

Fishery Management Report No. 06-59

**Fishery Management Report for Sport Fisheries in the
Northwest Alaska Management Area, 2004**

by

Fred DeCicco

December 2006

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-fork	MEF
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	mid-eye-to-tail-fork	METF
hectare	ha	at	@	standard length	SL
kilogram	kg	compass directions:		total length	TL
kilometer	km	east	E		
liter	L	north	N	Mathematics, statistics	
meter	m	south	S	<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	west	W	alternate hypothesis	H _A
millimeter	mm	copyright	©	base of natural logarithm	<i>e</i>
		corporate suffixes:		catch per unit effort	CPUE
Weights and measures (English)		Company	Co.	coefficient of variation	CV
cubic feet per second	ft ³ /s	Corporation	Corp.	common test statistics	(F, t, χ^2 , etc.)
foot	ft	Incorporated	Inc.	confidence interval	CI
gallon	gal	Limited	Ltd.	correlation coefficient (multiple)	R
inch	in	District of Columbia	D.C.	correlation coefficient (simple)	r
mile	mi	et alii (and others)	et al.	covariance	cov
nautical mile	nmi	et cetera (and so forth)	etc.	degree (angular)	°
ounce	oz	exempli gratia	e.g.	degrees of freedom	df
pound	lb	(for example)		expected value	<i>E</i>
quart	qt	Federal Information Code	FIC	greater than	>
yard	yd	id est (that is)	i.e.	greater than or equal to	≥
		latitude or longitude	lat. or long.	harvest per unit effort	HPUE
Time and temperature		monetary symbols		less than	<
day	d	(U.S.)	\$, ¢	less than or equal to	≤
degrees Celsius	°C	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (natural)	ln
degrees Fahrenheit	°F	registered trademark	®	logarithm (base 10)	log
degrees kelvin	K	trademark	™	logarithm (specify base)	log ₂ , etc.
hour	h	United States (adjective)	U.S.	minute (angular)	'
minute	min	United States of America (noun)	USA	not significant	NS
second	s	U.S.C.	United States Code	null hypothesis	H ₀
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	percent	%
Physics and chemistry				probability	P
all atomic symbols				probability of a type I error (rejection of the null hypothesis when true)	α
alternating current	AC			probability of a type II error (acceptance of the null hypothesis when false)	β
ampere	A			second (angular)	"
calorie	cal			standard deviation	SD
direct current	DC			standard error	SE
hertz	Hz			variance	
horsepower	hp			population	Var
hydrogen ion activity (negative log of)	pH			sample	var
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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NORTHWEST ALASKA MANAGEMENT AREA, 2004**

by

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Alaska Department of Fish and Game, Division of Sport Fish, Fairbanks

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
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EXECUTIVE SUMMARY

This document provides a wide array of information specific to the recreational angling opportunities, management activities, and fish harvests that exist within the Northwestern Management Area.

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 monies. The F&G funds are from the sale of fishing licenses. The Federal Aid In Fisheries Restoration (or D-J, named after Dingell and Johnson 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. Other, additional funding sources can include contracts with various government agencies and the private sector.

This report provides fisheries information for 2004 with preliminary information from the 2005 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.

ABSTRACT

Sport fisheries management recommendations and background information for 2004 in the Northwestern Alaska Management Area is presented. This information was provided to the Alaska Board of Fisheries, as well as the general public and interested parties. The Northwest Management Area contains Norton Sound, Seward Peninsula and Kotzebue Sound, and Chukchi Sea drainages south of Point Hope. Summaries of major fisheries within the area are detailed, including descriptions of recent performances, Alaska Board of Fisheries regulatory actions, social and biological issues, and descriptions of ongoing research and management activities.

Key Words: Northwest Alaska, Nome, Kotzebue, Unalakleet, Commercial fisheries, subsistence, Chinook salmon, coho salmon, chum salmon, Arctic grayling, Dolly Varden, sheefish, northern pike

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 1,357,080 km² (526,000 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 six 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 from Point Hope southward).

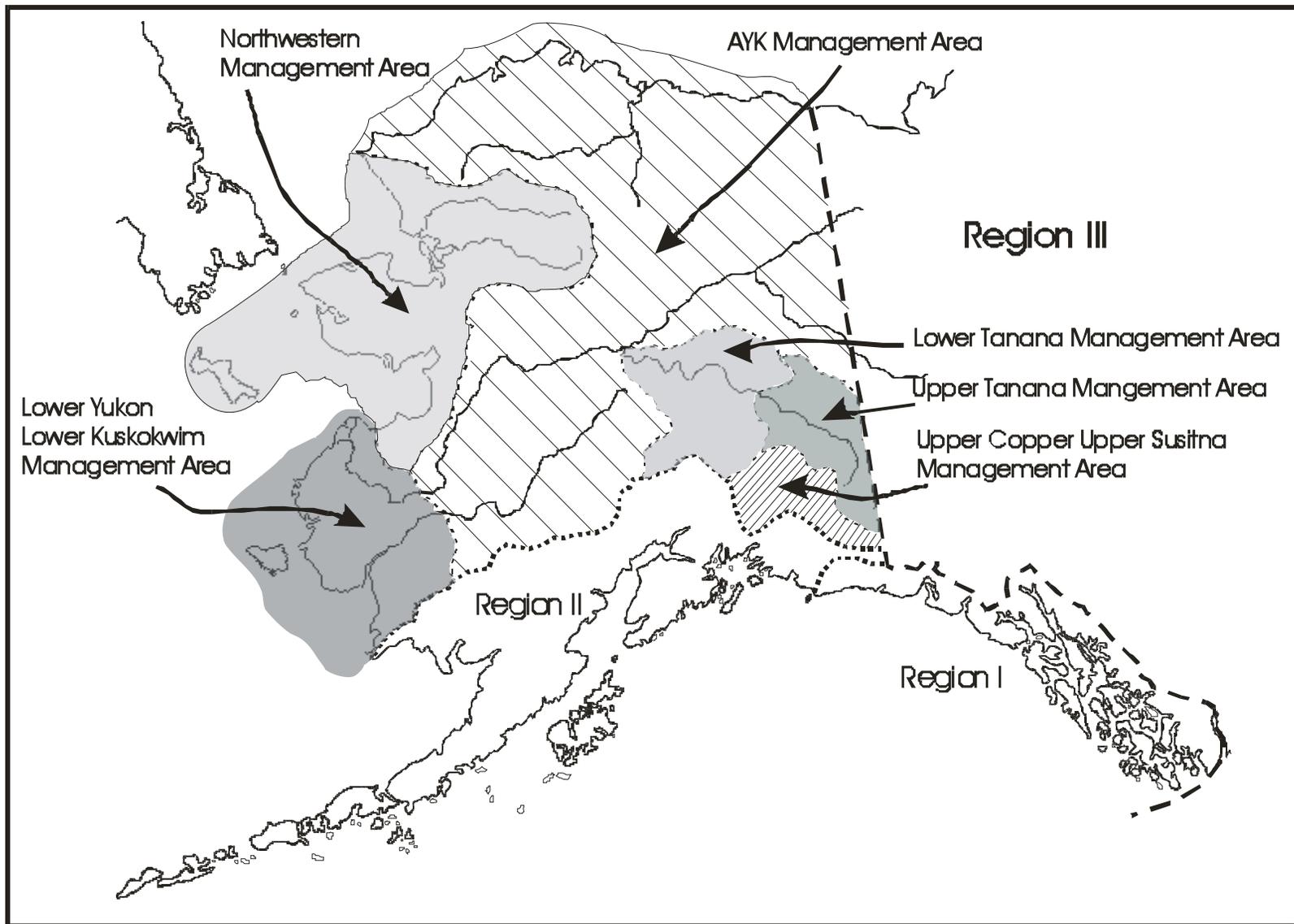


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

- (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 3 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 or individual 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. 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 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001a-d; Jennings et al. 2004, 2006a-b, *in prep*; 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 composed 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 *C. pidschian*, as well as freshwater resident Arctic grayling *Thymallus arcticus*, Dolly Varden, Arctic char *S. alpinus*, northern pike *Esox lucius*, sheefish *Stenodus leucichthys*, round whitefish *Prosopium cylindraceum*, least cisco *C. sardinella*, humpback whitefish, broad whitefish *C. nasus*, burbot *Lota lota* and lake trout *S. namaycush*. Most of these species are harvested in sport, personal use or subsistence fisheries. In addition, marine species such as red king crab *Paralithodes camtschatica*,

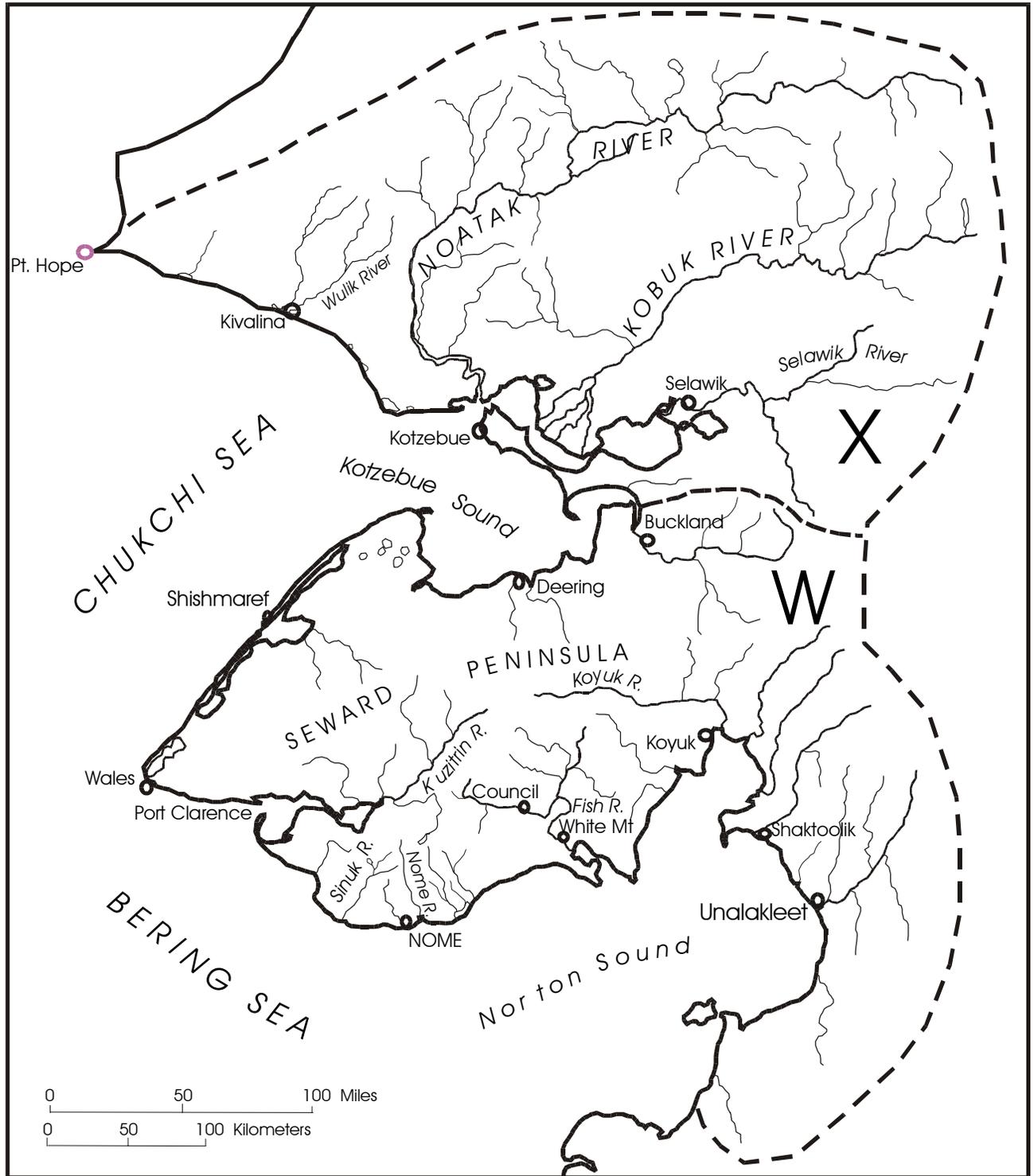


Figure 2.-The Northwestern Management Area with lines depicting reporting areas W and X.

