | nd | nd | |
| 1991 | 9,605 | 126,985 | 35,275 | |
| 1992 | nd | 135,135 | nd | |
| 1993 | 9,560 | 144,138 | 16,534 | |
| 1994 | nd | 66,752 | nd | |
| 1995 | 6,500 | 128,705 | 28,870 | |
| 1996 | 12,184 | 61,005 | nd | |
| 1997 | nd | 95,412 | nd | |
| 1998 | nd | 104,043 | nd | |
| 1999 | 9,636 | 70,704 | nd | |
| 2000 | nd | nd | nd | |
| 2001 | nd | 92,614 | nd | |
| 2002 | 3,655 ^a | 44,257 | nd | |

^a Only Kelly River and part of Kugururok River counted.

nd = no data

suggest that about 63% of all Dolly Varden captured in the Seward Peninsula/Norton Sound area are released while about 84% in the Kotzebue area are released. The higher harvest rate in the Seward Peninsula/Norton Sound area is likely because local residents have good road access to fishing areas where fish taken on rod and reel are used for food. In the Kotzebue area, fishing sites are accessed by aircraft or raft and much of the effort is from outside the local area by anglers seeking a quality fishing experience. Estimated sport fishing effort levels in both the Seward Peninsula/Norton Sound area and the Kotzebue have been fairly consistent over the past five years. Estimated catches of Dolly Varden in the Seward Peninsula/Norton Sound sub-area increased dramatically from 5,700 in 1998 to 21,000 in 1999 but declined to about 7,500 fish in 2001 and 2002. Catches have remained stable in the Kotzebue/Chukchi Sea sub-area within the range of 5,000 to 8,500 fish over the past 5 years (Table 21). The catch of Dolly Varden per angler day has averaged much higher in the Kotzebue area than in the Seward Peninsula area. This is likely because much of the effort on the Seward Peninsula is directed at other species, while most of the Kotzebue area effort is directed at Dolly Varden. The Kotzebue area seems to be attracting more visiting anglers seeking to catch large northern form Dolly Varden.

Dolly Varden harvests in the Seward Peninsula/Norton Sound sub-area are distributed among most of the sampled rivers with highest harvests coming from the Nome, Unalakleet, Solomon and Fish/Niukluk rivers (Table 23). In the Kotzebue/Chukchi Sea sub-area, highest harvests are from the Noatak and the “other rivers” category that includes the Wulik and Kivalina rivers.

Wulik River

The Wulik River is located about 90 miles north of Kotzebue and is well known as a “char” fishing destination (Figure 7). The river is about 90 miles long and enters the Chukchi Sea through Kivalina Lagoon near the village of Kivalina. Dolly Varden from the Wulik River are heavily used for subsistence by the residents of Kivalina (Table 20). During the most recent five-year period (1997-2002), estimated sport fishing effort has averaged about 500 angler-days (Howe et al. 1995-2001a-d, Walker et al. 2003, Jennings et al. *in prep* a and b). Sport fishing occurs throughout the open water period, but the majority of effort and harvest occurs during late August and September when Dolly Varden return from the sea to winter in the river.

Estimated sport harvest during 2000 was 138 fish (Jennings et al. *in prep* b) with the 2002 catch estimated at 2,139 Dolly Varden. Approximately 61% of the catch was of fish greater than 20 inches in length. Estimated effort on the Wulik River more than doubled between 1998 and 1999 to almost 750 angler days, but dropped to 336 angler days in 2000 and was estimated at 610 angler days in 2002. Local reports suggest that effort may have increased in 2003. Although the river is well known for its large run of anadromous Dolly Varden, effort remains relatively low because of the river’s remote location and difficulty of access.

Fishery Objectives and Management

Management of Dolly Varden in Norton Sound streams is structured to maintain opportunity and allow a relatively liberal bag on mixed stock population aggregations. In the Kotzebue sub-area, the intent is to maintain a high quality fishery with the opportunity to harvest a small number of large sized char under a conservative bag that protects the spawning component of the population, minimizes conflicts with subsistence users, and does not adversely affect the population structure. Because of the differential size structure of the population groups north and south of the Bering Strait, these objectives can be addressed with the same general bag and possession limit regulation of 10 fish per day with only 2 over 20 inches in length.

Table 23.—Historic Dolly Varden and Arctic char harvests in the NWMA by sub-area and river, 1987-2002.

| Areas | Year | | | | | | | | | | | | |
|--|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| <u>Seward Peninsula/Norton Sound Historic Dolly Varden and Arctic Char Harvests</u> | | | | | | | | | | | | | |
| Salt Water | 0 | 418 | 55 | 183 | 0 | 204 | 205 | 90 | 0 | 12 | 189 | 0 | 330 |
| Nome River | | 2,001 | 3,551 | 1,078 | 1,220 | 557 | 917 | 431 | 462 | 873 | 328 | 302 | 791 |
| Pilgrim River | | 327 | 603 | 166 | 856 | 131 | 448 | 63 | 74 | 388 | 65 | 14 | 45 |
| Unalakleet R. | | 891 | 570 | 614 | 1,474 | 746 | 427 | 410 | 976 | 1,506 | 936 | 588 | 2,384 |
| Fish-Niukluk R. | | 0 | 734 | 348 | 1,474 | 270 | 1,003 | 699 | 346 | 402 | 2,071 | 160 | 1,952 |
| Sinuk R. | | | | | 729 | 139 | 536 | 305 | 158 | 485 | 346 | 311 | 88 |
| Snake R. | | | | | 1,252 | 115 | 331 | 117 | 131 | 97 | 81 | 0 | 44 |
| Solomon R. | | | | | 2,219 | 131 | 893 | 197 | 366 | 49 | 186 | 383 | 154 |
| Other Streams | 5,506 | 1,218 | 1,545 | 1,227 | 1,141 | 89 | 1,050 | 759 | 395 | 473 | 265 | 482 | 920 |
| Lakes ^a | | 0 | 0 | 332 | 0 | 0 | 97 | 0 | 0 | 0 | 0 | 0 | 0 |
| Freshwater Total | 5,506 | 4,437 | 7,003 | 3,765 | 10,365 | 2,178 | 5,702 | 2,981 | 2,908 | 4,273 | 4,278 | 2,240 | 6,378 |
| Grand Total | 5,506 | 4,855 | 7,058 | 3,948 | 10,365 | 2,382 | 5,907 | 3,071 | 2,908 | 4,285 | 4,467 | 2,240 | 6,708 |
| <u>Kotzebue/Chukchi Sea Historic Dolly Varden and Arctic Char Harvests</u> | | | | | | | | | | | | | |
| Salt Water | 148 | 0 | 0 | 0 | 199 | 0 | 0 | 27 | 22 | 0 | 28 | 0 | 0 |
| Kobuk R. | 127 | | 23 | 34 | 170 | 99 | 9 | 132 | 28 | 172 | 82 | 49 | 49 |
| Noatak R. | 844 | | 651 | 386 | 936 | 197 | 325 | 786 | 124 | 632 | 139 | 175 | 255 |
| Other Streams | 401 | 965 | 302 | 302 | 412 | 279 | 533 | 1,402 | 676 | 97 | 347 | 216 | 181 |
| Lakes ^a | 0 | 18 | 23 | 471 | 0 | 107 | 47 | 18 | 0 | 12 | 0 | 0 | 22 |
| Freshwater Total | 1,372 | 983 | 999 | 1,193 | 1,518 | 682 | 914 | 2,338 | 828 | 913 | 568 | 440 | 507 |
| Grand Total | 1,520 | 983 | 999 | 1,193 | 1,717 | 682 | 914 | 2,365 | 850 | 913 | 596 | 440 | 507 |

-continued-

Table 23.–Page 2 of 2.

| Areas | Year | | | Average | |
|--|-------|-------|-------|---------|---------|
| | 2000 | 2001 | 2002 | (92-01) | (97-01) |
| <u>Seward Peninsula/Norton Sound Historic Dolly Varden and Arctic Char Harvests</u> | | | | | |
| Salt Water | 1,069 | 166 | 67 | 227 | 351 |
| Nome River | 340 | 43 | 511 | 504 | 361 |
| Pilgrim River | 0 | 270 | 72 | 150 | 79 |
| Unalakleet R | 4,462 | 1,002 | 789 | 1,344 | 1,874 |
| Fish-Niukluk R. | 1,687 | 1,197 | 259 | 979 | 1,413 |
| Sinuk R. | 59 | 86 | 47 | 251 | 178 |
| Snake R. | 199 | 108 | 18 | 122 | 86 |
| Solomon R. | 0 | 162 | 18 | 252 | 177 |
| Other Streams | 136 | 140 | 471 | 471 | 389 |
| Lakes ^a | 0 | 0 | 0 | 10 | 0 |
| Freshwater Total | 6,883 | 3,008 | 2,185 | 4,083 | 4,557 |
| Grand Total | 7,952 | 3,174 | 2,252 | 4,309 | 4,908 |
| <u>Kotzebue/Chukchi Sea Historic Dolly Varden and Arctic Char Harvests</u> | | | | | |
| Salt Water | 281 | 108 | 18 | 47 | 83 |
| Kobuk R. | 47 | 79 | 197 | 75 | 61 |
| Noatak R. | 763 | 1,026 | 1,495 | 442 | 472 |
| Other Streams | 467 | 430 | 174 | 463 | 328 |
| Lakes ^a | 41 | 50 | 0 | 30 | 23 |
| Freshwater Total | 1,318 | 1,585 | 1,866 | 1,009 | 884 |
| Grand Total | 1,599 | 1,693 | 1,884 | 1,056 | 967 |

^a Lake totals are for Arctic char

Fishery Outlook

Dolly Varden in Norton Sound are widespread, they spawn in most rivers and overwinter in all major drainages. The outlook is for fisheries to continue into the future without further management actions unless the participation in the fisheries changes dramatically. In the Kotzebue area, the fishery is likely to grow in popularity as more anglers experience these high quality-fishing opportunities. Until these fisheries grow to the point that harvests are thought to affect spawner abundance, spawner success, or population structure, it is unlikely that additional management actions will be necessary. Lower than average spawning escapements into Noatak River tributaries in 2002 and 2003 may indicate a change in population structure. These will be monitored in the future to determine if this trend continues.

Recent Board of Fisheries and Management Actions

Population assessments conducted on the Nome and Solomon rivers in 1991 and 1992 suggested that the number of fish overwintering in these drainages could not sustain harvest levels occurring at that time. Consequently, the daily bag limit was reduced by EO to two fish. Subsequent studies showed that these populations were composed of mixed stocks and that at least 20% of the fish overwintering in a given river could be expected to overwinter in a different river the next year. Tag recoveries showed that fish ranged over a wide geographic area. Since exploitation occurs primarily on mixed stocks in only a few locations and many of the represented stocks sustain no other exploitation, harvest levels were thought to be sustainable. Long-term harvest data supported this assumption and the reduced bag limit was rescinded. In the November 1994 meeting, the BOF adopted regulations that created a 10 fish with only 2 over 20 inches daily bag and possession limit for Dolly Varden/Arctic char in flowing and marine waters for the entire AYK Region. A separate daily bag limit of 2 fish (no size limit) was also created for lakes. The effects of these new bag limits are to have a fairly liberal limit for resident and migratory Dolly Varden that protects spawning sized fish, while maintaining a conservative limit for lake resident Arctic char without requiring anglers to differentiate between these two closely related species. This bag limit has not needed to be adjusted, and no recent EOs have been issued regarding char in NWMA.

Current Issues

With over 100,000 anadromous Dolly Varden overwintering annually, the Wulik River is probably the most important Dolly Varden stream in northwestern Alaska (Table 22). Fish from this river are also very important as a subsistence food to the residents of Kivalina who harvest 15,000 to 20,000 annually (Table 20). The Red Dog Mine is located in the headwaters of this drainage and poses a potential threat to these fish and the water quality of the river. Water quality near the mine is systematically monitored and except for a pollution event in 1989-1990 that has been corrected, the mine has operated in an environmentally sensitive manner. The Red Dog Mine funds a program run by the Alaska Department of Natural Resources (ADNR) to monitor heavy metals concentrations in receiving waters and in fish tissues. Fish tissues are sampled for heavy metals in the spring and the fall each year on a continuing basis in cooperation with the ADNR. The recent discovery of additional new ore bodies will add new challenges to mineral development in this important drainage.

The question of how great an impact Dolly Varden have on salmon, especially chum salmon populations that have been depressed in Norton Sound for several years, has been raised by

Nome residents in a number of public meetings. The department has no data concerning the possible effects of Dolly Varden egg predation on salmon numbers, however there has been no detectable increase in Dolly Varden numbers in Norton Sound to account for increased predation activity, and Dolly Varden have not been found to be significant predators on chum salmon in published predation studies.

Ongoing Research and Management Activities

The ADF&G began an effort to assess Dolly Varden populations in waters of the Seward Peninsula in 1991. Abundances and size compositions have been estimated for Dolly Varden overwintering in the Nome River in 1991 and 1992, and in the Solomon River in 1991. In addition, the movement of marked fish from the Nome River in 1991 to other rivers in 1992 was estimated (DeCicco 1992a, 1993a). These data in combination with harvest estimates and observed changes in abundances have been used to guide ADF&G management activities. It has been learned that Dolly Varden that overwinter in a particular stream may overwinter in other streams during subsequent years. Hence, a restrictive bag limit in one stream does not necessarily protect a single stock because fish range widely and stocks mix over a broad geographic area. Periodic assessment of Dolly Varden populations will continue as needed. During the winter of 2000/2001 Dolly Varden were radio tagged in the Nome and Solomon rivers in order to document the critical wintering areas in these rivers (DeCicco 2001).

Studies in the Kotzebue area have continued intermittently since 1967, but in recent years have been limited to counting spawning Dolly Varden in Noatak River tributary streams with the assistance of the National Park Service (NPS), and counting Dolly Varden overwintering in the Wulik River with the assistance of the ADNR. Data on the abundance of Dolly Varden spawning in the Noatak River system and overwintering in the Wulik River will continue to be collected in cooperation with these other agencies. A genetics study funded through the USFWS Office of Subsistence Management to determine the relationships among stocks north and south of the Bering Strait has begun, and a detailed study of a single spawning stock in the Noatak drainage was begun in 2001. The results of the genetic study should be available in the summer of 2004, and the spawning stock assessment project was never completed because of high water conditions during critical times of fish movement in both 2001 and 2002. In October 2003, Dolly Varden were radio tagged in the Wulik River to determine movement over the course of the winter.

NORTHWESTERN ALASKA ARCTIC GRAYLING

Fishery Description and Historical Perspective

Arctic grayling are the most numerous species harvested in the Kotzebue/Chukchi Sea sub-area and the third or fourth most commonly harvested species in the Seward Peninsula/Norton Sound sub-area. In general, the sport fisheries for grayling in the northwestern area are small with average estimated annual harvests of 1,100 in the Seward Peninsula/Norton Sound sub-area and 1,500 in the Kotzebue/Chukchi Sea sub-area (Tables 24 and 25).

The Seward Peninsula has long been known for its production of large Arctic grayling with approximately 25% of all trophy grayling registered with the department's trophy fish program coming from this area. However, most populations are quite small and since they are resident in separate, often small streams, they must be managed as independent units with regulations tailored to the individual populations or groups of similarly structured populations.

Since 1989, the stock status of grayling populations in several rivers where sport fishing occurs on the Seward Peninsula has been investigated (DeCicco 1990, 1991, 1992b, 1993b, 1994-1999 and 2002; DeCicco and Wallendorf 2000). The Nome River stock was found to be overexploited, while the Niukluk, Fish, Pilgrim, Snake and Sinuk rivers populations are believed to be sustaining current levels of harvest. The Solomon River was found to have a very small Arctic grayling population.

Grayling densities in most Seward Peninsula rivers are low. They ranged from about 40 to 60 grayling per mile in the Nome and Sinuk rivers, to about 200 grayling per mile in the Pilgrim River. Densities in the Niukluk and Fish rivers were higher at about 375 and 185 grayling per mile respectively in 1991. More recent data have shown that density in the Niukluk River increased to about 470 grayling per mile in 1998 while density in the Fish River was estimated at about 500 grayling per mile in 1999. In contrast, interior Alaskan populations often exceed 500 fish per mile. Average size of grayling from rivers on the Seward Peninsula is generally large and they are generally older and larger when they first spawn than grayling in interior Alaska streams. Arctic grayling from northwestern Alaska can live for more than 20 years, a grayling from the Eldorado River was recently aged over 30 years. Some grayling may survive to grow very large, particularly in rivers where fishing effort is light. For example, in the lightly exploited Sinuk River almost 70% of the 1991 sample was age-8 or older and the average total length of all fish sampled was over 18 inches. However, the density of fish was low, approaching that of the Nome River, which has been the most heavily fished stream in the area and has a depressed grayling population.

Populations of grayling in the Kotzebue area are inaccessible by road and are lightly exploited. Arctic Grayling occur in almost all streams of the area, and in many of the lakes as well. Most grayling in this area are captured in association with wilderness float trips or as an alternate species in trips directed toward fishing for Dolly Varden or sheefish. Over the past five years the estimated harvest rates have been about 15% of those captured (Table 25).

Prior to 1988, the daily bag limit for Arctic grayling in the NWMA was 15 with only 2 over 20 inches. In 1988, the BOF established a separate daily bag and possession limit for Arctic grayling in Northern Norton Sound of 5 per day, with only one over 15 inches. The effect of this change is reflected in harvest estimates that averaged about 4,300 grayling annually from 1980-1988, but dropped to about 1,550 from 1990-2000. Measurable increases in populations in the Fish and Niukluk rivers were likely due to this regulatory change. Both populations nearly doubled in abundance when compared to estimates from the early 1990s.

Recent Fishery Performance

Seward Peninsula/Norton Sound Sub-area

Estimated harvests of Arctic grayling by sport anglers in the Seward Peninsula/Norton Sound area have been declining since a high of 5,121 reached in 1991. Since then, harvests have averaged about 1,100 per year (Table 24). Estimated harvests have recently trended downward, from about 1,600 in 1993 to about 300 in 1998. Since then estimated harvests have ranged between 1,000 and 1,600 Arctic grayling annually. The estimated catch of Arctic grayling

Table 24.—Historic Arctic grayling harvests and catches in Seward Peninsula/Norton Sound waters, 1987-2002.