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 Kuzitrit 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 Kuzitrit rivers). Small sockeye salmon runs have historically occurred in the Pilgrim and Sinuk rivers although they have increased markedly in recent years, and a few remnant late run sockeye are present in most other locations. 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, pink salmon 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

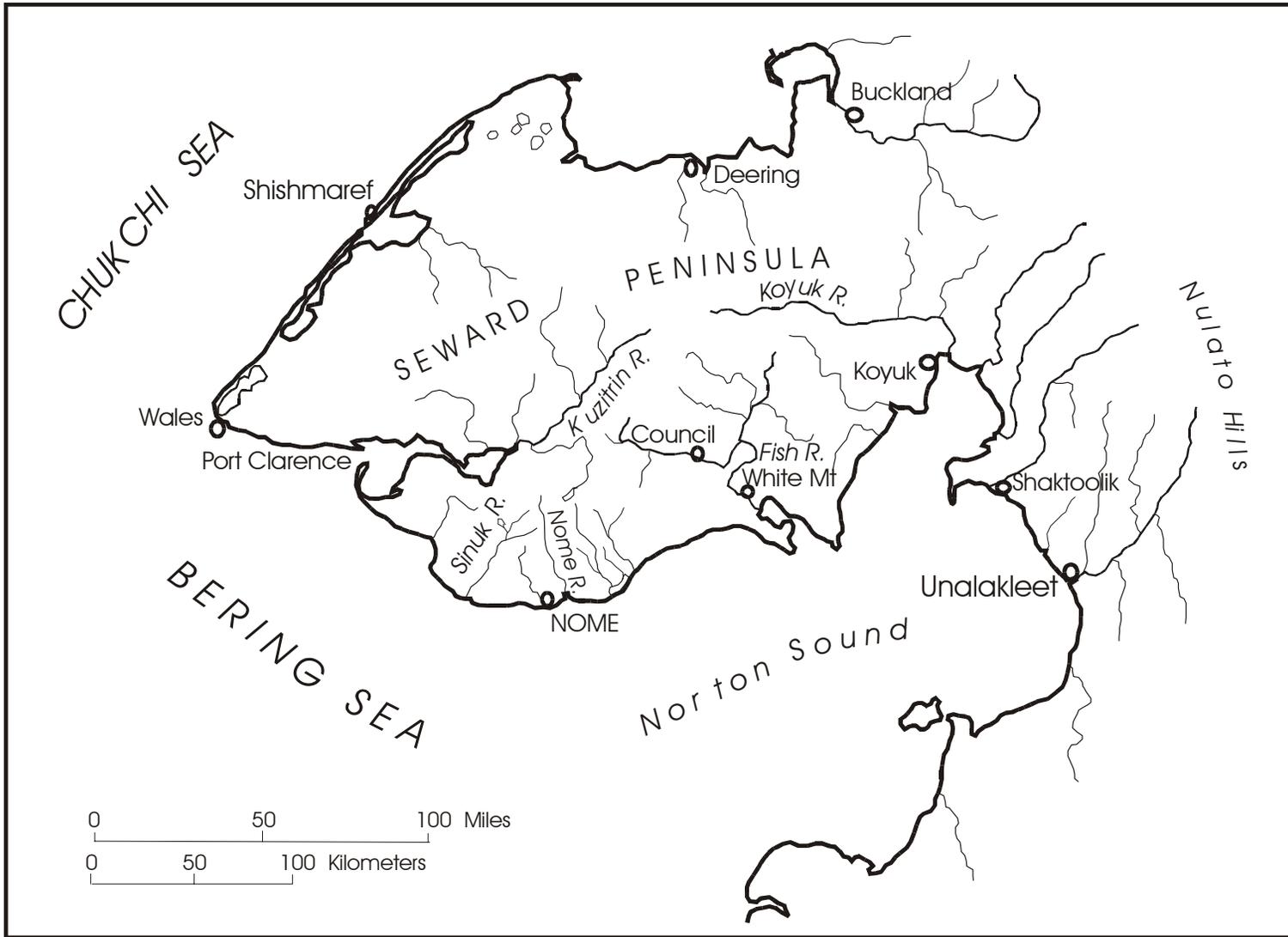


Figure 3.-The Seward Peninsula/Norton Sound sub-area.

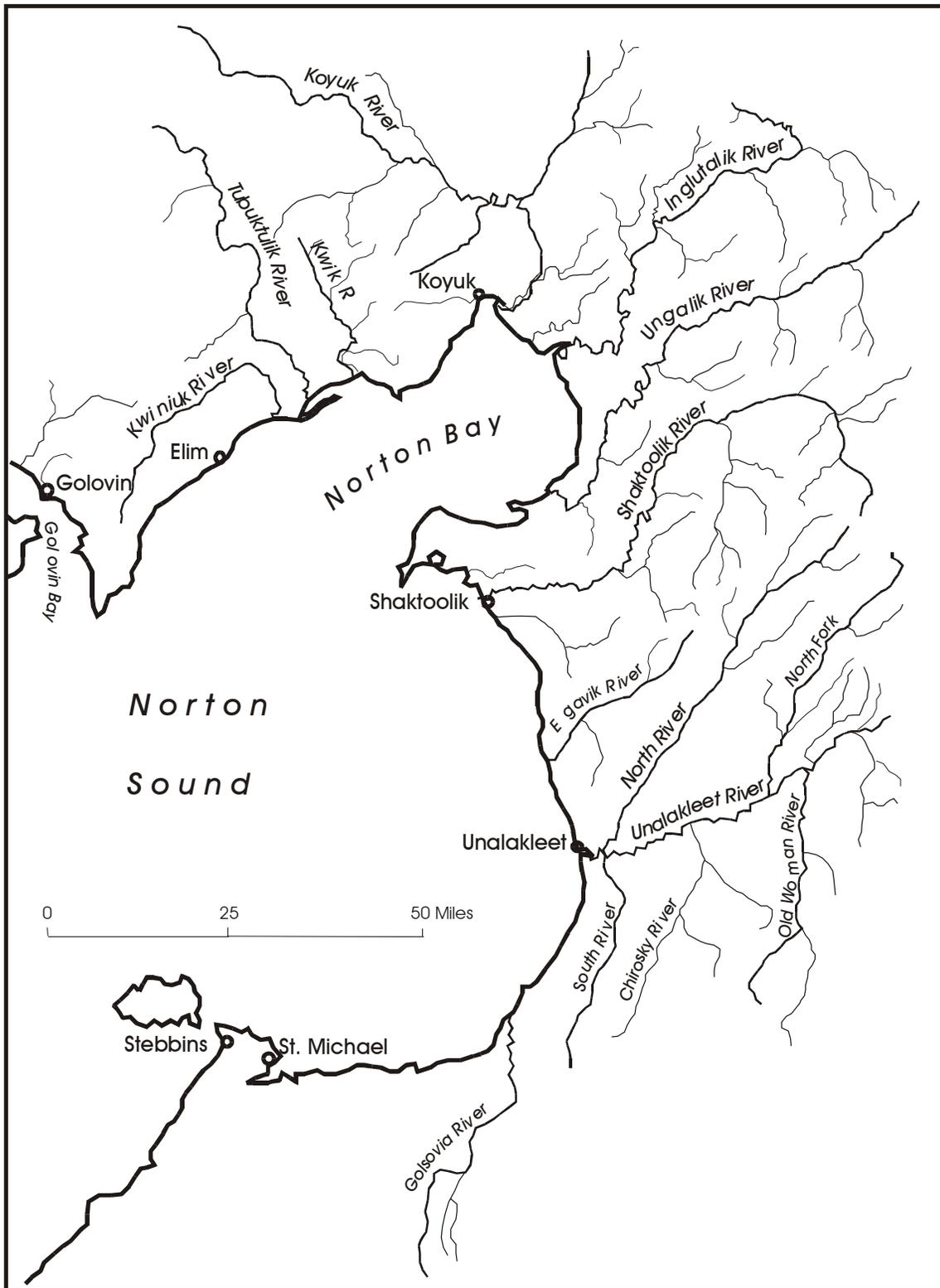


Figure 4.-Eastern Norton Sound.

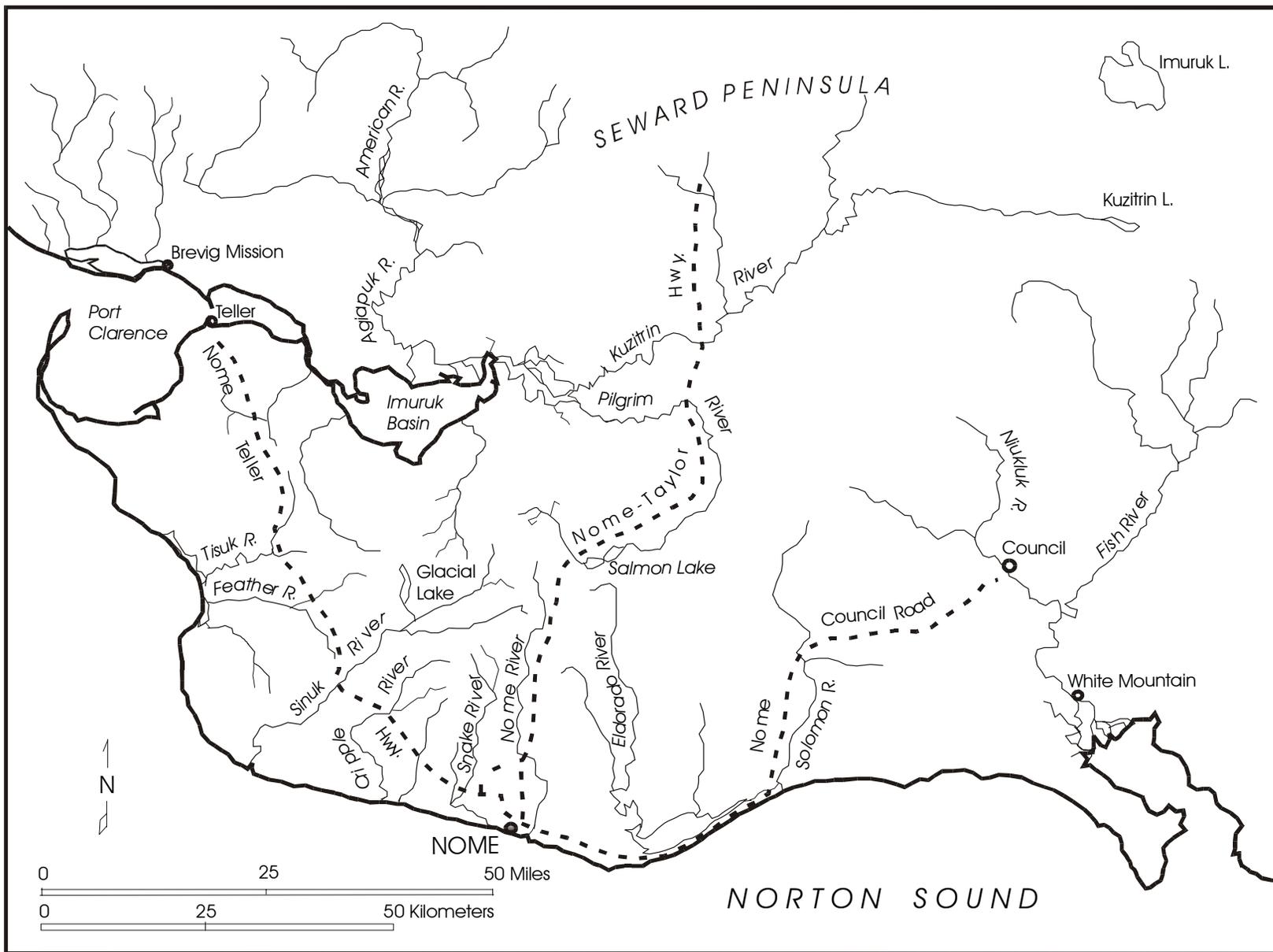


Figure 5.-Southern Seward Peninsula with road accessible waters.

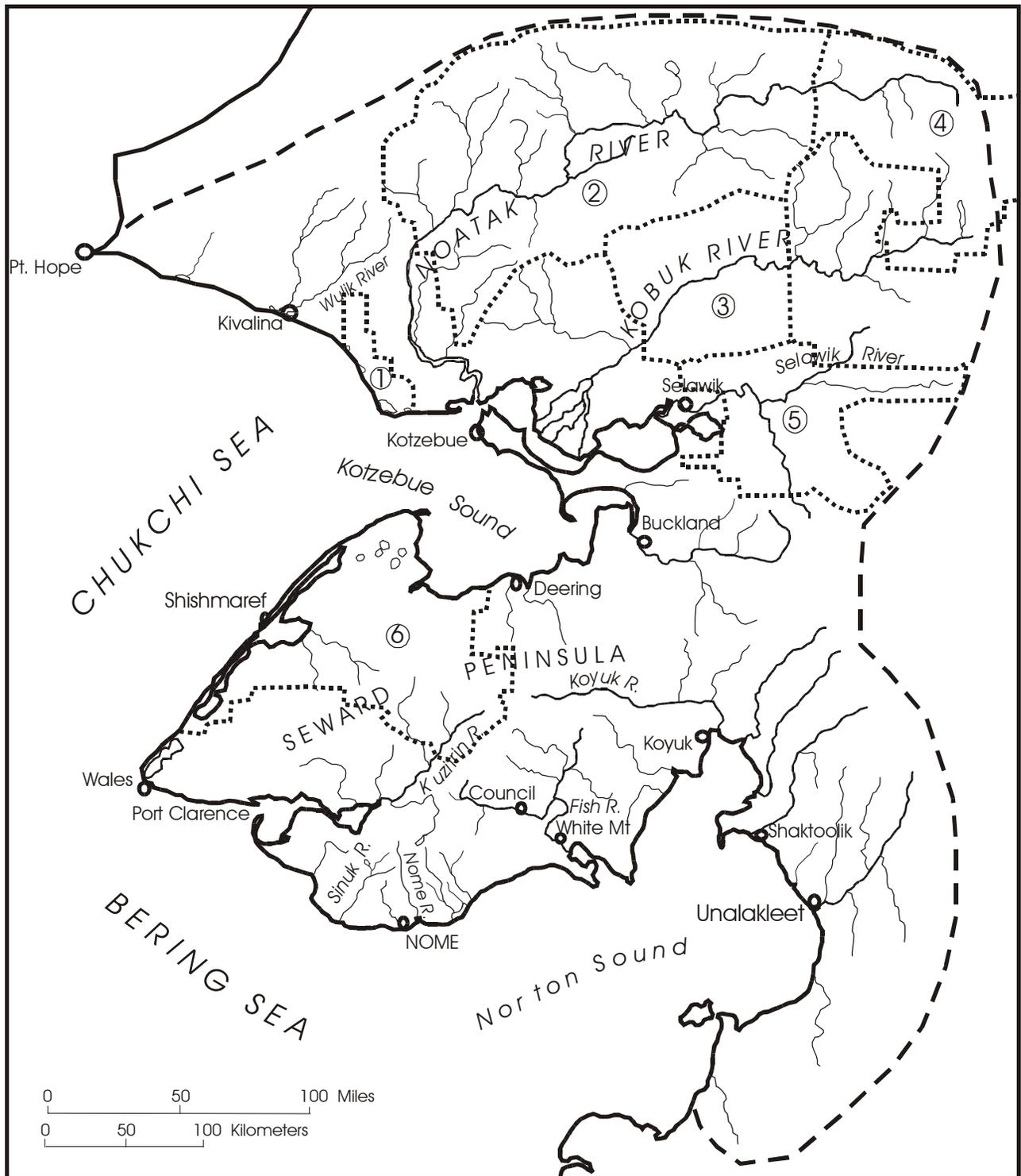


Figure 6.-National Parks Preserves and Wildlife Refuges in NWMA. 1) Cape Krusenstern National Monument, 2) Noatak National Preserve, 3) Kobuk Valley National Park and Preserve, 4) Gates of the Arctic National Park, 5) Selawik National Wildlife Refuge, and 6) Beringland Bridge National Preserve.