| Areas | Year | | | | | | | | | | | | |
|------------------|-------|-------|-------|-------|--------|-------|--------|-------|-------|--------|--------|--------|--------|
| | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Harvests | | | | | | | | | | | | | |
| Salt Water | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 131 | 0 | 0 | 0 | 0 | 0 |
| Nome River | | 891 | 2,032 | 33 | 186 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 |
| Pilgrim River | | 109 | 516 | 415 | 445 | 91 | 75 | 49 | 52 | 73 | 81 | 0 | 11 |
| Unalakleet R. | | | 142 | 99 | 1,708 | 98 | 131 | 353 | 291 | 420 | 210 | 144 | 277 |
| Fish-Niukluk R. | | 1,237 | 748 | 415 | 1,320 | 128 | 585 | 506 | 404 | 313 | 734 | 16 | 1,029 |
| Sinuk R. | | | | | 129 | 0 | 37 | 8 | 18 | 97 | 0 | 8 | 11 |
| Snake R. | | | | | 402 | 16 | 467 | 32 | 18 | 121 | 0 | 8 | 113 |
| Solomon R. | | | | | 158 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Streams | 4,600 | 2,636 | 767 | 416 | 773 | 159 | 289 | 236 | 254 | 461 | 236 | 122 | 159 |
| Lakes | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Freshwater Total | 4,600 | 4,873 | 4,205 | 1,378 | 5,121 | 492 | 1,584 | 1,200 | 1,037 | 1,485 | 1,261 | 298 | 1,600 |
| Grand Total | 4,600 | 4,928 | 4,205 | 1,378 | 5,121 | 492 | 1,584 | 1,331 | 1,037 | 1,485 | 1,261 | 298 | 1,600 |
| Catches | | | | | | | | | | | | | |
| Salt Water | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nome River | | | | 613 | 1,363 | 90 | 569 | 1,111 | 571 | 497 | 569 | 207 | 300 |
| Pilgrim River | | | | 1,476 | 4,463 | 526 | 2,362 | 266 | 370 | 821 | 429 | 65 | 694 |
| Unalakleet R. | | | | 448 | 4,104 | 1,459 | 874 | 1,639 | 1,471 | 1,694 | 4,918 | 3,256 | 6,089 |
| Fish-Niukluk R. | | | | 2,189 | 7,261 | 2,171 | 5,976 | 2,389 | 1,169 | 4,653 | 10,452 | 8,159 | 7,414 |
| Sinuk R. | | | | 232 | 1,291 | 300 | 879 | 417 | 498 | 339 | 1,464 | 25 | 22 |
| Snake R. | | | | 199 | 2,096 | 158 | 1,614 | 377 | 887 | 1,055 | 123 | 218 | 723 |
| Solomon R. | | | | 33 | 602 | 38 | 140 | 212 | 200 | 97 | 703 | 0 | 21 |
| Other Streams | | | | 929 | 1,980 | 1,030 | 809 | 670 | 622 | 1,250 | 1,529 | 1,570 | 869 |
| Lakes | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Freshwater Total | | | | 6,119 | 23,160 | 5,772 | 13,223 | 7,081 | 5,788 | 10,406 | 20,187 | 13,500 | 16,133 |
| Grand Total | | | | 6,119 | 23,160 | 5,772 | 13,223 | 7,081 | 5,788 | 10,406 | 20,187 | 13,500 | 16,133 |

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Table 24.–Page 2 of 2.

| Areas | Year | | | Average | |
|------------------|--------|-------|--------|---------|---------|
| | 2000 | 2001 | 2002 | (92-01) | (97-01) |
| Harvests | | | | | |
| Salt Water | 0 | 0 | 0 | 13 | 16 |
| Nome River | 0 | 0 | 0 | 2 | 2 |
| Pilgrim River | 58 | 43 | 31 | 53 | 46 |
| Unalakleet R | 538 | 247 | 773 | 271 | 310 |
| Fish-Niukluk R. | 442 | 430 | 452 | 459 | 484 |
| Sinuk R. | 0 | 43 | 103 | 22 | 23 |
| Snake R. | 16 | 63 | 110 | 85 | 46 |
| Solomon R. | 0 | 0 | 0 | 0 | 0 |
| Other Streams | 149 | 168 | 96 | 223 | 223 |
| Lakes | 0 | 0 | 0 | 0 | 0 |
| Freshwater Total | 1,203 | 994 | 1,565 | 1,115 | 1,135 |
| Grand Total | 1,203 | 994 | 1,565 | 1,129 | 1,151 |
| Catches | | | | | |
| Salt Water | 0 | 0 | 0 | 0 | 0 |
| Nome River | 10 | 60 | 735 | 398 | 416 |
| Pilgrim River | 221 | 403 | 144 | 616 | 409 |
| Unalakleet R | 6,814 | 2,331 | 4,229 | 3,055 | 3,527 |
| Fish-Niukluk R. | 1,701 | 3,972 | 6,87 | 4,806 | 4,989 |
| Sinuk R. | 29 | 218 | 432 | 419 | 377 |
| Snake R. | 449 | 1,385 | 279 | 699 | 652 |
| Solomon R. | 853 | 0 | 0 | 226 | 261 |
| Other Streams | 992 | 1,098 | 351 | 1,044 | 1,075 |
| Lakes | 0 | 0 | 0 | 0 | 0 |
| Freshwater Total | 11,069 | 9,467 | 12,757 | 11,263 | 11,704 |
| Grand Total | 11,069 | 9,467 | 12,757 | 11,263 | 11,704 |

Table 25.—Historic Arctic grayling harvests and catches in the Kotzebue Sound/Chukchi Sea sub-area, 1989-2002.

| Area | Year | | | | | | | | | | |
|------------------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|--------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Harvests | | | | | | | | | | | |
| Salt Water | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| Kobuk R. | 268 | 67 | 446 | 255 | 305 | 178 | 383 | 513 | 476 | 1,729 | 672 |
| Noatak R. | 912 | 269 | 817 | 105 | 322 | 407 | 185 | 1,136 | 872 | 42 | 412 |
| Other Streams | 150 | 286 | 631 | 248 | 234 | 186 | 263 | 393 | 555 | 0 | 97 |
| Lakes | 85 | 0 | 87 | 360 | 55 | 33 | 79 | 94 | 0 | 17 | 66 |
| Freshwater Total | 1,415 | 622 | 1,981 | 968 | 916 | 804 | 910 | 2,136 | 1,903 | 1,788 | 1,247 |
| Grand Total | 1,415 | 622 | 1,981 | 968 | 916 | 814 | 910 | 2,136 | 1,903 | 1,788 | 1,247 |
| Catches | | | | | | | | | | | |
| Salt Water | | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 |
| Kobuk R. | | 790 | 1,535 | 1,593 | 1,717 | 1,593 | 5,146 | 2,469 | 2,815 | 5,280 | 6,680 |
| Noatak R. | | 1,462 | 2,402 | 1,112 | 1,718 | 842 | 1,114 | 3,886 | 2,179 | 964 | 3,621 |
| Other Streams | | 1,076 | 1,264 | 738 | 3,151 | 2,653 | 7,921 | 3,516 | 3,182 | 548 | 5,114 |
| Lakes | | 0 | 174 | 1,548 | 642 | 374 | 1,560 | 1,306 | 216 | 404 | 66 |
| Freshwater Total | | 3,328 | 5,375 | 4,991 | 7,228 | 5,462 | 15,741 | 11,177 | 8,392 | 7,196 | 15,481 |
| Grand Total | | 3,328 | 5,375 | 4,991 | 7,228 | 5,472 | 15,741 | 11,177 | 8,392 | 7,196 | 15,481 |

-continued-

Table 25.–Page 2 of 2.

| Area | Year | | | Average | |
|------------------|-------|-------|--------|---------|---------|
| | 2000 | 2001 | 2002 | (92-01) | (97-01) |
| Harvests | | | | | |
| Salt Water | 0 | 0 | 0 | 1 | 0 |
| Kobuk R. | 836 | 355 | 1,674 | 570 | 814 |
| Noatak R. | 223 | 620 | 79 | 432 | 434 |
| Other Streams | 45 | 111 | 233 | 213 | 162 |
| Lakes | 129 | 158 | 8 | 99 | 74 |
| Freshwater Total | 1,233 | 1,244 | 1,994 | 1,315 | 1,483 |
| Grand Total | 1,233 | 1,244 | 1,994 | 1,316 | 1,483 |
| Catches | | | | | |
| Salt Water | 0 | 0 | 0 | 1 | 0 |
| Kobuk R. | 5,753 | 4,103 | 18,080 | 3,715 | 4,926 |
| Noatak R. | 1,668 | 2,123 | 452 | 1,923 | 2,111 |
| Other Streams | 1,934 | 975 | 2,703 | 2,973 | 2,351 |
| Lakes | 376 | 171 | 460 | 666 | 247 |
| Freshwater Total | 9,731 | 7,372 | 21,695 | 9,277 | 9,634 |
| Grand Total | 9,731 | 7,372 | 21,695 | 9,278 | 9,634 |

tripled from 6,342 in 1996 to 20,117 in 1997, dropping in 1998 to 12,408 fish and rebounding to 16,000 in 1999. Since then estimated catches have ranged from 9,500 to about 13,000. It appears that catch-and-release practices are increasing in these grayling fisheries. The percentage of captured grayling that were harvested averaged about 17% from 1993 through 1996 and dropped to about 2.4% during 1998. However, this has stabilized at 10-12% over the past four years.

Current exploitation rates on most northwestern Alaska grayling populations are unknown, but since most are in remote areas, exploitation is believed to be light. Some estimates of exploitation in Nome area roadside streams are available by combining harvest data with abundance data. Using these data for years with abundance estimates, exploitation rates of Arctic grayling have been estimated to range from 10 to 20% in some streams during the early 1990s. More recent estimates for the Niukluk and Fish rivers suggest that annual exploitation in these streams has been <5% over the past ten years. These data suggest a change in angler motivation toward enjoyment of a quality fishing experience, away from harvest as a primary reason for fishing.

Kotzebue Sub-area

In the Kotzebue/Chukchi Sea sub-area, harvests over the past five years have ranged between 900 and 2,100 fish (Table 25). Catches over the same period have ranged quite widely from about 16,000 in 1995 to about 7,200 in 1998. The percentage of catch that was harvested has ranged from about 37% in 1992 to 6% in 1995. It has averaged about 15% annually over the past five years. Most grayling from this area are harvested in association with float trips or for variety, while fishing for other species. It is likely that harvests will remain relatively stable until participation in this area increases significantly.

Fishery Objectives and Management

Research on the status of resident Arctic grayling populations in the rivers accessible by the road system in northern Norton Sound has been ongoing for about 15 years. Arctic grayling in northwestern Alaska may live for more than 20 years and attain a large size. They spawn in the spring and the summer is spent feeding to recover condition in order to be able to spawn the next year. Data on population abundance, age, and size composition by river throughout this period has allowed the development of regulations tailored to individual rivers or groups of rivers that share population characteristics. Overall management objectives for these Arctic grayling populations are to maintain the historic abundance of fish >15 inches in length in populations, and to allow for population recovery in systems that have been stressed by over exploitation. Maintaining the opportunity to participate in high quality Arctic grayling fisheries is also an objective of management. The background daily bag and possession limits are 5 fish per day with only 1 over 15 inches (Appendix C). This bag limit is appropriate for drainages with Arctic grayling populations that have characteristics of lightly exploited populations. These characteristics include large average size and a high proportion of sexually mature fish that are seven years of age or older in the population. Abundance is related more to the river's size and flow characteristics, therefore, both abundance and population density vary by river. Rivers that share these characteristics and regulations include the Fish/Niukluk River system, the Eldorado, Kuzitrin and Sinuk rivers. On the other extreme are over exploited populations where abundance is very low. Rivers like the Nome and Solomon are in this category. These rivers are closed to all fishing for Arctic grayling. Populations intermediate between these two categories include those in the Pilgrim and Snake rivers. These populations contain a smaller proportion of

sexually mature fish, have been impacted somewhat by harvest, but Arctic grayling are still relatively abundant and populations appear stable. In these rivers the regulations allow harvest of 2 Arctic grayling per day with only 1 over 15 inches. Populations are assessed periodically to estimate whether they are maintaining desired characteristics.

Management objectives have not been developed for remote Arctic grayling waters of the remainder of the Seward Peninsula or the Kotzebue sub-area. Anglers rarely visit these waters, and populations are in pristine condition. The general regulations for these waters provide for a liberal daily bag and possession limit of 10 fish with no size limits. Until effort and harvests increase, it is likely that regulations will remain unchanged. A region-wide Arctic grayling management plan is being developed by the department, and will be presented to the BOF in January 2003.

Fishery Outlook

Northwestern Alaska, particularly Seward Peninsula waters provide some of the best opportunities in the state to capture large sized Arctic grayling. Large, sexually mature fish dominate many populations. Populations are managed to maintain this size structure by limiting the harvest of large fish. The result is a quality Arctic grayling fishing opportunity. The outlook for these fisheries to be maintained is favorable. Populations in the Fish and Niukluk rivers have recovered from relatively low levels of abundance in the early 1990s, and the outlook in these rivers is exceptional. Populations in both the Snake and Sinuk River are slightly larger than when last assessed and appear to be sustaining current levels of exploitation

Recent Board of Fisheries and Management Actions

In 1992 the daily bag and possession limit for Arctic grayling in the Pilgrim River was reduced to 2 per day with only 1 over 15 inches, and the Nome and Solomon rivers were closed to fishing for Arctic grayling by emergency order. In 1993, the daily bag and possession limit in the Snake River was made the same as that in the Pilgrim River. In the 1994 meeting, the BOF adopted these bag limit changes for the Snake and Pilgrim rivers into regulation. After a population assessment in the Nome River in 1997 found that the population had not increased after five years of emergency closure, the BOF adopted regulations closing the Nome and Solomon rivers to fishing for Arctic grayling. In 2000 the BOF also closed these rivers to subsistence fishing for Arctic grayling. There are no proposals regarding Arctic grayling in the NWMA that will be considered at the January 2004 BOF meeting.

Current Issues

There is concern on the part of the public and ADF&G staff that populations of grayling in the vicinity of Nome that are road accessible, especially the Nome and Solomon rivers, have been over exploited and may not recover for many years. The Nome River population showed no increase over the past five years. An experimental restoration project in 1998 to increase survival of young-of-the-year Arctic grayling by rearing them in a gravel pit failed. Additional restoration efforts have been underway during the past two years using a different rearing pond. In 2002 and 2003 1,574 pen-reared Arctic grayling were released into the Nome River. The population will be assessed in 2005 to estimate its abundance and the contribution of pen-reared fish to the population. Other road accessible populations would be vulnerable to over exploitation if fishing practices and motivations were to change, however, at this time other populations appear to be healthy, and able to sustain the current low levels of harvest. The Nome and Solomon rivers have been closed to sport fishing for Arctic grayling since 1992. In

1999, these rivers were closed to the subsistence fishing for Arctic grayling by EO, and they were closed by the BOF in 2000.

Ongoing Research and Management Activities

The ADF&G began an ongoing active effort to assess Arctic grayling populations in waters of the Seward Peninsula in 1989. Abundance and age and size compositions have been estimated for Arctic grayling in the Fish, Niukluk, Nome, Pilgrim, Snake and Sinuk rivers. These data in combination with harvest estimates and observed changes in abundance or size or age compositions have been used to guide ADF&G management activities. Special regulations in some streams and the closure of both the Solomon and Nome rivers to grayling have resulted. Assessments of the Nome River grayling population in 1997 and 2000 found that it had not recovered even with years of closure to sport fishing. This project has shown the need to close these rivers to all harvest of Arctic grayling. Stock assessment in the Fish and Niukluk rivers in 1998 and 1999 found that grayling populations had increased significantly since the early 1990s. These changes are likely a delayed effect of regulation changes made in 1988. Arctic grayling populations in the Snake and the Sinuk rivers have been assessed in the past two years. Both populations were found to be maintaining both their length structure and abundance suggesting that they are able to sustain current levels of harvest. A management plan has been developed to address Nome roadside Arctic grayling fisheries (Appendix E), and a region-wide Arctic grayling management plan is being developed.

KOTZEBUE SOUND SHEEFISH

Fishery Description and Historical Perspective

Within the NWMA, except for a small population of sheefish that resides in the Koyuk River of Norton Bay, spawning stocks of sheefish occur only in the Kobuk and Selawik rivers (Alt 1975).

The drainages of Kotzebue Sound are known for the large size of sheefish that are available to the sport angler. These remote high quality sport fisheries, and are considered by many to be some of the "crown jewels" of Alaskan freshwater sport fishing. Since the inception of ADF&G's Trophy Fish Program in 1967, all but one of the qualifying sheefish has come from the Kobuk River.

Kotzebue Sound sheefish are distributed throughout the nearshore estuarine areas of Kotzebue Sound. The major concentration is in Hotham Inlet but a few fish occur in the Sheshalik and Krusenstern areas as well as in southern Kotzebue Sound, especially in summer (Figure 14). Nearly all sheefish occupying the estuarine environment during summer are immature or nonspawning adults, while adult prespawning fish move upstream during summer on the Kobuk and Selawik rivers to spawn just before freeze-up in the fall. The Kobuk River stock with 32,000 to 43,000 spawning in 1995-1996 (Taube 1997, Taube and Wuttig 1998) is the largest and most heavily utilized. They spawn upstream from the village of Kobuk, with the greatest observed concentrations between the Maneluk River and Beaver River. After spawning is complete in late September, fish disperse to downstream overwintering areas. Abundance of sheefish spawning in the Selawik River was estimated at about 5,200 fish during 1995 and 1996 (Underwood et al. 1998). Tag recoveries showed that these stocks mixed in Hotham Inlet winter habitats, but maintained fidelity to their spawning areas.

Sport fisheries for sheefish are managed by the Sport Fish Division of ADF&G. Subsistence fisheries are given priority and are currently unrestricted. The commercial fishery and much of the subsistence harvest takes place through the ice while sport fisheries are mainly summer and