Lake in the Sinuk River drainage contains sockeye salmon and round whitefish. Record returns of sockeye were counted through the BLM weir into Glacial Lake in the past 2 years with over 8,000 in 2004 and over 11,000 in 2005. 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. Limited fishing for sockeye was allowed in 2005 for the first time in recent years. The sockeye population has been recovering with the help of lake fertilization. Record runs of sockeye have been documented in the Pilgrim during the past 3 years (42,000 in 2003, 85,000 in 2004 and 56,000 in 2005).

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 A) 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, ninespine stickleback, 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).

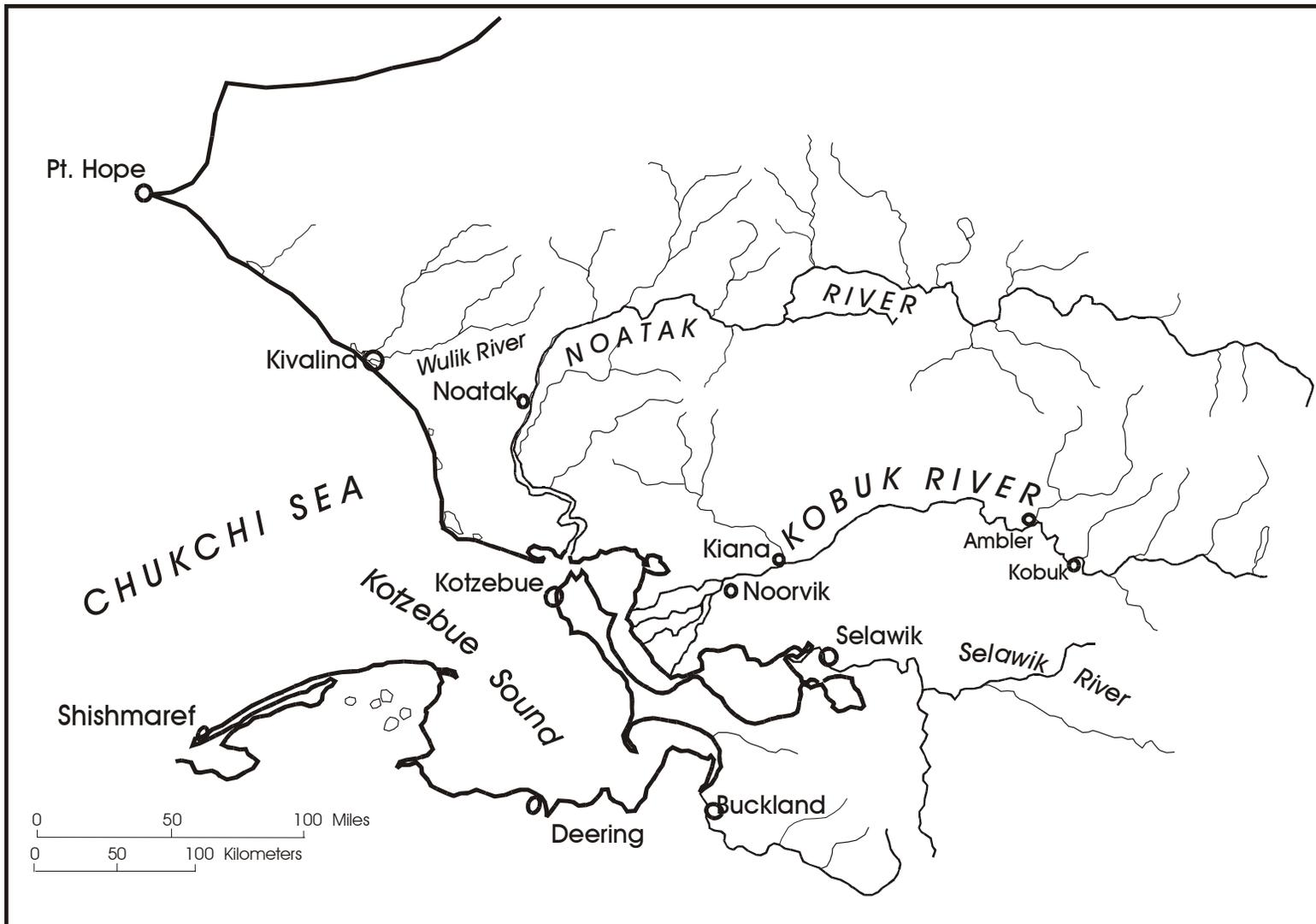


Figure 7.-Kotzebue Sound Chukchi Sea sub-area.

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 spawning population of sheefish in northwestern Alaska. Sheefish migrate 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 live longer and 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, Alaska blackfish, slimy sculpin, ninespine stickleback, 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 part of their normal 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 an extension 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 in 2004 are reproduced as Appendix B.

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 are generally 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 (CF) 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

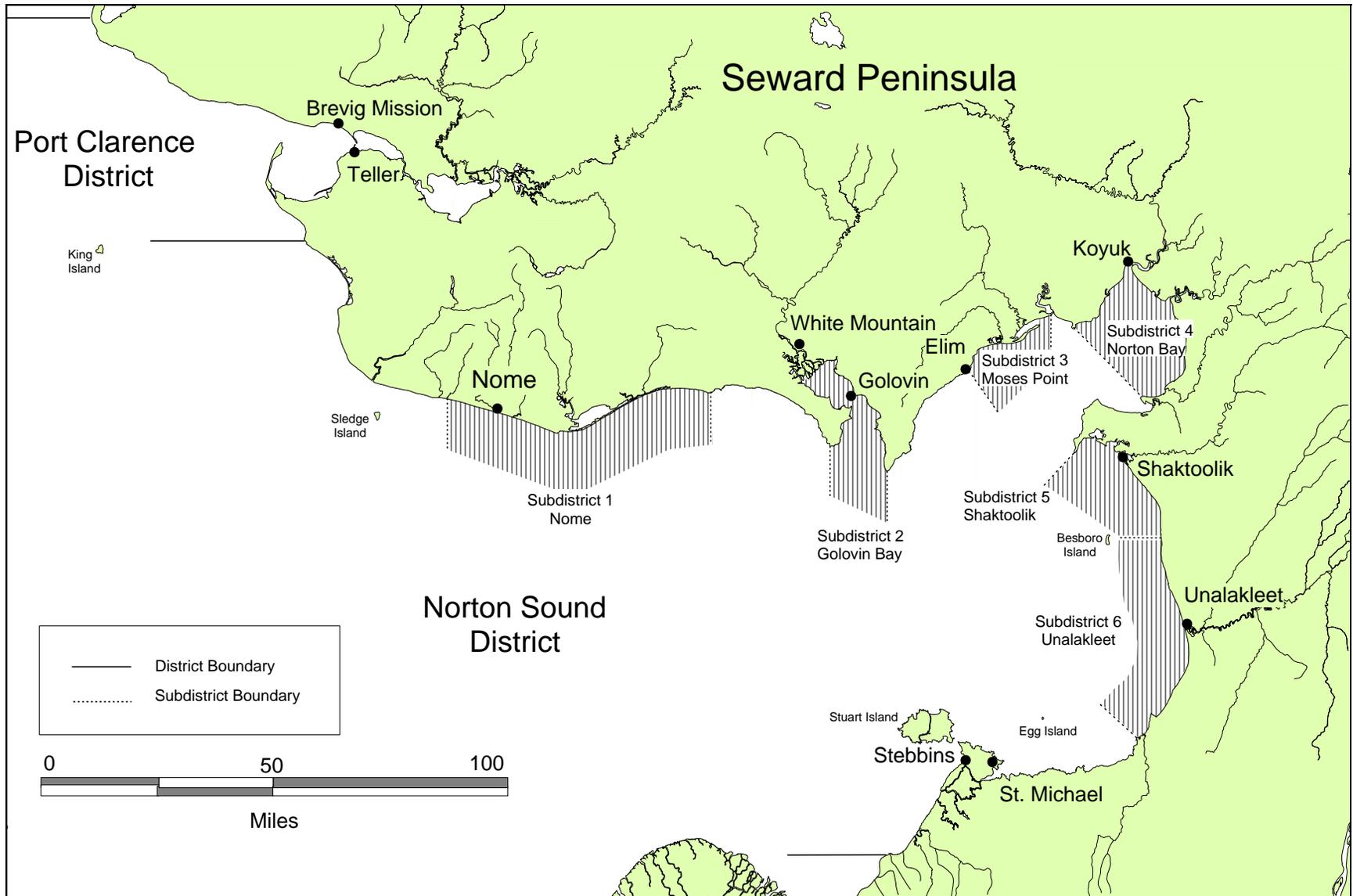


Figure 8.-Commercial salmon fishing subdistricts in Norton Sound.

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 (Kohler et al. 2004). Average commercial harvests over the last 5 years (2000-2004) in the Norton Sound district have been 196 Chinook, 59,527 coho, 5,816 chum, 29 sockeye and 14,131 pink salmon (Table 1). Management actions because of weak runs resulted in commercial harvests in 2003 that were the second lowest on record for these fisheries totaling 12 Chinook, 17,058 coho, 3,560 chum, 0 pink and 16 sockeye salmon. The 2004 season was somewhat better with 40 sockeye, 42,016 coho and 6,296 chum salmon commercially harvested. The 2005 season was the best in recent years with a harvest of 151 Chinook, 280 sockeye, 85,255 coho and 3,983 chum. 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 has been prohibited in this district since 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 85,000 fish in 2004 and 56,000 in 2005. 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 5 years (1999-2003) in the Kotzebue Sound District have been about 91,260 chum salmon and only about 30 Dolly Varden (Table 2). Low fishing effort because of depressed prices resulted in a harvest of only 25,000 chum salmon in 2003, but they have increased to 51,000 in 2004 and 75,970 in 2005. There is also a directed under ice commercial fishery on sheefish in Hotham Inlet. Documented annual harvests in this fishery have averaged fewer than 50 fish over the past 5 years, and the harvest quota of 25,000 pounds has never been met. Kohler et al. (2005) documents these fisheries in greater detail.

The Division of Commercial Fisheries conducts annual assessments of salmon escapements using weirs, counting towers and aerial surveys. Weirs and towers are thought to provide more accurate measures of escapement than aerial surveys, and these methods have been expanded to cover more streams during recent years (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). Chum salmon escapements are documented on a number of streams in order to determine if escapement goals are being met (Table 5). 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 become available.

Table 1.-Historic commercial salmon harvests by subdistrict from the Norton Sound district 1980-2005.

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
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg 94-03	0	1	67	1	87	2	5	746	12,849	1,808	97	4	2,075	26,364	780
Avg 99-03	0	0	0	0	0	0	9	335	3,482	1,452	3	0	1,376	9,274	243

-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
2003	0	0	0	0	0	2	0	4,031	0	485	10	0	13,027	0	3,075
2004	0	0	0	0	0	0	0	12,734	0	1,372	0	40	42,016	0	6,296
2005	0	0	0	0	0	50	0	21,818	0	791	101	280	63,437	0	3,192
Avg 94-03	19	0	0	0	53	766	1	7,224	116,625	4,374	3,378	36	27,439	83,077	8,118
Avg 99-03	0	0	0	0	0	167	1	3,510	17,099	1,498	528	2	13,855	3,456	2,665

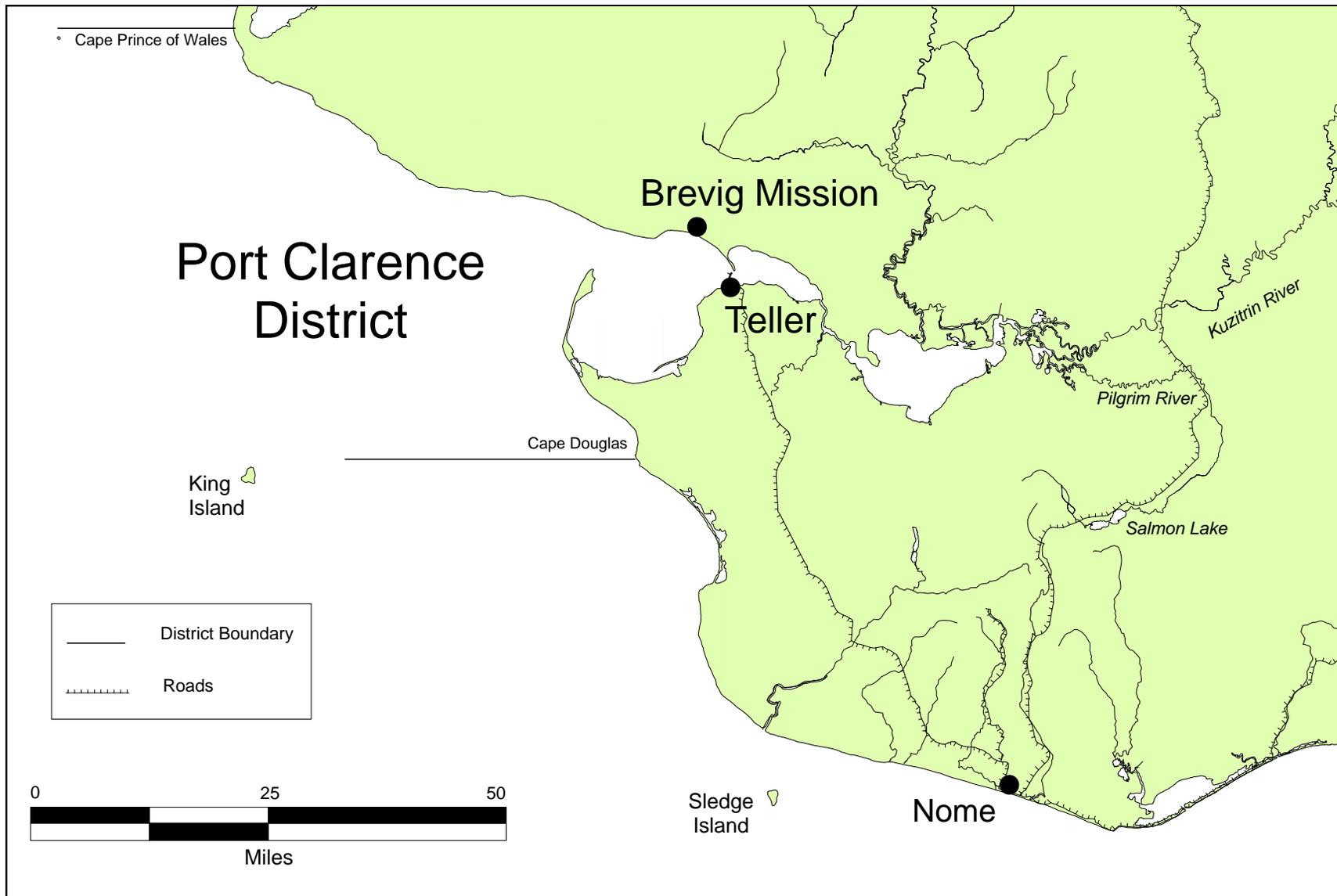


Figure 9.-Port Clarence commercial fishing district.

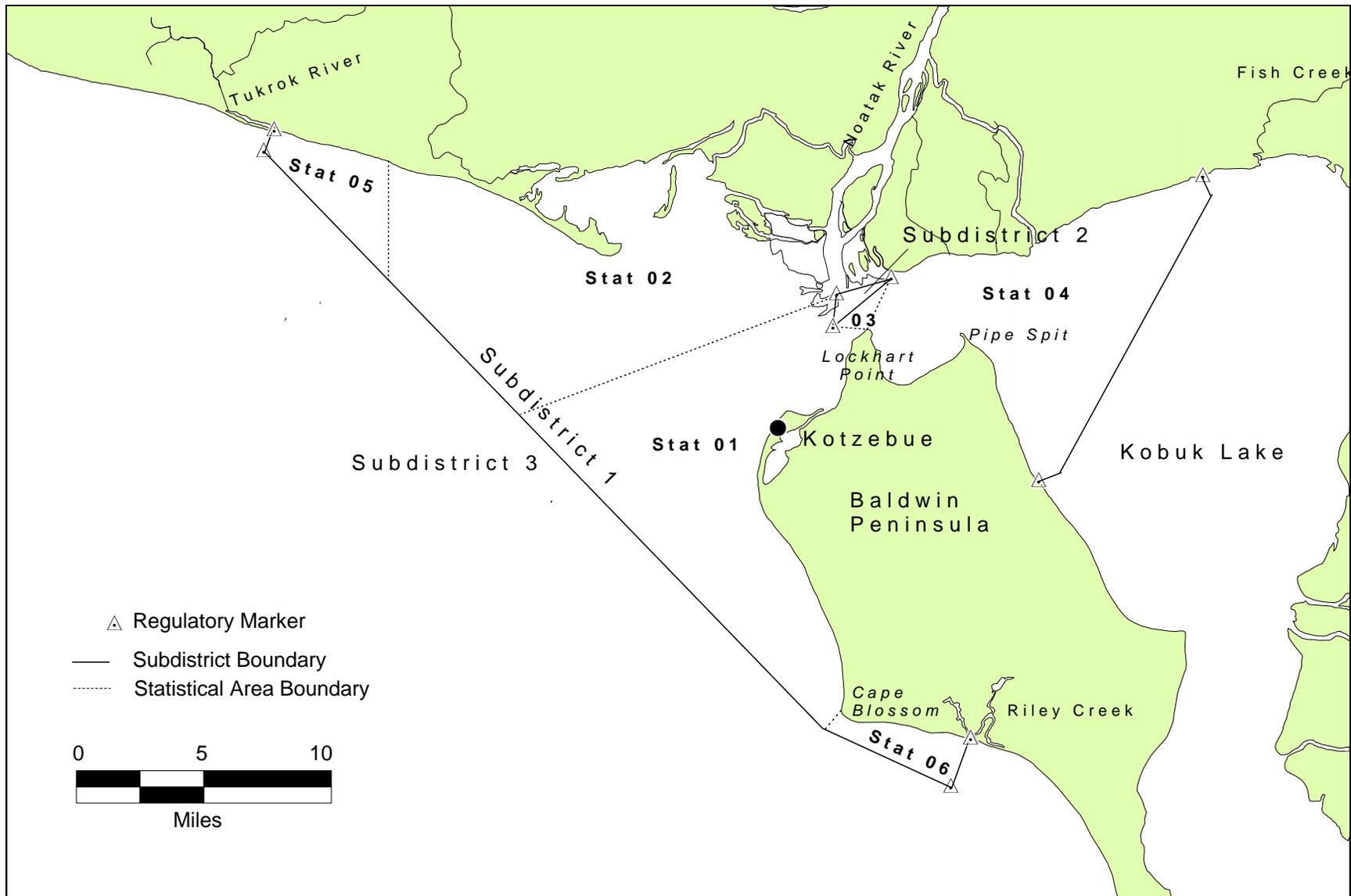


Figure 10.-Kotzebue commercial salmon fishing district.

Table 2.-Kotzebue district chum salmon commercial harvests and incidental Dolly Varden harvests 1980-2005.

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	4,874
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	
2003	25,423	20	176
2004	51,038	124	
2005	75,971	181	
Avg 1994-2003	126,880	763	
Avg 1999-2003	108,776	306	

Table 3.—Weir or tower documented salmon escapements in Norton Sound 1996-2005.

River/Fish	Year											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Nome River												
Chinook	5	5	22	70	3	24	7	7	12	51	70	
Chum	5,093	3,339	5,147	1,930	1,048	4,065	2,859	1,720	1,958	3,903	5,584	
Pink	13,893	95,681	8,035	359,469	2,033	41,673	3,138	35,057	11,402	1,051,146	285,759	
Coho	1,650	66	312	96	417	696	2,418	3,418	548	2,283	5,848	
Snake River												
Chinook		5	12		20	28	33	7	50	17	31	
Chum	4,395	2,772	6,184	11,067	484	1,911	2,182	2,669	2,179	2,145	2,967	
Pink	919	44,558	6,742	219,697	116	4,723	1,295	4,042	2,829	126,917	13,813	
Coho	857	1,638	1,127	178	90	406	1,335	396	489	474 ^a	2,925	
Eldorado River												
Chinook	22	27	98	446	28	33	50	25	29	25	32	
Chum	39,868	12,665	14,302	13,808	4,218	11,617	11,635	10,260	3,589	3,273	10,426	
Pink	4,234	46,095	1,022	137,283	977	55,992	488	115,652	173	60,861	12,356	
Coho	35	324	194	21	510	192	1,509	516	115	1,149	679	
Pilgrim River												
Chinook			356			72		168	1,016	925	216	
Chum			14,418			861		5,538	15,192	10,228	9,715	
Pink			5,557			374		3,870	14,100	50,757	13,298	
Coho			452			21		216	677	1,556	304	
Sockeye			1,234			12,141		4,012	42,729	85,520	56,484	
Niukluk River												
Chinook	423	243	259	260	40	48	30	542	179	135	41	
Chum	86,332	80,178	57,305	45,588	29,573	30,662	33,999	20,018	10,158	10,791	25,596	
Pink	17,088	1,154,922	10,468	1,624,438	20,351	961,603	41,625	636,404	75,855	1,022,302	270,424	
Coho	4,713	12,818	3,997	810	4,260	11,382	3,468	7,269	1,282	1,833 ^b	2,727	
North River												
Chinook		1,197	4,185	2,100	2,263	1,046	1,337	1,484	1,452	1,105	1,019	
Chum		9,789	6,904	1,562	5,600	4,971	6,515	5,918	9,859	9,624	11,984	
Pink		332,539	127,926	74,045	48,993	69,703	24,737	321,756	280,212	1,149,294	1,670,934	
Coho		1,229	5,768	3,361	4,792	6,959	12,383	2966 ^b	5,837	9,646	19,189	

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Table 3.—Page 2 of 2.

River/Fish	Year										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Kwiniuk River											
Chinook	486	578	974	303	116	144	261	1,632	749	645	342
Chum	42,161	28,493	20,119	24,247	8,763	12,897	16,598	37,864	12,117	10,371	12,083
Pink	17,574	907,893	9,535	655,934	607	750,173	8,423	1,114,616	22,332	3,045,915	341,048
Coho	114 ^b	0 ^b	0 ^b	0 ^b	0 ^b	2 ^b	9,531	6,459	5,484	10,523	12,950

^a Incomplete count because of high water 1,916 coho counted by aerial survey in the Snake River.

^b Incomplete count because of high water or tower not run through end of season..

Table 4.-Salmon escapement goals (SEG, BEG, or OEG) for Norton Sound area streams, 2005.

Location	Type	Chum	Type	Chinook	Type	Sockeye	Type	Coho	Type	Pink
Salmon Lake					Aerial	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								
Inlutalik River										
Ungalik River										
Shaktookik			Aerial	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	25,000

Table 5.-Recent chum salmon escapements in Nome Subdistrict streams, 1995-2004.

Location	Escapement Goal (number of fish)	Year									
		1995 Estimate	1996 Estimate	1997 Estimate	1998 Estimate	1999 Estimate	2000 Estimate	2001 Estimate	2002 Estimate	2003 Estimate	2004 Estimate
Sinuk River											
Aerial Survey	4,000-6,200	3,110	1,815 (early)	2,975	630 (incomplete)	no survey	10 (incomplete)	3,746	1,682	677	100
Snake River											
Tower	1,600-2,500	4,393	2,772	6,184	11,067	484	1,400	2,182	2,669	2,197	2,145
Nome River											
Tower/Weir	2,900-4,300	5,092	3,339	5,131	976	1,048	4,051	2,859	1,720	1,958	3,903
Eldorado River											
Eldorado Tower	6,000-9,000	39,867	12,655	14,302	13,808	4,218	10,604	11,635	10,260	3,589	3,273
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	647	2,250
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	140	53
Solomon River											
Aerial Survey	1,100-1,600	315	323	316 (Incomplete)	90 (Incomplete)	51 (Incomplete)	150 (Incomplete)	280	325	73	100

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Table 5.-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	2003 Estimate	2004 Estimate
Fish River											
Niukluk Tower	(Goal not set)	86,333	80,121	57,304	45,587	35,240	26,724	30,662	33,979	19,681	10,791
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	3,950	55
Kwiniuk River											
Kwiniuk Tower	11,500-23,000	42,703	28,493	20,118	24,248	8,763	12,251	16,598	37,864	12,117	10,371
Tubutulik River											
Aerial Survey	8,000-16,000	16,518	10,790	3,105	10,060	No survey	No Survey	863 (Incomplete)	180 (Incomplete)	1,352	1,117
Unalakleet River											
North Tower	(Goal not set)	no project	9,789 (Incomplete)	6,904 (Incomplete)	5,421 (Incomplete)	5,600 (Incomplete)	3,717	6,515	5,918	9,859	9,624
Unalakleet Test Fish	689 (Index)	1,101	1,424	743	492	956	1,083	644	844	433	340
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	657	947

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

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 composed of Alaska Natives, many of whom lead a relatively traditional lifestyle. Many 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 (1999-2003) have averaged about 67,500 fish in the Norton Sound District (Table 6). This average harvest was composed of 4,458 Chinook, 581 sockeye, 12,040 coho, 37,905 pink, and 12,519 chum salmon. In 2004, 84,455 salmon were harvested in Norton Sound. Of these, 3,716 were Chinook, 398 sockeye, 9,890 coho, and 3,635 were chum. The recent 5-year average subsistence salmon harvest in the Port Clarence District was about 9,142 fish, composed of 109 Chinook, 3,132 sockeye, 1,378 coho, 2,173 pink and 2,050 chum salmon (Table 7). In 2003, subsistence fishing opportunity in the Nome sub-district of Norton Sound was severely restricted because of low salmon abundance. In 2004, fishing opportunity was expanded because of abundant sockeye and pink salmon. In 2005, higher than expected runs of chum salmon in addition to abundant pink and sockeye runs allowed for a more relaxed subsistence fishing schedule. In addition to salmon, other fish, including saffron cod, rainbow smelt, Dolly Varden and whitefish are taken. In the Kotzebue Sound District, the recent 5-year subsistence salmon harvest has been about 63,595 chum salmon (Table 7). In the Kotzebue District sheefish are also an important subsistence resource, especially in the villages along the Kobuk River, Kotzebue, and Selawik. In 2003, an estimated 7,813 sheefish were harvested, and in 2004, an estimated 10,163 sheefish were harvested, the highest harvest recorded since 1971. The relative importance of whitefish is higher in the Kotzebue Sound District than in many areas of the state. The average subsistence harvest of whitefish in for the village of Noatak and the five Kobuk River villages combined from 1998-2002 was 44,552. In 2003, 73,242 whitefish were estimated harvested, and in 2004, 50,501 were estimated harvested (Brennan et al. 2002; Georgette et al. 2003a-b, 2004; Georgette and Shiedt 2005).