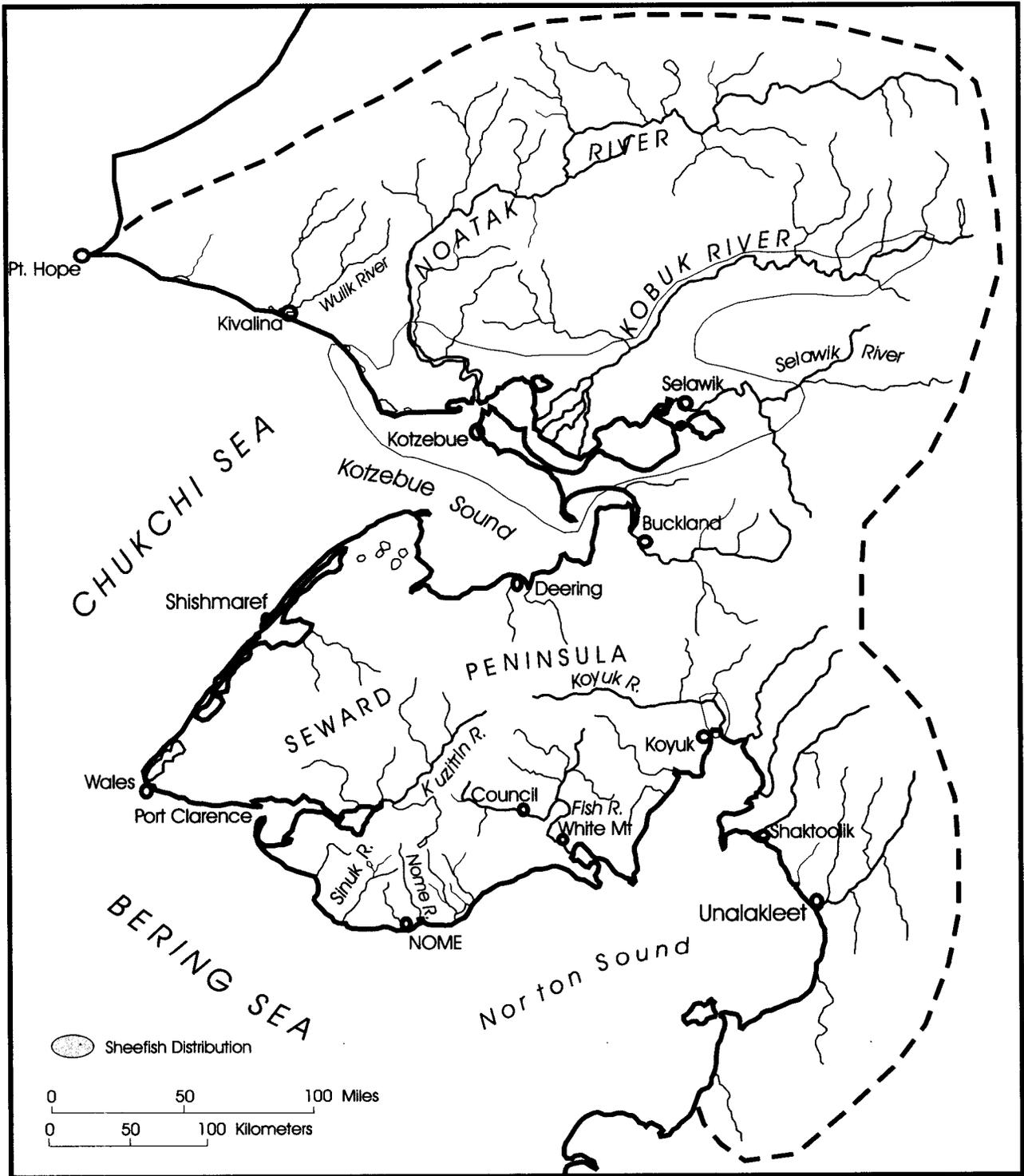


Figure 14.-Sheefish distribution in the NWMA.

fall activities. The same population(s) contributes to all harvests. The annual commercial sales of sheefish in Kotzebue have ranged from 200 to 850 fish since 1991 (Brennan et al. 1998, 1999). The magnitude of the subsistence harvest in the villages of the Kobuk River was estimated at about 7,000 in 1996 (Georgette and Utermohle 1997), 9,800 in 1997, 5,350 in 1998 and 8,526 in 1999. In 2000, the estimated harvest was 7,446 sheefish (Table 26). All villages were not surveyed during 2001 and 2002. The estimated Kobuk River harvest in 2001, excluding Amber, was 3,838 sheefish, and in 2002, the harvest from Noorvik alone was estimated at 4,310 sheefish. Since subsistence practices have not changed appreciably in recent years, it is likely that Kobuk River subsistence harvests have been relatively stable at, or near, these levels. Winter gill net harvests from the fishery near Kotzebue were estimated at about 15,000 in 1995-1996, and about 14,000 in 1996-1997 (Taube 1997, Taube and Wuttig 1998). During the winter of 2000/2001, a complete census of participants in the winter fishery documented the harvest at 14,533 (Savereide 2002). Sheefish are also taken by jigging lures under the ice in Hotham Inlet and Selawik Lake, but harvests are undocumented. Overall it is likely that 20,000-30,000 sheefish are taken for subsistence annually in northwestern Alaska.

The Sport Fish Division of ADF&G conducted studies of the ecology, movements, and growth of sheefish between 1966 and 1979. Much of this work was conducted in northwestern Alaska and was summarized by Alt (1987). After some familiarization work in 1994, ADF&G Division of Sport Fish in cooperation with the National Park Service (NPS), began a project to estimate abundance of sheefish spawning in the Kobuk River. This project continued through 1997 and established base line estimates on spawner abundance, age, size and sex composition of the spawning population. Tag recovery data indicated that, although some sheefish were capable of spawning in consecutive years, most spawned every other year. The U. S. Fish and Wildlife Service (Underwood et al. 1998) estimated the abundance of sheefish spawning in the Selawik River at 5,200 in 1995 and 5,150 in 1996.

Most sheefish sport fishing effort occurs on the Kobuk River spawning population. Most of the area-wide subsistence harvest and the entire commercial harvest of sheefish occur on the entire (spawners and nonspawners) population. When taken in isolation, recent sport harvests of about 900 fish annually are easily sustainable (Table 27). Although spawner abundances have recently been estimated, the total size of the area wide population is not known, and the sport harvest must be viewed in relation to other ongoing harvests. It was always assumed that subsistence harvests are much greater than either commercial or sport harvests, and recent data support this assumption. Taube and Wuttig (1998) estimated the under ice gill net harvest in Hotham Inlet near Kotzebue at 13,704 fish in the winter of 1997/98, similar to the 2001/2002 harvest of 14,533 documented by Savereide (2002). In order to ensure sustained yields from these population(s), a management approach involving the subsistence and commercial fisheries for sheefish is recommended. Sheefish are very fecund fish with some large females containing over 400,000 eggs. Such populations may be subject to episodic recruitment events depending on environmental conditions. If spawner abundances are maintained above some threshold level, intermittent years of good recruitment should carry the population through years when environmental conditions are less favorable.

Recent Fishery Performance

Estimated annual sport harvests of sheefish by anglers in northwestern Alaska since 1977 have fluctuated from a high of about 1,900 to a low of about 145 with an average annual harvest of about 900 fish over the past 10 years (Table 27). The harvest in 2002 was estimated at 500

Table 26.— Historic subsistence harvests of sheefish from northwest Alaska waters, 1966-2002^a.

| Year | Number of Fishermen Interviewed | Reported Harvest | Average Catch Per Household | Hotham Inlet Winter Harvest |
|------------------------|---------------------------------|--------------------|-----------------------------|-----------------------------|
| 1966-67 | 135 | 22,400 | 166 | |
| 1967-78 | 146 | 31,293 | 214 | |
| 1968-69 | 144 | 11,872 | 82 | |
| 1970 | 168 | 13,928 | 83 | |
| 1971 | 155 | 13,583 | 88 | |
| 1972 | 79 | 3,832 | 49 | |
| 1973 | 65 | 4,883 | 75 | |
| 1974 | 58 | 1,062 | 18 | |
| 1975 | 69 | 1,637 | 24 | |
| 1976 | 57 | 966 | 17 | |
| 1977 | 95 | 1,810 | 19 | |
| 1978 | 95 | 1,810 | 19 | |
| 1979 | 75 | 3,985 | 53 | |
| 1980 | 74 | 3,117 | 42 | |
| 1981 | 62 | 6,651 | 107 | |
| 5/82-4/83 ^b | 430 | 4,704 | 36 | |
| 5/83-4/84 ^b | 27 | 764 | 28 | |
| 5/84-9/84 ^b | 30 | 2,803 | 93 | |
| 1985 ^c | 2 | 60 | 30 | |
| 1986 ^{b, c} | 72 | 721 | 10 | |
| 1987 ^c | 46 | 276 | 6 | |
| 1988 ^{c, d} | | | | |
| 1989 ^d | | | | |
| 1990 ^d | | | | |
| 1991 | 40 | 2,180 | 55 | |
| 1992 | 43 | 2,821 | 66 | |
| 1993 ^d | | | | |
| 1994 | 171 | 3,181 ^e | 84 | |
| 1995 | 314 | 9,465 ^e | 24.6 | 15,161 ^f |
| 1996 | 389 | 6,465 ^e | 18 | 13,704 ^f |
| 1997 | 338 | 9,805 ^e | 24.6 | |
| 1998 | 435 | 5,350 ^e | 13.6 | |
| 1999 | 191 | 8,256 ^e | 18.6 | |
| 2000 | 237 | 7,446 ^e | 16.6 | 14,533 ^f |
| 2001 | 257 | 3,838 ^e | 10.6 | |
| 2002 | 115 | 4,310 ^f | 37.5 | |

^a Due to limited survey effort during many years, total catch and effort are minimums and are not comparable among years. Data from Brennan et al. 1999.

^b Summer harvests only.

^c Data from fall subsistence salmon surveys may include summer and winter harvests.

^d Subsistence sheefish harvests not documented.

^e Reported harvests from Kobuk River villages only.

^f Data from Sport Fish Division harvest estimates.

Table 27.—Historic sport fish catches and harvests of sheefish from northwest Alaska waters, 1977-2002.

| Year | Kotzebue/Chukchi Sea Sub-area | | | | | | | | |
|-----------|-------------------------------|-------|-------------|-------------|-------|-------------|---------------|-------|-------------|
| | Sheefish | | | Kobuk River | | | Selawik River | | |
| | Harvest | Catch | % Harvested | Harvest | Catch | % Harvested | Harvest | Catch | % Harvested |
| 1977 | 656 | | | | | | | | |
| 1978 | 506 | | | | | | | | |
| 1979 | 709 | | | | | | | | |
| 1980 | 1,713 | | | | | | | | |
| 1981 | 1,263 | | | 1,015 | | | | | |
| 1982 | 2,222 | | | 1,886 | | | | | |
| 1983 | 2,079 | | | 1,448 | | | | | |
| 1984 | 3,050 | | | | | | | | |
| 1985 | 1,645 | | | 1,330 | | | | | |
| 1986 | 3,363 | | | 1,590 | | | | | |
| 1987 | 1,836 | | | 865 | | | | | |
| 1988 | 964 | | | 964 | | | | | |
| 1989 | 629 | | | 131 | | | | | |
| 1990 | 151 | 403 | 37 | 151 | 336 | 44.9 | 0 | 0 | 0 |
| 1991 | 603 | 1,616 | 37 | 579 | 1,568 | 36.9 | 24 | 48 | 50.0 |
| 1992 | 1,904 | 3,678 | 52 | 627 | 2,034 | 30.8 | 411 | 411 | 100.0 |
| 1993 | 1,029 | 2,273 | 45 | 395 | 1,074 | 36.8 | 111 | 111 | 100.0 |
| 1994 | 564 | 958 | 59 | 135 | 386 | 35.0 | 95 | 95 | 100.0 |
| 1995 | 1,142 | 3,270 | 35 | 748 | 2,669 | 28.0 | 38 | 47 | 80.9 |
| 1996 | 485 | 3,183 | 15 | 360 | 2,850 | 12.6 | 94 | 271 | 34.7 |
| 1997 | 906 | 2,341 | 39 | 318 | 1,334 | 23.8 | 108 | 108 | 100.0 |
| 1998 | 414 | 924 | 45 | 145 | 617 | 23.5 | 148 | 186 | 79.6 |
| 1999 | 635 | 5,134 | 12 | 621 | 5,070 | 12.2 | nd | nd | nd |
| 2000 | 1,201 | 3,372 | 36 | 362 | 2,338 | 15.5 | 0 | 0 | 0 |
| 2001 | 1,305 | 5,146 | 25.4 | 552 | 4,105 | 13.4 | 0 | 0 | 0.0 |
| 2002 | 500 | 1,996 | 25.1 | 352 | 1,710 | 20.6 | 119 | 239 | 49.8 |
| 92-01 Avg | 959 | 3,028 | 36 | 426 | 2,248 | 23 | 112 | 137 | 66 |
| 97-01 Avg | 892 | 3,383 | 31 | 400 | 2,693 | 18 | 64 | 74 | 45 |