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 members 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 finfish in the NWMA occurred in January 2004 and BOF adopted several regulations that affected sport fisheries in the NWMA.

Table 6.-Subsistence salmon harvests by subdistrict for the Norton Sound District 1980-2004.

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
2003	63	76	351	507	565	166	28	309	5,012	1,477	660	39	1,143	2,524	1,687
2004	100	106	1574	15,047	685	164	6	652	19,866	874	411	0	694	7,858	683
Avg 94-03	20	110	814	2,442	2,072	138	103	1,364	8,402	3,282	438	45	1,400	4,884	1,906
Avg 99-03	17	72	470	1,299	682	111	46	1,280	6,496	2,292	465	36	1,340	3,961	1,191

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Table 6.-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
2003	373	46	510	4,184	3,397	881	50	2,941	12,332	587	2,585	283	6,192	21,777	1,785
2004						786	10	1,663	6,076	219	2,255	276	5,307	17,969	1,174
Avg 94-03	453	17	447	3,693	4,548	1,002	307	2,521	7,837	1,659	3,884	446	9,305	16,189	6,814
Avg 99-03	423	12	346	3,927	4,136	866	80	2,311	8,359	1,164	2,576	334	6,294	13,862	3,054

Table 7.-Estimated subsistence salmon harvests for the Port Clarence and Kotzebue districts 1980-2004.

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		
2003	177	4,495	1,434	4,113	2,430	17,024	2,177		
2004	276	8,288	1,031	5,817	2,501	10,616	5,293		
Avg 94-03	144	3,302	1,499	2,916	2,429	26,000	4,685	38,892	5,218
Avg 99-03	109	3,432	1,378	2,173	2,050	20,450	3,270	39,875	

Three regulations dealt with salmon sport fisheries in the Unalakleet River drainage. The BOF set the king salmon daily bag limit at two fish of which only one could be over 20 inches in length. It also adopted a seasonal bag limit of four Chinook over 20 inches. In addition, the bag limit for other salmon (other than king) was amended to be 10 fish of which only four could be coho, chum or sockeye in combination. The only other regulation change was incorporated in the AYK Arctic grayling management plan that changed the background bag limit for Arctic grayling from ten to five per day.

The next BOF meeting to discuss NWMA fisheries proposals will be held during the winter of 2006-2007. The proposal deadline for this meeting is April 2006.

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 C, and mentioned in the following sections of this document addressing specific fisheries.

ESTABLISHED MANAGEMENT PLANS AND POLICIES

Other than the newly adopted AYK regional Arctic grayling management plan, 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. The Nome area roadside Arctic grayling plan falls under the AYK Regional Arctic grayling plan that was adopted by the BOF in January 2004. 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.

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. These efforts appear to have made positive contributions to Norton Sound salmon returns. Sockeye returns to both the Pilgrim River and Glacial Lake have reached record levels in the past 3 years. Chum returns to Nome Subdistrict streams have achieved escapement goals in most streams and it is anticipated that Tier II restrictions may not be necessary in 2006.
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 wastewater treatment and the construction of a clean water bypass system in Red Dog Creek. Water quality is monitored by the Department of Natural Resources (DNR) and mine personnel. Contamination from dust 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 twice each year.
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 4 years interest and development potential 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 assumed 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 sport fishing 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 and a proposal for a boat ramp on the Nome River by the City of Nome is in progress.

SECTION II: SEASON SUMMARY FOR 2005

NORTON SOUND

Salmon returns to Norton Sound were the strongest in recent years. Pink salmon runs set records for odd years in most drainages, and the coho return was strong in all but the Fish/Niukluk river drainage. The Pilgrim River (Port Clarence district) and the Glacial Lake sockeye return was very strong with over 56,000 counted past the weir on the Pilgrim River and over 11,000 counted into Glacial Lake. The Pilgrim River also had a fairly good escapement of chum with over 9,500 counted past the weir but the Chinook return was weak. Both the Nome and Snake rivers

received good runs of chum, coho and pink salmon. It appears that the Nome area may be recovering from the “chum crisis” as escapement goals were met or exceeded in all but the Niukluk River in 2005. The Unalakleet king salmon return was just shy of the escapement goal for the North River with 1,019 fish counted past the tower. The pink salmon return to the North River of 1.6 million was even stronger than in 2004. The coho escapement was over 19,000 and the commercial harvest in Unalakleet was the highest since 1994 with over 85,000 harvested in Unalakleet and Shaktoolik subdistricts. Needless to say, coho sport fishing was excellent in this area in 2005. Arctic grayling and Dolly Varden stocks appear to be in reasonably good shape and were able to sustain normal fishing. Stock assessment projects for Arctic grayling in the Niukluk and Nome rivers went well in 2005. Preliminary results suggest that the Nome River population has not yet recovered, but the Niukluk population appears to be maintaining its abundance and size composition under the current regulatory regime.

Because of the early season subsistence salmon closure, sport fisheries for all salmon in the Nome Subdistrict were closed by EO on June 15 (EO 3-S-01-05, Appendix C).

Pink Salmon

Escapements of pink salmon in the Nome Subdistrict during 2005 set records in for odd year returns in most streams. Tower or weir count totals for drainages were: 13,813 in the Snake River, 12,356 in the Eldorado River, and 285,759 in the Nome River. Farther east in Norton Sound, the runs were also strong 270,424 pink salmon were counted past the Niukluk Tower, and 1,670,934 counted past the tower on the North River in the Unalakleet drainage. Sport fishing in all areas remained open with normal bag limits after the initial preseason closure in the Nome Subdistrict expired. Strong annual returns of pink salmon are unusual and there is no past record of this phenomenon in Norton Sound.

Chum Salmon

Chum salmon runs appeared to make a comeback throughout the Nome Subdistrict in 2005. All rivers with counting towers or weirs met or exceeded their escapement goals. Sport fisheries remained closed by regulation, no commercial fishing occurred. Subsistence fisheries were initially regulated under Tier II management, but switched to Tier I management early in the season. Escapements by river 10,426 in the Eldorado River 5,584 in the Nome River, and 2,967 were counted past the Snake River tower. Escapement in the Pilgrim River was 9,715 fish counted through the weir. Escapement of chum salmon counted past the tower on the Niukluk River was only 25,596 fish, stronger than in 2004, but below the goal of 30,000 chum salmon. The North River tower (Unalakleet River) obtained a count of 11,984 chum salmon in 2005. The Kwiniuk River with 12,083 chum salmon counted past the tower reached the lower end of its OEG range of 11,500 – 23,000. Sport fishing for chum salmon remained closed in the Nome Subdistrict, and no other sport fishing restrictions were necessary for chum salmon in 2005.

Chinook Salmon

The Chinook fishery in Norton Sound is functionally confined to the Unalakleet River with only a little effort or harvest elsewhere. During 2005, 1,019 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 almost met. The average count past the tower for past years (1996-2005) has been 1,719 Chinook. There were two 24-hr commercial fishing periods for Chinook, Unalakleet and Shaktoolik, but only 151 were sold in these

fisheries. The sport fishery was not adjusted in 2005 as it appeared that the minimum escapement goal would be met until very late in the run when a restriction would likely have been of little use to increase escapement. 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 2,540 Chinook spawned in the Unalakleet River during 2005. It is likely that a management plan for Chinook will be developed for the Unalakleet River and presented to the BOF during the winter of 2006 meeting.

Coho Salmon

Like 2004, coho returns to Norton Sound streams in 2005 were strong in all but the Fish/Niukluk river drainage. In the Nome River, 5,848 were counted past the weir, the highest escapement recorded in 10 years. On the Snake River 2,925 were counted, also the highest escapement in 10 years. In the Solomon, Sinuk and Bonanza rivers, 339, 2,045 and 393 coho were observed respectively in aerial surveys. The Eldorado and Niukluk rivers had relatively weak coho returns with only 679, and 2,727 coho counted respectively. Farther to the east, runs were strong. In the Kwiniuk River 12,950 were estimated past the tower, and 19,189 were estimated past the North River tower (Unalakleet drainage). On September 9, EO 3-SS-01-05 reduced the daily bag limit of coho salmon to one fish on the Fish and Niukluk rivers (Appendix C). This EO remained in effect for the remainder of the season. No management actions were taken in other drainages. As in 2004, a research project was conducted on the Unalakleet River to estimate the proportions of coho captured downstream from the North River that migrated into the North River and to other upriver areas in the mainstem of the Unalakleet River. This study will continue for one more year in order to assess the variability of the estimates. Results from the first year of this study (2004) indicated that about 15% of the coho entering the Unalakleet River migrate up the North River to spawn. Preliminary data suggest that a similar proportion migrated into the North River in 2005.

Arctic Grayling

Arctic grayling fisheries in the Norton Sound sub-area in 2005 progressed without the need for in-season management actions. Stock assessment projects were conducted to estimate abundance and size composition of Arctic grayling in the Nome and Niukluk rivers in 2005. The Nome river work indicated that the larger size groups in population have not shown signs of recovery, but there were indications that more small (10 inch) fish had recruited to the population than had been seen in the past. The population in the Niukluk River appears to be very healthy. These stock assessments are part of a rotating grayling assessment program described in the management plan for Nome roadside Arctic grayling fisheries (DeCicco 2002; Appendix D).

Sport and subsistence fishing for Arctic grayling remained closed in the Nome and Solomon rivers.

The BOF adopted a region-wide management plan for Arctic grayling sport fisheries at their January 2004 meeting. This resulted in a change in the background daily bag limit for Arctic grayling from 10 fish to five fish. The existing Nome roadside Arctic grayling plan falls under the umbrella of the region-wide plan.

Dolly Varden

Dolly Varden fisheries in Norton Sound are seasonal in nature. Fish overwinter in fresh water and usually 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. In 2005, more than usual numbers of Dolly Varden remained in rivers during June to feed on the abundant fry that resulted from the massive pink salmon runs in 2004. Many Dolly Varden remained in rivers to spawn in the fall. The large pink salmon return in 2005 should also serve to benefit this species. The 2005 fishing season progressed without need for in-season management actions.

KOTZEBUE SOUND/CHUKCHI SEA

Aerial surveys were not conducted on the major drainages in Kotzebue Sound for either Dolly Varden or chum salmon in 2005. However, the Kobuk and Noatak test fish projects indicated that chum salmon escapements were about average. The commercial fishery in Kotzebue harvested 75,971 chum salmon, the highest in the past 3 years, but the fishery only had limited participation because of short fishing periods. Dolly Varden fisheries proceeded normally, but angler reports and a single aerial survey on the Wulik River in July suggested that spawning escapements were low for the fourth year in a row. All 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. The BOF adopted a region-wide management plan for Arctic grayling sport fisheries at their January 2004 meeting. This resulted in a change in the background daily bag limit for Arctic grayling from 10 fish to five fish.

Sheefish

Sheefish fisheries in northwestern Alaska took place as usual without the need for in-season management actions in 2004. Verbal reports from Kotzebue and village residents suggested that the sheefish population is healthy and may be at an all time high in abundance. 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. 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. The USFWS conducted an estimate of spawning sheefish on the Selawik River in 2004 and 2005. The estimates in both years, approximately 23,000 in 2004 and approximately 45,000 in 2005, were much higher than similar estimates in 1997 and 1998, approximately 5,500 in both years, suggesting that anecdotal reports of high sheefish abundance are correct.

Dolly Varden

Dolly Varden populations in the Kotzebue/Chukchi Sea sub-area are monitored with annual aerial counts of overwintering aggregations in the Wulik River and intermittent aerial counts of spawners. Spawners counts were conducted on the Wulik River in July 2005, and only 789 spawning fish were observed. Reports from guides and anglers in Kotzebue suggested that 2005 was another poor year for Dolly Varden spawning in the Noatak drainage as well. This would be

the fourth year in a row that low numbers of spawners were present in Noatak drainage spawning streams. A fall overwintering count was conducted in the Wulik River on October 6, 2005 and 120,848 Dolly Varden were seen. Subsistence harvests in Kivalina were not documented in 2005, but traditional fishing took place on the Wulik River, catches were reported to have been good and subsistence needs were met. Most fishers transported their harvest back to Kivalina for storage rather than cache it upriver. There was increased use of the Wulik River by hunters in the fall of 2005, and it is likely that a substantial amount of sport fishing occurred in association with hunting activities. 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 from 2002 to 2005 may indicate a possible cause for concern. A project to describe genetic relationships among Dolly Varden stocks north and south of the Bering Strait was begun in 2000 and will continue through 2006. In 2005, collections were made from the Kobuk (Squirrel) River and a mixed stock sample was collected from the Kivalina's subsistence harvest in October 2005.

COMMERCIAL AND SUBSISTENCE FISHERIES

No commercial salmon fisheries occurred in the Port Clarence District or in the Nome, Golovin, Moses Point, or Norton Bay subdistricts of Norton Sound in 2005. Two 24 hr commercial periods were fished in the Unalakleet and Shaktoolik subdistricts in late June, but catches were low (151 fish total) and the Unalakleet test net indicated that the run was not strong, so commercial fishing was curtailed. Commercial fishing for coho in the Unalakleet and Shaktoolik subdistricts began on July 24 and continued with regular 48 hr fishing periods per week through the end of the season (September 7). The overall subdistrict 5 (Shaktoolik) commercial harvest in 2005 was 50 Chinook, 791 chum salmon and 21,818 coho. The coho harvest was four times the recent 5-year average and almost three times the recent 10-year average. The harvest in subdistrict 6 (Unalakleet) was 101 Chinook, 3,192 chum salmon and 63,437 coho. The coho harvest the third highest on record, and almost three times the recent 10-year average. No commercial harvest of pink salmon occurred in 2005 because of a lack of buyer interest even though there were record odd year numbers available in Norton Sound.

Subsistence fisheries in eastern Norton Sound were allowed to proceed normally throughout the season. In 1999, the BOF designated the Nome Subdistrict as a Tier II chum salmon management area. Permits were initially issued to 57 qualified fishers for the 2005 season, all who applied, but eight eligible applicants failed to pick up their permits. The season in the Nome Subdistrict began with a total subsistence salmon closure on June 15. Tier II subsistence fishing was allowed in marine waters east of Cape Nome for three days each week beginning on June 15. On June 29, fresh water subsistence areas were opened to Tier II gillnet fishing on the Eldorado, Flambeau and Sinuk rivers. On June 30 all waters were opened to Tier I subsistence fishing with rod and reel. On July 1 fresh waters were opened to Tier I gill net fishing to target sockeye in the Sinuk River and pink salmon elsewhere. On July 6, beach seining for pink salmon was allowed in fresh water subsistence areas and Tier II gill net fishing was allowed in most rivers. In mid July, Tier II fishing was rescinded and Tier I gill netting was allowed on a regular schedule of three days a week in the ocean and 48 hours a week in fresh water subsistence areas and the pink and sockeye limits were waived. During the last week of July gill nets were allowed 5 days a week in the ocean and for two 48-hour periods a week in fresh water subsistence areas. In late August coho limits were raised from 20 on each river to 50 on the Snake River and 100 on the Nome River, and the 20 coho limit in the ocean was waived. Anvil

Creek on the Snake River was closed to protect spawning coho. The coho return in the Nome Subdistrict was very good in all drainages. Subsistence permits were required in the Golovin and Moses Point Subdistricts for the second year. In the Golovin Subdistrict 174 permits were issued, and 70 permits were issued in Moses Point.

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 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001a-d; Jennings et al. 2004, 2006a-b, *in prep*; Walker et al. 2003)). The results of this survey indicate that effort in the Northwest Management Area has remained more or less stable since 1996. Effort since 1982 has ranged from 17,000 to 30,000 angler days during most years (Table 8; Figure 11). During 2003, the total sport fishing effort for the Northwest Management Area was estimated at 17,417 angler days, with 19,027 angler days estimated in 2004. The fraction of the entire AYK Region (excluding the Upper Copper/ Upper Susitna Area) effort expended in the Northwest Management Area has remained fairly stable ranging from 10-15% over the past 10 years (Table 7). 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 15,500 angler days over the past 10 years (1992-2002, Table 9). Rivers supporting the most sport fishing effort in the NWMA have been the Unalakleet, Fish/Niukluk and Nome rivers. 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 since 2000. Angler effort was estimated at about 4,530 angler days for the Unalakleet River in 2004, approximately 36% of the total effort in the sub-area (Table 9). 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 1,450 angler days over the past 5 years and was estimated at only 651 angler days in 2003 but increased to 1,636 angler days in 2004. The increase in effort in 2004 was likely due to the large run of pink salmon present and the ease of access to fishing areas. The Fish/Niukluk river system has sustained an annual average of about 2,900 angler days of effort for the past 5 years. In 2004, effort on this river system was estimated at 2,786 angler days. Estimated effort on the Sinuk, Snake and Pilgrim rivers has averaged about 500 angler days each over the previous 5 years.

Table 8.-Sport fishing effort in the A-Y-K region by management sub-areas, 1982-2004.

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
2003	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
2004	116,486	65.7	3,311	1.9	13,109	7.4	25,406	14.3	13,323	7.5	5,704	3.2	177,339
94-03 Avg.	118,785	66	4,891	3	11,987	7	23,248	13	15,292	9	6,004	3	180,206
99-03 Avg.	132,590	66	4,892	3	12,501	6	22,230	12	15,628	8	5,765	3	200,946

^a AYK total does not include Copper River drainage.

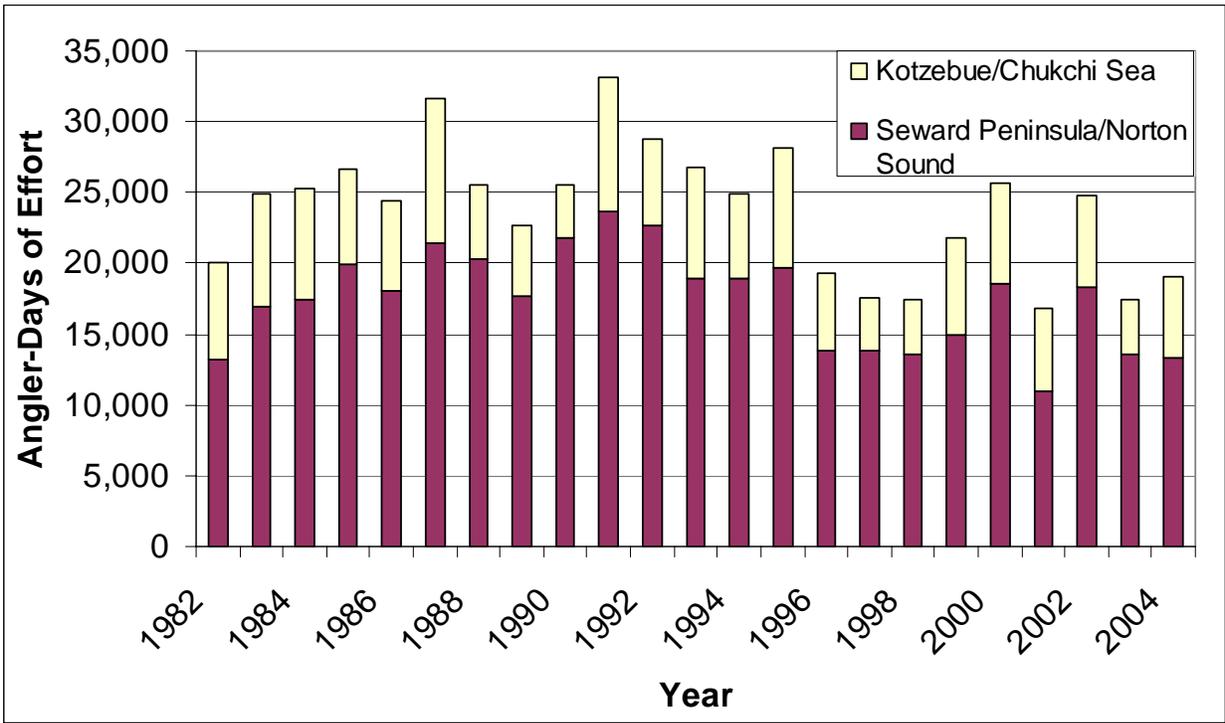


Figure 11.-Sport fishing effort in angler-days in the NWMA by sub-area, 1982-2004.

Table 9.-Sport fishing effort in angler-days for major rivers and by sub-area in the Northwestern Management Area, 1983-2004.

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
2003	651	1,625	3,056	701	1,560	4,810	12,403	1,855	2,039	397	1,830	6,121	18,524
2004	1,636	2,786	4,527	486	594	2,393	12,622	1,130	2,760	219	1,246	5,355	17,977
94-03 Avg.	2,088	2,679	4,139	836	810	4,388	14,939	1,984	1,972	511	1,286	5,753	20,692
99-03 Avg.	1,303	2,924	4,895	684	760	3,348	13,914	2,126	2,129	534	1,189	5,979	19,893

In the Kotzebue/Chukchi Sea sub-area, sport fishing effort has been more variable, ranging from 3,700 to 8,500 angler days per year over the past 10 years. After showing a decline to about 3,800 angler days in 1997 and 1998 has stabilized at about between 5,500 and 6,500 angler days over the past few years (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 and 2003 more saltwater sport fishing effort was documented in Norton Sound than ever before (about 1,600 angler days). In 2004, salt water effort dropped to pre-2002 (700 angler days). 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 include: 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 2004. Observations regarding the 2005 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 and 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 9). Effort declined in late 1990s showed a slight increase in recent years, and was estimated at 17,977 angler days in 2004. Salmon harvests were estimated to have ranged from 3,800 fish in 1977 to 20,000 fish in 1982 (Table 10). Mean annual harvest of salmon of all species from 1994 to 2003 was about 10,500 fish, with 94% of the harvest reported from Seward Peninsula and Norton Sound, and only about 6.0% from Kotzebue drainages. Over the past 5 years (1999-2003), about 51% of the total

Table 10.-Seward Peninsula/Norton Sound estimated sport fish salmon catch/harvest/effort, 1977-2004.

Year	Effort	King Salmon		Coho		Chum		Pink		Sockeye		Total	
		Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
1977	7,828	197		449		670		2,402		0		3,718	
1978	8,379	303		742		546		7,399		0		8,990	
1979	8,725												
1980	7,958	52		1,455		1,601		7,732		0		10,840	
1981	10,879	70		1,504		1,889		3,101		0		6,564	
1982	13,198	409		2,986		2,620		13,742		0		19,757	
1983	16,944	687		3,823		2,042		4,583		0		11,135	
1984	17,436	247		7,582		1,481		8,322		351		17,632	
1985	19,919	239		1,177		1,036		1,138		20		3,590	
1986	18,107	1,077		3,926		1,719		3,172		19		9,894	
1987	20,413	615		2,319		814		1,304		924		5,052	
1988	20,278	400		5,038		1,583		2,912		782		9,933	
1989	17,692	203		4,158		1,497		3,564		165		9,422	
1990	21,799	364	515	3,305	6,816	925	3,450	7,647	15,920	198	361	12,241	26,701
1991	23,622	404	512	5,800	8,810	1,415	2,380	1,738	3,993	237	498	9,357	15,695
1992	22,684	204	570	4,671	8,415	523	2,436	6,403	25,855	131	188	11,801	37,276
1993	18,930	595	3,067	3,783	6,174	691	2,219	2,250	6,397	10	116	7,319	17,857
1994	18,922	600	887	5,547	7,737	536	2,562	7,051	14,259	18	105	13,734	25,445
1995	19,647	438	849	3,705	7,486	394	2,884	928	3,273	104	271	5,465	14,492
1996	13,783	662	2,421	7,289	12,473	662	4,675	5,972	16,038	100	268	14,585	35,607
1997	13,850	1,106	5,517	4,393	7,487	278	2,829	1,458	5,954	30	305	7,235	21,787
1998	13,616	590	1,720	4,441	10,159	682	4,838	6,939	25,769	16	209	12,652	42,486
1999	15,006	630	1,023	5,582	14,383	211	2,415	3,039	3,835	0	124	9,462	21,656
2000	18,559	889	2,020	7,441	14,380	1,097	5,719	2,886	11,986	45	164	12,313	34,105
2001	10,955	271	668	4,802	8,522	1,709	3,532	360	2,695	39	53	7,142	15,417
2002	18,325	802	1,996	4,211	7,560	818	4,856	4,303	13,398	0	53	10,134	27,810
2003	12,403	239	1,301	3,039	6,186	292	2,804	2,222	8,964	572	1,350	5,792	19,255
2004	13,323	535	2,353	5,806	17,646	498	3,830	8,309	44,060	404	680	15,148	67,889
Avg (94-03)	15,507	623	1,840	5,045	9,637	668	3,711	3,516	10,617	92	290	9,851	25,806
Avg (99-03)	15,050	566	1,402	5,015	10,206	825	3,865	2,562	8,176	131	349	8,969	23,649

average harvest has been coho salmon, 26% pink salmon, 16% chum salmon, and 6% Chinook salmon. During years of high pink salmon abundance such as 2000, 2002 and 2004, harvests of this species have comprised about 50% of the total annual salmon harvest. However, during years of low pink salmon abundance such as 1999, 2001 and 2003 they accounted for about 3% of the harvest while coho salmon accounted for about 60% of the total annual salmon harvest (Table 10).