sheefish, and the most recent five year (1997-2001) average harvest has been about 960 sheefish. In addition to harvests, catches have been estimated through the SWHS since 1990. Estimates of sheefish catch (which includes fish that are kept and those released) for the past five years was about 3,400 fish, indicating that about 70% of all sheefish captured in northwestern Alaska by sport anglers are released. In a 1997 hook and release study, the mortality of sheefish caught and released on sport fishing gear was found to be low, 3.3% for treble hook lures, and 1.7% for single hook lures (Stuby and Taube 1998). Overall mortality was 2.4%. The Kobuk River is probably the most popular sheefish destination in North America, and people from the world over go there to fish for this unique species. In spite of the worldwide reputation of this destination, the level of fishing effort is still quite low. An estimated 572 anglers fished for a total of 3,286 angler-days on the Kobuk River during 2002. The Kobuk River accounted for half of the overall estimated freshwater sport fishing effort in the Kotzebue sub-area (6,417 angler-days) in 2002.

Fishery Objectives and Management

The Kobuk River sheefish fishery is managed to maintain opportunity to participate in this unique high-quality sport fishery while keeping harvests from spawning areas low. In order to accommodate local use of this resource downstream from major spawning areas, the daily bag limit is generous downstream from the Mauneluk River, 10 sheefish per day (Appendix C). In the spawning area upstream from the Mauneluk River, only two fish per day are allowed to be harvested or in possession. The majority of anglers visiting the Kobuk River for sheefish, use the area upstream from the Mauneluk River.

Fishery Outlook

The outlook for sheefish fisheries in northwestern Alaska is good in the immediate future. Although overall harvest levels are substantial, populations appear to be healthy, spawner abundances are high and sport harvests are low.

Recent Board of Fisheries and Management Actions

During 1988, the Board of Fisheries adopted the current regulations for sheefish in the waters of northwestern Alaska: 10 fish per day and 10 in possession, with an exception for the Kobuk River upstream of the Mauneluk River where only 2 sheefish may be caught per day or possessed. The ADF&G believes that these regulations are sufficient to allow ample opportunity for sport fishing, yet keep harvests of spawning fish low. The 10 fish limit in the lower Kobuk River and the remainder of the management area is liberal enough to allow local fishermen who choose to catch sheefish on sport fishing tackle the opportunity to take sheefish without the need to fish with nets. During the December 2000 meeting, the BOF reduced the sheefish daily bag and possession limit in spawning areas on the Selawik River to two sheefish. This made regulations on the Selawik River consistent with those already in place on the Kobuk. Another sheefish proposal that would have eliminated catch and release of sheefish was not supported.

Current Issues

Local Alaska Native residents of Kobuk River villages have expressed concern over some practices of sport anglers on the upper Kobuk River in the vicinity of the sheefish spawning grounds. Catch-and-release fishing is considered by some local residents to be disrespectful and damaging to the fish. Discarding filleted carcasses in the water is thought to drive other sheefish away from the area. The ADF&G Division of Subsistence investigated local concerns in the upper Kobuk River in 1986 and determined that some concerns could be addressed if sport

fishers were more aware of local customs and culture. Catch-and-release fishing is viewed as a conservation tool by ADF&G and by many anglers and although sheefish may be sensitive to rough handling, the department has demonstrated that they can be released without significant mortality. An educational brochure explaining proper hook and release techniques for sheefish has been developed in association with the NPS. This brochure has been made available to those fishing on the upper Kobuk River. It is hoped that with proper handling, impacts of catch and release fishing to the spawning population can be minimized.

Because the subsistence component of the harvest is high, and some sheefish spawning areas are located within federally managed lands, the possibility exists that federal subsistence management in these areas may affect sportfishing opportunity there. This issue may be addressed in the future as the USFWS Office of Subsistence Management becomes more involved with active management of fisheries in remote areas of Alaska.

Ongoing Research and Management Activities

The department believes that recent research conducted cooperatively with the USFWS and the NPS has provided substantial background data on spawner abundance for the two stocks comprising the Kobuk-Selawik sheefish population. These data will be used as a base line to which future population assessments can be compared. Additional studies to monitor harvests may be planned. Current low levels of sport fishing harvest are unlikely to affect sustained yields of this species in northwestern Alaska. A study to document the winter subsistence harvest of sheefish in Kotzebue Sound was completed in 2001 (Savereide 2002). This study was funded through the USFWS Office of Subsistence Management.

NORTHWESTERN ALASKA NORTHERN PIKE

Fishery Description and Historical Perspective

Northern pike are present throughout the northern regions of the world. They are primarily a freshwater resident species, but are known to enter weakly brackish waters in the Baltic and in some other areas. The known distribution of northern pike in northwestern Alaska is shown in Figure 15.

Northern pike occur in most of the lakes and flowing waters of the Noatak and Kobuk rivers and are particularly common in wetlands of the lower reaches, delta areas, and in lakes in lowland areas adjacent to these rivers. Northern pike are also common residents of the waters along the western shores of Hotham Inlet, Selawik Lake and the entire Selawik lowland area. They occur in the lower portions of the Buckland River drainage, and may be present in some other lakes and streams on the northern Seward Peninsula. On the remainder of the Seward Peninsula, northern pike are common residents of Imuruk Basin and the middle and lower reaches of the Pilgrim and Kuzitrin rivers. These two adjacent drainages form a large interconnected wetland area (approximately 380 km²) in their lower reaches. In addition there is another large wetland area (approximately 650 km²) farther upstream in the Kuzitrin River drainage. Northern pike are also found in the Fish River drainage and have even been observed in the fast clear waters of the Niukluk River downstream from Council. They occur in the Koyuk River and may be present in the Kwik River near Moses Point, but are not known to be present in other Norton Sound drainages.

The majority of northern pike harvested in northwestern Alaska are taken for subsistence. Few community harvest estimates are available, however, in 1986, 5,750 northern pike were estimated to have been harvested by the community of Kotzebue. During the mid 1980s a

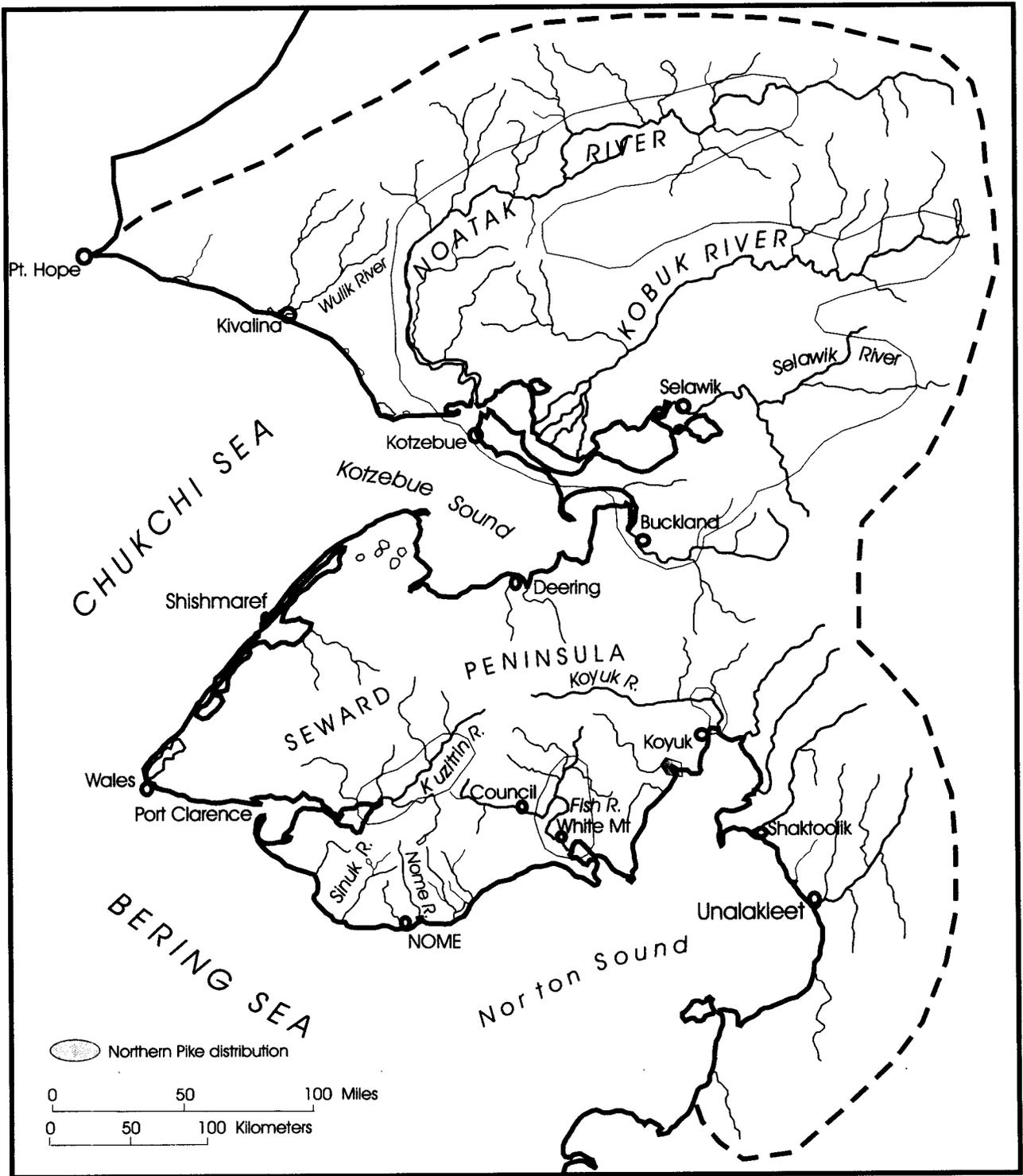


Figure 15.-Northern pike distribution in the NWMA.

commercial freshwater fishery occurred near Selawik. In 1985, the USFWS estimated that the spring subsistence/commercial harvest (only some of the fish were sold) of northern pike was between 5,671 and 9,138 fish. Currently, without the commercial fishery, the annual harvest at Selawik is still likely several thousand northern pike. Northern pike are also harvested by residents of the lower Kobuk River villages of Noorvik and Kiana, and the residents of Teller who fish in Imuruk Basin drainages. Additional harvests of northern pike may take place near other area villages. The total annual northwestern Alaska northern pike subsistence harvest is likely 10,000 to 15,000 fish.

Sport fisheries for northern pike occur around Kotzebue in lakes in the lower Noatak and Kobuk river drainages, but participation and harvests are low. The average annual estimated harvest of northern pike in the Kotzebue sub-area of NWMA during the past five years (1997-2001) was about 200 fish (Table 28). In the Seward Peninsula/Norton Sound sub-area, virtually the entire harvest of northern pike comes from Imuruk Basin drainages, and most of that from the Kuzitrin or lower Pilgrim rivers. The estimated annual harvest of northern pike over the past five years (1997-2001) was about 300 fish (Table 28).

Recent Fishery Performance

Estimated harvests of northern pike by sport anglers on the Seward Peninsula have averaged about 400 fish over the past 10-years, with the largest annual harvest estimated at nearly 2,000 in 1990 (Table 28). The estimated average annual harvest for the past five years was about 300 fish, and the 2002 estimated harvest was 329 fish. Estimates of catch (which includes fish that are kept and those released) since 1990 indicate that about 81% of all pike caught in the past ten years have been released. It is assumed that anglers are selectively retaining larger sized northern pike. During 1992 and 1993 the abundance of northern pike in the lower Pilgrim and Kuzitrin rivers was estimated at about 10,000 fish over 300 mm (12 in) in length for the portion of the population inhabiting these rivers from the road crossings downstream to their confluence (Burkholder 1993, 1994). Northern pike populations have been estimated to sustain annual harvests >15% (Pearse and Hansen 1993). Current exploitation of the Pilgrim-Kuzitrin population appears to be less than 5%, which is well within what are thought to be sustainable levels.

Estimated sport harvests of northern pike in the Noatak-Kobuk-Selawik area of northwestern Alaska have averaged about 256 fish over the last 10-years (Table 28). Estimated harvests reached a high of 2,752 fish in 1986, and a low of 64 fish in 1989. The estimated harvest in 2005 was about 158 fish, the highest harvest since 1993. The average annual harvest for the past five years has also been about 180 fish. Since assessment of northern pike populations has not been carried out in this area of northwestern Alaska, the health of populations and relative influence of harvests can only be inferred by comparing the area to other parts of Alaska. The amount of suitable northern pike habitat in the Noatak-Kobuk-Selawik area is much greater (by approximately 50 times) than that available to northern pike in the Pilgrim-Kuzitrin area, and the sport harvests are much lower. It is unlikely that sport fisheries are adversely impacting northern pike populations, even when taken in addition to subsistence harvests.

Fishery Management Objectives

There are no specific management objectives for northern pike fisheries in NWMA. Regulations are liberal and management is structured to encourage participation. Liberal regulations provide the opportunity for rural residents to harvest northern pike with rod and reel within the sport

Table 28.—Historic northern pike harvests and catches in NWMA by sub-area, 1977-2002.

| Year | Seward Peninsula/Norton Sound sub-area | | | | | Kotzebue/Chukchi Sea sub-area | | | | |
|-------------|--|--------|---------------|-------|---------|-------------------------------|---------|---------------|-------|----|
| | Number | Effort | Northern Pike | | % | Number | Effort | Northern Pike | | % |
| | of | Angler | Harvest | Catch | | of | Angler | Harvest | Catch | |
| | Anglers | Days | | | Anglers | Days | Harvest | | | |
| 1977 | | 7,828 | 302 | | | 3,487 | 147 | | | |
| 1978 | | 8,379 | 389 | | | 4,997 | 389 | | | |
| 1979 | | 8,725 | | | | 2,593 | 527 | | | |
| 1980 | | 7,958 | 284 | | | 3,841 | 852 | | | |
| 1981 | | 10,879 | 303 | | | 5,284 | 465 | | | |
| 1982 | | 13,198 | 210 | | | 6,906 | 454 | | | |
| 1983 | | 16,944 | 798 | | | 7,963 | 1,262 | | | |
| 1984 | 1,597 | 17,436 | 208 | | | 696 | 7,791 | 312 | | |
| 1985 | 2,854 | 19,919 | 56 | | | 1,788 | 6,701 | 383 | | |
| 1986 | 2,872 | 18,107 | 699 | | | 1,570 | 6,313 | 2,752 | | |
| 1987 | 2,528 | 20,413 | 906 | | | 2,090 | 9,288 | 813 | | |
| 1988 | 2,661 | 20,278 | 564 | | | 959 | 5,279 | 1,565 | | |
| 1989 | 2,560 | 17,692 | 648 | | | 1,028 | 4,932 | 64 | | |
| 1990 | 2,686 | 21,799 | 1,957 | 4,145 | 47 | 991 | 3,782 | 320 | 1,730 | 18 |
| 1991 | 3,236 | 23,622 | 1,429 | 4,257 | 34 | 1,606 | 9,543 | 394 | 1,879 | 21 |
| 1992 | 3,540 | 22,684 | 479 | 3,742 | 13 | 1,421 | 6,145 | 333 | 1,666 | 20 |
| 1993 | 3,134 | 18,930 | 537 | 2,117 | 25 | 1,575 | 7,809 | 559 | 2,209 | 25 |
| 1994 | 3,016 | 18,922 | 376 | 1,731 | 22 | 1,100 | 6,036 | 287 | 1,488 | 19 |
| 1995 | 3,719 | 19,647 | 215 | 1,856 | 12 | 1,957 | 8,495 | 256 | 1,421 | 18 |
| 1996 | 2,958 | 13,783 | 728 | 3,239 | 22 | 1,407 | 5,571 | 112 | 1,423 | 8 |
| 1997 | 2,773 | 13,850 | 363 | 2,188 | 17 | 824 | 3,729 | 145 | 657 | 22 |
| 1998 | 3,206 | 13,616 | 75 | 452 | 17 | 1,089 | 3,801 | 195 | 1,104 | 18 |
| 1999 | 3,124 | 15,006 | 355 | 2,217 | 16 | 1,313 | 6,771 | 193 | 1,869 | 10 |
| 2000 | 2,713 | 18,559 | 420 | 1,317 | 32 | 1,387 | 7,129 | 357 | 1,249 | 29 |
| 2001 | 2,371 | 10,955 | 349 | 3,276 | 11 | 1,177 | 5,904 | 122 | 337 | 36 |
| 2002 | 2,743 | 18,325 | 326 | 495 | 66 | 1,064 | 6,417 | 158 | 1,558 | 10 |
| Avg (92-01) | 3,055 | 16,595 | 390 | 2,214 | 19 | 1,325 | 6,139 | 256 | 1,342 | 21 |
| Avg (97-01) | 2,837 | 14,397 | 312 | 1,890 | 18 | 1,158 | 5,467 | 202 | 1,043 | 23 |

fishing regulatory framework. Baseline data exist for the Pilgrim/Kuzitrin portion of the Imuruk Basin population complex. Because of the proximity of Nome, it is likely that this population will be the first in the NWMA to require more restrictive regulations as the human population in the Nome area grows and participation in the fishery increases. Harvests are monitored through the SWHS. If large changes in harvest occur, additional stock assessment work will be conducted.

Fishery Outlook

Changes in fishing regulations for northern pike in NWMA are not expected in the near future. Pike populations are largely unexploited, and both participation and harvest are low.

Recent Board of Fisheries and Management Actions

There have been no recent BOF or management actions concerning northern pike. The current daily bag and possession limit in the NWMA is 10 fish with no size limit.

Current Issues

There are no current issues regarding northern pike in the NWMA. Harvest level will continue to be monitored through the SWHS. If harvests increase dramatically, additional research may be undertaken.

Ongoing Research Activities

There are no current research activities associated with northern pike in the NWMA.