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 daily bag limit of 15 salmon 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 remained 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 king salmon (under 20 inches in length) was adopted. In 2004, the BOF restructured salmon bag limits for the Unalakleet River drainage. A seasonal bag limit for king salmon was set at 4 fish of which only 2 could be from the North River, and the daily bag limit was set at 2 fish of which 1 could be over 20 inches. In addition, the “other salmon” limit was set at 10 fish of which only 4 could be chum, coho, or sockeye in combination.

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 sport fishing 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 eight 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. However, 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 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 3 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 9). In 2002 effort was estimated at 8,195 angler days, in 2003, 3,056 angler days and in 2004 effort was estimated at 4,527 angler days (Table 11). Unalakleet River salmon harvests trended upward between 1990 and 2000, and have remained relatively stable (Figure 12). The average annual sport harvest of salmon of all species from the Unalakleet River between 1994 and 2003 has been about 4,200 fish. Coho comprised about 63% of the average harvest while Chinook made up about 10%. Coho have comprised an average of 67% of the salmon harvest from the Unalakleet River since 2000 (Table 11). Approximately 61% of the entire NWMA harvest of Chinook salmon, and 67% of the coho harvest were taken from the Unalakleet River in 2004.

In 2004, the Unalakleet and Shaktoolik rivers were closed by EO to the retention of Chinook and chum salmon because low numbers counted past the counting tower on the North River. This EO remained in effect from July 1 through August 10 (Appendix C). The North River did not reach the lower end of its escapement goal (1,200-2,400 Chinook) with a total escapement of 1,105 Chinook in 2004. No other management actions were taken on the Unalakleet River in 2004.

The estimated sport harvest of Chinook in the Unalakleet River remained fairly stable from 1998 to 2002 averaging about 420 annually. In 2003 the harvest dropped to an estimated 97 fish likely a result of fishery restrictions, however in 2004 the harvest was near the previous average with 356 estimated harvested even with restrictions in place (Table 10). 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

Table 11.-Sport fish effort, catch and harvest estimates by species for the Unalakleet River, 1990-2004.

	Year									
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Effort										
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
Harvest										
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
Catch										
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 11.-Page 2 of 2.

	Year					Average (1994-2003)	Average (1999-2003)
	2000	2001	2002	2003	2004		
Effort							
Number of Anglers	1,002	918	1,093	509	741	877	903
Number of Trips	3,415	1,365	4,314	1,643	2,015	2,648	2,493
No. Angler Days	6,257	2,793	8,195	3,056	4,527	4,139	4,895
Harvest							
Chinook Salmon	345	250	544	97	356	403	330
Coho Salmon	4,150	2,766	2,937	1,604	3,524	2,754	2,830
Chum Salmon	403	714	607	191	47	369	425
Pink Salmon	961	188	1,378	29	2,003	767	1,100
Dolly Varden	4,462	1,002	789	134	3,593	1,354	1,754
Arctic Grayling	538	247	773	131	597	339	393
Total Fish Harvest	10,859	5,167	7,028	2,186	10,120	5,987	6,833
Catch							
Chinook Salmon	1,045	542	835	505	1,930	1,344	719
Coho Salmon	9,287	5,399	3,691	2,832	12,655	4,947	6,160
Chum Salmon	3,652	2,030	1,653	1,681	1,473	1,759	2,186
Pink Salmon	3,982	1,197	2,463	3,762	10,332	2,825	2,976
Dolly Varden	10,293	2,769	2,593	4,284	10,928	4,429	6,080
Arctic Grayling	6,814	2,331	4,229	6,189	3,478	3,833	5,130
Total Fish Catch	35,073	14,268	15,464	19,253	40,796	19,137	23,252

proportions of radio-tagged fish moving upstream in each drainage. In both 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 (Wuttig 1998, 1999). Similar expansions would give estimates of 5,673 Chinook for 1999, 2,615 for 2000, and 3,343 for 2001, 3,710 for 2002, 3,060 for 2003, 2,763 for 2004, and 2,538 for 2005. Unalakleet and Shaktoolik Chinook stocks were designated “stocks of concern” by the BOF in January 2004, and escapement goals in these drainages are currently being reviewed by the department.

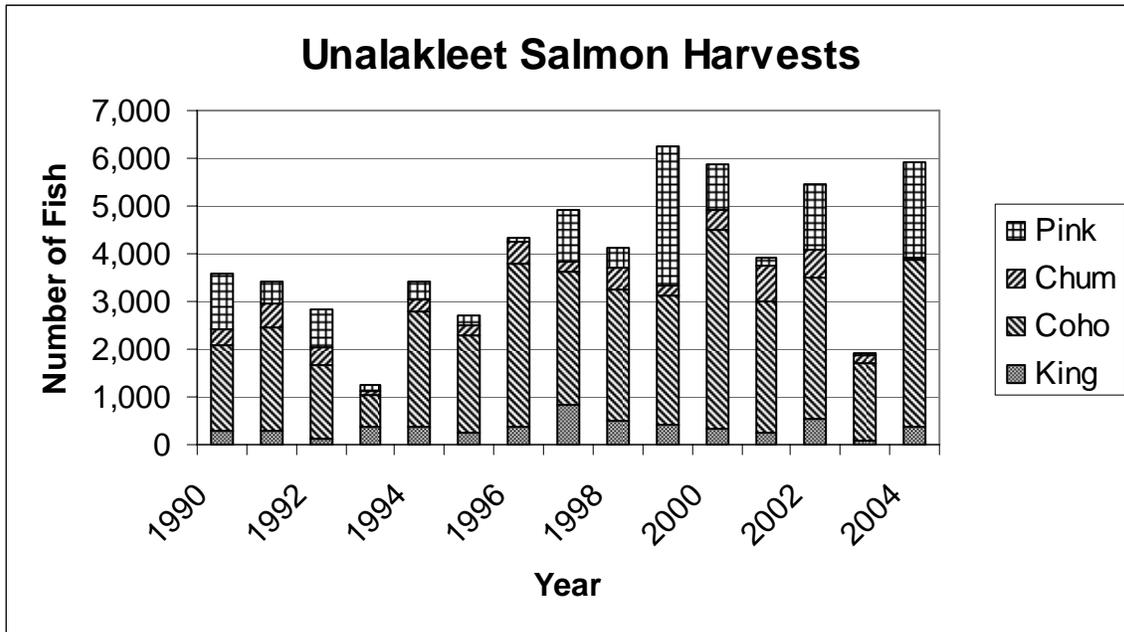


Figure 12.-Estimated sport fish harvests of salmon from the Unalakleet River, 1990-2004.

Over the past 5 years (1999-2003) the commercial harvests of Chinook in the Unalakleet Subdistrict have been declining and have averaged 167 fish (Table 1). Since 1961, harvests have ranged from four in 2002 to 12,621 in 1985. There was no directed commercial fishing for Chinook between 2002 and 2004. In 2005 two 24-hour commercial periods were allowed early in the season. Only 101 Chinook were harvested in the Unalakleet Subdistrict and no further commercial Chinook fishing was allowed. Commercial fish managers believe that some of the Chinook harvest in Unalakleet is composed of Yukon River stocks, but this has never been confirmed. Incidental harvests in commercial fisheries directed at other species have been 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 5-year average (1999-2003) harvest was 2,576 fish. The 2004 subsistence harvest was estimated at 2,255 Chinook. The sport fish harvest over the same 5-year period has averaged 330 fish or about 11% of the total Unalakleet harvest. In 2004 the estimated sport fish harvest of 356 fish was about 14% of the total Unalakleet Chinook harvest.

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 estimated sport harvest of coho, from 1999 to 2003, has averaged 2,830 fish. There was a marked increase in estimated harvest to 4,150 coho in 2000, and the estimated harvest of coho in the Unalakleet River was 2,937 fish in 2002, 1,604 in 2003, and 3,524 in 2004 (Table 11). The coho sport fishery is more consumptive than most other Unalakleet salmon fisheries. Approximately 55% of coho caught are harvested while about 30% of Chinook, 21% of chum, and 27% of pink salmon (1999-2003 average) caught are harvested.

From 1999-2003 commercial harvests of coho salmon in the Unalakleet subdistrict have averaged 16,156 fish. Since 1961 they have ranged from 79 in 1964 to 71,019 in 1994 (Table 1). 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 commercial harvest in 2003 was 13,027 coho, and the harvest in 2004 was 42,016 coho. 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. The counts in 2003, 2004, and 2005 were 5,837; 9,646; and, 19,189 respectively (Table 3). Between 1999 and 2003, subsistence harvests of coho salmon in the community of Unalakleet averaged 6,284 fish and the 2004 subsistence harvest was estimated at 5,307 coho (Table 6). The sport fish harvest over the same period has averaged 2,657 fish, or about 11% of the total coho harvest in Unalakleet (Table 11). 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. Based on the tower counts, the return from the 2000 run in 2004 was strong and the 2005 run was over twice the size the 2004. A radio telemetry project to estimate the proportion of the Unalakleet River coho run moving past the North River tower was initiated in 2004 and will continue through 2006. Preliminary estimates suggest that approximately 15% of the Unalakleet River coho run migrates up the North River and is enumerated at the tower.

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 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 in place for the North River. When other escapement goals have been developed, 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. Recent increases in escapements suggest that these runs are returning to more acceptable levels. While the commercial harvests of Chinook in the Unalakleet Subdistrict have declined during the past 5 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 federal management of subsistence fisheries 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.

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 through the Norton Sound Economic Development Corp. and operated by the Unalakleet IRA with guidance by ADF&G, CF. Aerial surveys are difficult in the Unalakleet River because of its dark bottom and tannic stained water. These surveys provide a measure of the 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.

Two meetings were held in 2004 with the Unalakleet IRA during the Chinook run to discuss management options as this run developed and to inform the community about research projects. A 3-year coho radiotelemetry project supported in part by the BLM was begun in 2004. About 200 coho were fitted with radio transmitters and tracked to spawning locations. One objective of the study is to estimate the fraction of the run that moves past the counting tower on the North River to determine if the tower count is a good index of the entire run. Preliminary results from the first 2 years of this project suggest that about 15% of coho entering the Unalakleet River migrate up the North River to spawn. A similar research project was conducted on Chinook in the Unalakleet River during 1997 and 1998. 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. It is hoped that an expansion factor will result from the ongoing coho study. CF has undertaken a similar project with chum salmon in the Unalakleet drainage. Results are not yet available. The sport fish staff have frequently assisted and cooperated informally with the CF 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 CF.

In June 2004, low catches of Chinook and chum salmon in the CF 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-KS-02-04 was issued on June 1, 2004 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 10, 2004 (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 5 years (1999-2003) estimated harvests from these rivers have averaged about 2,215 salmon annually, of which coho have composed about 61% and pink salmon have about 24%. Sport fishing on the Nome River has accounted for an annual average of about 10% of all the fishing effort in the entire northwestern management area during the last 5 years (Table 9). An average of about 409 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 2,248 salmon (Table 12). The decline in salmon harvests from the Nome River in the past 5 years is likely a result of poor runs and recent fishery restrictions. Chum, coho and pink salmon escapements have increased in the Nome River during the past 2 years (Table 3). If this trend continues, harvests are likely to increase in this drainage, and chum salmon restrictions may be relaxed.

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. Over the past 5 years the drainage has sustained an average annual effort of about 3,100 angler days, and about 1,100 salmon have been harvested annually from the Fish and Niukluk rivers (Table 13). Escapements of chum and coho salmon have been relatively weak during the past 5 years, and in-season fishery restrictions have been necessary.

The Pilgrim River, with its headwaters at Salmon Lake has historically been somewhat less popular for salmon fishing; however, large sockeye escapements over the past 3 years have drawn additional effort to this drainage. 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 and favorable marine conditions. The escapement of sockeye past the weir in the lower Pilgrim River was 42,729 fish in 2003, the largest recorded in that system until the return of 2004 when 85,520 sockeye were counted. In 2005, 56,484 returned to the system. These compare to an average escapement of 5,800 for 3 years of enumeration between 1997 and 2002 (Table 3). 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 300 salmon have been harvested annually between 1999 and 2003. However, the large return of sockeye in 2003 and 2004

Table 12.—Sport fish effort, and harvests by species from the Nome River 1983-2004, and catches 1990-2004.

Year	Number of Anglers	Days Fished	Salmon				Chum	All Salmon	Dolly Varden	Arctic Grayling	Whitefish
			King	Coho	Red	Pink					
Harvest											
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
2003	377	651	0	68	0	12	0	80	1,223	0	0
2004	668	1,636	0	270	0	3,369	0	3,639	226	0	0
Avg 94-03	647	2,088	1	269	0	1,058	0	1,329	530	2	0
Avg 99-03	462	1,303	0	229	0	180	0	409	582	0	0
Catches											
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
2003	377	651	0	90	0	73	0	163	1,276	94	0
2004	668	1,636	0	428	0	6,189	14	6,631	374	113	0
Avg 94-03	647	2,088	8	434	0	2,082	132	2,657	844	415	0
Avg 99-03	462	1,303	5	326	0	817	51	1,199	766	240	0

Table 13.—Sport fish effort, and harvests by species from the Fish/Niukluk River 1983-2004, and catches 1990-2004.