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APPENDIX A

Appendix A.–Reference information specific to 2004 Board of Fisheries Proposals

| Proposals | Reference Text | Page | Tables/Fig | Page |
|------------------|-----------------------------|-------------|-------------------|-------------|
| 109 | Arctic grayling fisheries | 34, 78-86 | Tables 24, 25 | 80-83 |
| 124, 125 | Harvest record, Subsistence | 35 | | |
| 126-129 | Unalakeet Salmon | 33, 43-50 | Table 10, Fig 12 | 45-47 |

APPENDIX B

Appendix B.—National Wild and Scenic Rivers in the NWMA.

- Streams Within The National Park System

Kobuk River. The portion within the Gates of the Arctic National Park and Preserve.

Noatak River. The river from its source in the Gates of the Arctic National Park to its confluence with the Kelly River in the Noatak National Preserve.

Salmon River. The portion within the Kobuk Valley National Park.

- Streams Within The National Wildlife Refuge System

Selawik River. The portion from a fork of the headwaters in township 12N, Range 10E, Kateel River meridian to the confluence of the Kugarak River; within the Selawik National Wildlife Refuge.

- Streams Located Outside National Parks and Refuges

Unalakleet River. The segment of the main stem from the headwaters in township 12S, Range 3W, Kateel River meridian extending downstream approximately 65 miles to the western boundary of township 18S, range 8W.

APPENDIX C

Appendix C. –Northwestern Area sport fishing regulations summary for 2000.

NORTHWESTERN ALASKA

SEASONS

Entire year for all species except halibut. Halibut season is February 1-December 31.

BAG, POSSESSION, AND SIZE LIMITS GENERAL REGULATIONS

The general regulations for all waters of the Northwestern Area are listed below. Special regulations for individual water bodies appear afterward (at bottom of page).

| Species | Daily Bag | Possession & Size Limit |
|--|-----------|--------------------------------|
| King salmon 20 “ or greater | 1 | |
| Less than 20 “ | 10 | |
| Other salmon | 10 | (no size limit) |
| Arctic char/Dolly Varden (all lakes) | 2 | (no size limit) |
| Flowing and salt water | 10 | (only 2 over 20 inches) |
| Lake trout | 4 | (no size limit) |
| Arctic grayling | 10 | (no size limit) |
| Sheefish | 10 | (no size limit) |
| Northern pike | 10 | (no size limit) |
| Burbot | 15 | (no size limit) |
| Halibut | 2 per day | 4 in possession, no size limit |
| Outlet stream (Pilgrim River) 300 feet downstream from - Salmon Lake | | Closed to salmon fishing |
| Shellfish | | |

-continued-

SPECIAL REGULATIONS

KOBUK RIVER DRAINAGE (upstream of the mouth of the Mauneluk River):

1. Sheefish- daily bag and possession limit is 2 fish, no size limit

NORTHERN NORTON SOUND (all waters draining into Norton Sound from Cape Darby to Cape Prince of Wales (see map):

1. **Chum salmon:** Daily bag and possession limit is 3 fish, no size limit
All freshwater drainages and marine waters between the west bank of the Sinuk River and Topkok Head (see map) are closed to chum salmon fishing.
2. **Coho salmon:** Daily bag and possession limit is 3 fish, no size limit
3. **Sockeye salmon:** Daily bag and possession limit is 3 fish, no size limit
4. **Pink salmon:** Daily bag and possession limit is 10 fish, no size limit
5. **Arctic grayling:** Daily bag and possession limit is 5 fish, **only 1 over 15 inches**
6. **Salmon Lake, its tributaries, and the lake outlet are:** *Closed to salmon fishing.*
7. **Nome River:** *Closed to fishing for Arctic grayling*
8. **Pilgrim River drainage:** Arctic grayling daily bag and possession limit is 2 fish, **only 1 over 15 inches.**
9. **Snake Rive drainage:** Arctic grayling daily bag and possession limit is 2 fish, **only 1 over 15 inches.**
10. **Solomon River:** *Closed to fishing for Arctic grayling*

UNALAKLEET RIVER DRAINAGE:

- 1: Arctic grayling: Daily bag and possession limit is 5 fish, **only 1 over 15 inches**
- 2: Other salmon: Daily bag and possession limit is 5 fish, no size limit.
After taking a bag limit of coho salmon from the Unalakleet River drainage, a person may not sport fish for any species of fish downstream from the South River for the remainder of that same day.
- 3: All salmon Any salmon completely removed from the water shall be retained and becomes part of the bag limit of the person originally hooking it. A person may not completely remove a salmon from the water before releasing it.

APPENDIX D
SPORT FISH EMERGENCY ORDERS ISSUED
DURING 2002 AND 2003

Appendix D.–NWMA sport fish emergency orders issued during 2002 and 2003.

| <u>E.O. Number</u> | <u>Dates</u> | <u>Action</u> |
|---------------------------|-------------------------|--|
| EO-3-S-01-02 | June 15 – Aug 1, 2002 | Closed the Nome Subdistrict (Cape Rodney to Cape Prince of Wales to sport fishing for all salmon. |
| EO-3-PS-01-02 | July 3 – further notice | Opened waters east of Cape Nome to sport fishing for pink salmon (10/day). |
| EO-3-SS-01-02 | Aug 17 –Oct 31, 2002 | Closed coho sport fishing from Rocky Point to Cape Prince of Wales and reduced bag limit to 1 coho from Fish R. to Unalakleet R. |
| EO-3-SS-02-02 | Aug 31-Oct 31, 2002 | Opened Nome River to 1 coho/day. |
| EO-3-S-03-03 | June 3 –Aug 31, 2003 | Prohibited the retention of king and chum Salmon in the Unalakleet and Shaktoolik Rivers, and prohibited the use of bait. |
| EO-3-S-01-03 | June 10-Aug 15, 2003 | Closed the Nome Subdistrict (Cape Rodney to Cape Prince of Wales to sport fishing for all salmon. |
| EO-3-SF-01-03 | July 1 – July 31, 2003 | Closed the Nome River to all sport fishing |
| EO-3-CS-03-03 | July 19 – Aug 31, 2003 | Prohibited the retention of chum salmon In the Fish and Niukluk Rivers. |
| EO-3-SS-01-03 | Aug 21 – Dec 31, 2003 | Closed sport fishing for coho from Cape Douglas to Cape Darby and the Pilgrim and Kuzitrin Rivers. |

APPENDIX E

Appendix E.-Nome roadside Arctic grayling management goals and research.

GOALS

The ADF&G intent for the management objectives are to regulate Nome roadside Arctic grayling fisheries to maintain populations with characteristics that users presently consider to be producing a high quality sport fishery and maintain minimum spawning stock abundances. Each population will be managed to maintain a minimum number of Arctic grayling >15 inches in length (sexually mature fish).

MANAGEMENT OBJECTIVES FOR SPECIFIC RIVERS

Maintain a population of Arctic grayling > 15 inches in length in index sections of the following rivers at these levels:

| <u>River</u> | <u>Section</u> | <u>Section Length</u> | <u>#>15 inches</u> |
|--|----------------|-----------------------|-----------------------|
| 1. Niukluk River (Council to Casadepage River) | | 14 mi | 3,500 |
| 2. Fish River (Cache Cr to lower end of canyon) | | 16 mi | 4,500 |
| 3. Pilgrim River (7.5 mile section below bridge) | | 7.5 mi | 350 |
| 4. Snake River (Boulder Creek to bridge) | | 12 mi | 600 |
| 5. Sinuk River | | 25 mi | 1,000 |
| 6. Nome River (Hobson Creek to weir) | | 26 mi | 2,000 |

The numbers of fish by river section in rivers were determined from past estimates of abundance of Arctic grayling within the size ranges and sections noted (numbers 1-5), where it has been shown that populations are supporting existing levels of effort and harvest. For the Nome River, the number is a desired number of fish >15 inches that is believed would sustain a modest level of harvest based on the river’s accessibility and the amount of Arctic grayling habitat available.

It is likely that levels of fishing effort will increase at some time in the future. Effort level is something that managers cannot control, and as this occurs, harvests and populations will continue to be monitored to ensure that the grayling stocks are not adversely impacted. Reduction of daily bag limits is a tool that may be needed in the future to decrease the risk of negatively impacting the size structure and abundance of Arctic grayling populations if increased effort levels result in harvests that may reduce populations below these threshold levels.

Providing diversity of opportunity in the form of the various harvest options for Arctic grayling is built into current management practices.

RESEARCH ACTIVITIES

The intent of the Sport Fish Division is to continue to conduct stock assessment projects on Arctic grayling populations in Nome roadside streams. The success of this management plan cannot be measured without periodic assessment of the Arctic grayling populations. It is recommended that assessments on individual stream index areas be conducted once every five years to determine if the regulatory framework for each stream is proper for maintaining the population at the desired level.

-continued-

TASKS ALREADY ACCOMPLISHED

1. The regulatory structure in place should regulate harvests that result in sustaining populations with at or above objective levels. Baseline biological information on the grayling population has been collected during the past 12 years of stock assessment.
2. A research program has been developed that should provide the data necessary to measure the success of the regulatory structure in relation to the stated objectives given the dynamic nature of changing fishery characteristics.

IMPLEMENTATION

1. Population abundance and size structure assessment will be undertaken in each stream at least once every five years to measure the effectiveness of regulations to maintain the structure of a given population.
 - A. If assessments indicate that the abundance of Arctic grayling has fallen below the thresholds set in this plan, management actions will be taken to reduce harvest.
 - B. If assessments indicate substantial increases in abundance of Arctic grayling larger than 15 inches size composition, Sport Fish Division would consider supporting a proposal allowing additional harvest of grayling on a river by river basis, if there is strong public support.
 - C. Restoration efforts for the Nome River are underway. If the population can be restored to the threshold level identified, subsistence harvests and catch-and-release fishing will be considered.