Year	Num.	Days	King	Coho	Red	Pink	Chum	All	Dolly	Arctic	Northern	Whitefish	Burbot
	Anglers	Fished	Salmon	Salmon	Salmon	Salmon	Salmon	Salmon	Varden	Grayling	Pike		
	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	1569	1197	430	297	129	43
2002	542	1,805	75	298	0	254	45	672	259	452	51	16	0
2003	867	2,448	39	216	0	196	101	552	110	387	0	15	0
2004	624	2,786	22	291	0	353	435	1,101	120	102	0	45	0
Avg 94-03	696	2,752	44	838	0	157	90	1,129	891	471	71	33	42
Avg 99-03	727	3,070	66	803	0	148	117	1,134	1,041	514	87	32	26

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Table 13.—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
2003	867	2,448	515	1,447	0	626	258	2,846	1,695	5,495	11	766	0
2004	624	2,786	22	1,653	0	10,176	979	12,830	849	1,594	82	64	0
Avg 94-03	696	2,752	116	1,856	11	1,618	766	4,366	2,948	5,183	300	227	56
Avg 99-03	727	3,070	182	1,968	0	1,171	553	3,873	2,695	5,000	228	308	29

resulted in increased sport fishing effort and an estimated harvest of 1,225 salmon including 575 sockeye in 2003 and 449 salmon including 404 sockeye in 2004 (Table 14). The Fish/Niukluk and the Pilgrim rivers are the only road accessible rivers where fishing for chum salmon is still allowed, however annual (1999-2003 average) harvests from these drainages have been only about 120 chum salmon (Tables 13 and 14). The mouth of the Snake River is in downtown Nome. This small stream can be accessed from a bridge at about mile 8 of the Teller Road and from the Glacier Creek Road. Over the past 5 years (1999-2003) the Snake River has sustained an average annual effort of about 600 angler days, with an annual harvest of about 150 salmon, about 86% coho and 14% pink salmon (Table 15). Other road accessible waters include the Solomon, Kuzitrin, Penny, Cripple and Sinuk rivers (Tables 16-20). The annual harvests in these rivers combined for the past 5 years (1999-2003) have averaged 113 coho and 103 pink salmon. During years of high pink salmon abundance (even years) this species has dominated catches and harvests in most Nome roadside streams.

Recent Fishery Performance

The alternate year strong pink salmon run in Norton Sound have has a major influence on salmon harvests in sport fisheries on road accessible streams. This relationship has been 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 12). Estimated effort nearly doubled to over 1,900 angler days in 2002, decreased in 2003, and increased again in 2004. Effort has reflected the abundance of pink salmon available to anglers. 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 pink salmon was only 12 fish in 2003, but jumped to 3,369 in 2004 when over 1,000,000 pink salmon were estimated in the river. The estimated harvest of coho salmon in the Nome River in 2004 was about 270 fish and has remained relatively stable since 1994 averaging 269 fish in spite of several emergency closures during that period (Table 12). 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 13). 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. Effort has averaged 2,350 angler days for the past 3 years and was estimated at 2,786 angler days in 2004. The estimated harvest of salmon increased to about 1,100 in 2004 of which 435 were chum 353 were pink and 291 were coho. Although sport fishing for chum salmon is allowed in this drainage, harvests remained low until 2004. The estimated Chinook harvest was 22 fish in 2004 (Table 13). A low harvest of only a few hundred pink salmon occurred in the even years since 1998 in spite of an abundant run of this species with over 1,000,000 counted past the tower on the Niukluk River.

Table 14.—Sport fish effort and harvests by species from the Pilgrim River 1983-2004, and catches 1990-2004.

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
Harvest													
1983	0	597	0	37	0	37	111	185	445	761	148	0	0
1984	398	732	65	195	78	104	0	442	195	247	13	0	0
1985	363	375	10	20	20	50	100	200	14	319	0	0	0
1986	238	868	38	76	0	0	113	227	189	227	529	0	0
1987	438	1,159	72	109	435	0	272	888	163	272	199	0	0
1988	836	4,822	55	218	746	36	346	1,401	327	109	91	36	0
1989	1,050	1,678	68	204	78	301	272	923	603	516	415	131	10
1990	862	1,710	19	81	93	208	41	442	498	415	1,194	0	33
1991	1,169	3,183	51	310	124	81	85	651	1,015	459	608	13	0
1992	686	1,184	55	57	66	55	106	339	131	91	231	0	0
1993	570	1,195	28	191	10	0	0	229	730	75	207	0	0
1994	323	844	0	134	9	154	0	297	63	49	108	0	0
1995	531	1,253	19	113	62	0	73	267	74	52	68	18	11
1996	445	840	0	133	84	49	0	266	388	73	75	0	0
1997	456	820	45	0	20	0	0	65	65	81	117	0	0
1998	392	546	32	6	0	0	0	38	14	0	26	0	0
1999	283	433	0	33	0	0	0	33	45	11	94	9	0
2000	177	753	0	179	32	6	0	217	0	57	271	0	0
2001	207	491	0	29	0	0	0	29	270	43	0	0	0
2002	303	562	0	0	0	0	0	0	72	31	148	0	0
2003	400	730	103	113	572	437	0	1,225	482	98	0	304	0
2004	196	565	0	45	404	0	0	449	0	0	436	0	0
Avg 94-03	352	727	20	74	78	65	7	244	147	50	91	33	1
Avg 99-03	274	594	21	71	121	89	0	301	174	48	103	63	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	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
2003	400	730	268	203	1,323	1,044	548	3,386	549	397	0	304	0
2004	196	565	0	124	680	163	33	1,000	80	0	590	0	0
Avg 94-03	352	727	43	180	222	219	115	779	293	377	254	34	1
Avg 99-03	274	594	58	103	309	231	117	817	330	372	171	63	0

Table 15.—Sport fish effort and harvests by species from the Snake River 1983-2004, and catches 1990-2004.

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
2003	249	701	0	11	0	0	0	11	13	140	0
2004	234	468	0	163	0	60	0	223	0	91	0
Avg 94-03	315	836	0	139	0	170	1	310	81	62	1
Avg 99-03	268	684	0	128	0	21	0	148	76	88	0

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Table 15.—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
2003	249	701	0	11	0	0	0	11	27	559	0
2004	234	468	0	307	0	223	14	544	0	238	0
Avg 93-03	315	836	6	239	0	250	42	537	203	606	14
Avg 99-03	268	684	0	239	0	25	16	280	122	679	0

Table 16.—Sport fish effort and harvests by species from the Solomon River 1983-2004, and catches 1990-2004.

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
2003	126	168	0	0	0	97	0	97	0	0	0
2004	116	129	0	90	0	0	0	90	53	0	211
Avg 94-03	228	502	0	52	2	72	0	126	159	0	5
Avg 99-03	161	388	0	19	0	42	0	61	67	0	0

-continued-

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	Whitefish
						<u>Catches</u>					
1990	216	458	0	12	58	736	108	914	415	33	0
1991	593	1,057	7	83	0	620	47	757	4,549	602	0
1992	685	962	0	316	0	998	91	1,405	197	38	0
1993	317	1,404	47	650	0	633	0	1,330	1,725	140	61
1994	328	1,193	0	255	0	784	7	1,046	520	212	19
1995	426	781	0	208	0	190	22	420	734	200	0
1996	230	335	0	237	0	39	0	276	49	97	0
1997	250	434	0	39	0	74	0	113	415	703	26
1998	245	340	17	59	64	433	0	573	410	0	0
1999	193	438	0	185	0	13	0	198	573	21	0
2000	88	242	57	53	119	288	278	795	1,537	853	0
2001	254	615	0	39	0	407	0	446	399	0	0
2002	144	475	0	35	0	192	81	308	18	0	0
2003	126	168	0	0	0	97	0	97	0	80	0
2004	116	129	0	90	0	195	0	285	67	130	211
Avg 94-03	228	502	7	111	18	252	39	427	466	217	5
Avg 99-03	161	388	11	62	24	199	72	369	505	191	0

Table 17.–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
Catches													
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
2002	193	203	0	0	0	139	28	167	0	18	127	0	0
2003	196	214	13	0	0	0	0	13	0	12	970	0	0
2004	100	215	0	0	0	0	0	0	0	34	706	0	0
Avg 94-03	195	354	1	12	7	31	8	59	43	381	1,154	68	2
Avg 99-03	177	288	3	1	1	48	6	59	40	361	1,251	136	1

Table 18.—Sport fish effort and harvests by species from the Penny River 1983-2004, and catches 1990-2004.

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
2003	15	519	0	0	0	0	0	0	40	0
2004	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Avg 94-03	38	152	0	19	2	7	0	28	20	0
Avg 99-03	15	519	0	0	0	0	0	0	40	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
2003	15	519	0	0	0	875	42	917	159	0
2004	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Avg 93-03	38	152	0	23	17	243	8	292	61	19
Avg 99-03	15	519	0	0	0	875	42	917	159	0

Table 19.—Sport fish effort and harvests by species from the Cripple River 1983-2004, and catches 1990-2004.

Year	Number of Anglers	Days Fished	Salmon				All Salmon	Dolly Varden	Arctic Grayling	
			King	Coho	Red	Pink				Chum
Harvest										
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
2003	61	926	0	127	0	116	0	243	378	70
2004	216	872	0	131	0	602	0	733	61	0
Avg 94-03	123	523	0	104	0	177	0	281	135	7
Avg 99-03	62	372	0	79	0	59	0	137	198	14
Catches										
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
2003	61	926	0	496	0	271	55	1,748	686	704
2004	216	872	0	601	0	6,801	277	8,551	91	0
Avg 94-03	123	523	0	561	0	896	208	1,758	256	78
Avg 99-03	62	372	0	185	0	209	24	603	362	141

Table 20.—Sport fish effort and harvests by species from the Sinuk River 1983-2004, and catches 1990-2004.

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
2003	312	430	0	0	0	0	0	0	712	12	0
2004	301	466	0	13	0	156	0	169	42	0	0
Avg 94-03	261	633	0	39	7	52	0	98	260	30	0
Avg 99-03	195	556	0	15	8	2	0	24	198	34	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
2003	312	430	0	0	0	68	14	82	840	249	0
2004	301	466	0	13	0	1,352	149	1,514	42	0	0
Avg 94-03	261	633	0	90	12	139	48	288	505	369	3
Avg 99-03	195	556	0	34	8	20	10	72	263	189	4

The Pilgrim River is the other road accessible water where chum salmon fishing is still allowed. Effort there in 2004 was estimated at 565 angler days near the recent 5-year average of about 600 angler days (Table 14). Large returns of sockeye in 2003–2005 reflected larger harvests with 570 sockeye harvested in 2003 and 400 harvested in 2004.

Sport Fishery Management Objectives

There have been no specific management objectives identified for salmon fisheries on the Nome roadside streams. The goal of sport fishery management in these waters is to 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 in order to meet escapement goals. 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. Increased escapements in the past 2 years suggest that chum salmon populations are responding positively to these efforts. 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 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 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. This 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 CF 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-01-02, effective June 15, closed the Nome Subdistrict to all sport fishing for salmon through July 31 in order that CF 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.

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 CF 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.

In 2004, five EOs were issued regarding sport fishing for salmon in the NWMA. EO 3-S-1-04 effective June 15, closed the Nome Subdistrict to all sport fishing for salmon so CF could implement the normal preseason subsistence closure prior to opening selected locations to Tier II subsistence fishing. Due to the large run of pink salmon, EO 3-S-02-04 effective July 2, opened the Nome Subdistrict to normal sport fishing for salmon. EO 3-KS-02-04 prohibited the retention of king salmon in the Unalakleet and Shaktoolik rivers and prohibited the use of bait while sport fishing. This EO became effective on July 1 and expired on August 10. EO 3-CS-01-04 effective on July 21 prohibited the retention of chum salmon in the Fish River drainage including the Niukluk River. EO 3-SS-01-04 prohibited the retention of coho in the Fish River drainage effective August 25. It also prohibited the use of bait (Appendix D).

In 2005, two EOs were issued regarding sport fishing for salmon in NWMA. EO 3-S-1-05, effective June 15, closed the Nome Subdistrict to all sport fishing for salmon so CF could implement the normal preseason subsistence closure prior to opening selected locations to Tier II subsistence fishing. EO 3-SS-01-05 reduced the daily bag and possession limit for coho in the Fish River drainage including the Niukluk River from three fish to one fish effective September 10 (Appendix C).

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 the initiation of Tier II subsistence management in the Nome Subdistrict. 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. Chum salmon runs have stabilized and even increased in some drainages in recent years suggesting that runs may be in the process of recovering, however the decline in chum salmon escapement into the Niukluk River over the past 5 years while other drainages are showing relatively stable runs is a growing concern in the NWMA.

Ongoing Research and Management Activities

Current research and management activities on Nome roadside salmon populations are primarily conducted by the CF in conjunction with Kawerak 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 CF throughout the salmon runs. The weirs obstruct 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 2005 to enumerate sockeye migrating into the lake and the Unalakleet IRA has operated a tower on the North River.

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, these are two different species, and regulations are in place that manage them as separate species. Arctic char are 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 comprise an important part of this traditional harvest, and in some communities they outrank salmon and whitefish in importance to the subsistence economy. The number of Dolly Varden harvested for subsistence purposes is largely undocumented in northwestern Alaska but vastly exceeds the number taken by sport anglers. Intermittent community subsistence harvest estimates dating to 1959 for Kivalina and Noatak (Table 21) and personal observation by 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. Estimated harvests of Dolly Varden by sport anglers in the Seward Peninsula/Norton Sound sub-area have averaged about 5,125 fish over the past 5 years (Table 22). 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 9,000-12,000 spawned annually in the Noatak drainage (Table 23). Total abundance of spawning Dolly Varden in northwestern Alaska is unknown; however, partial surveys in 2002-2005 and angler reports suggested that spawner abundance in Noatak, Wulik and Kivalina river streams has declined.

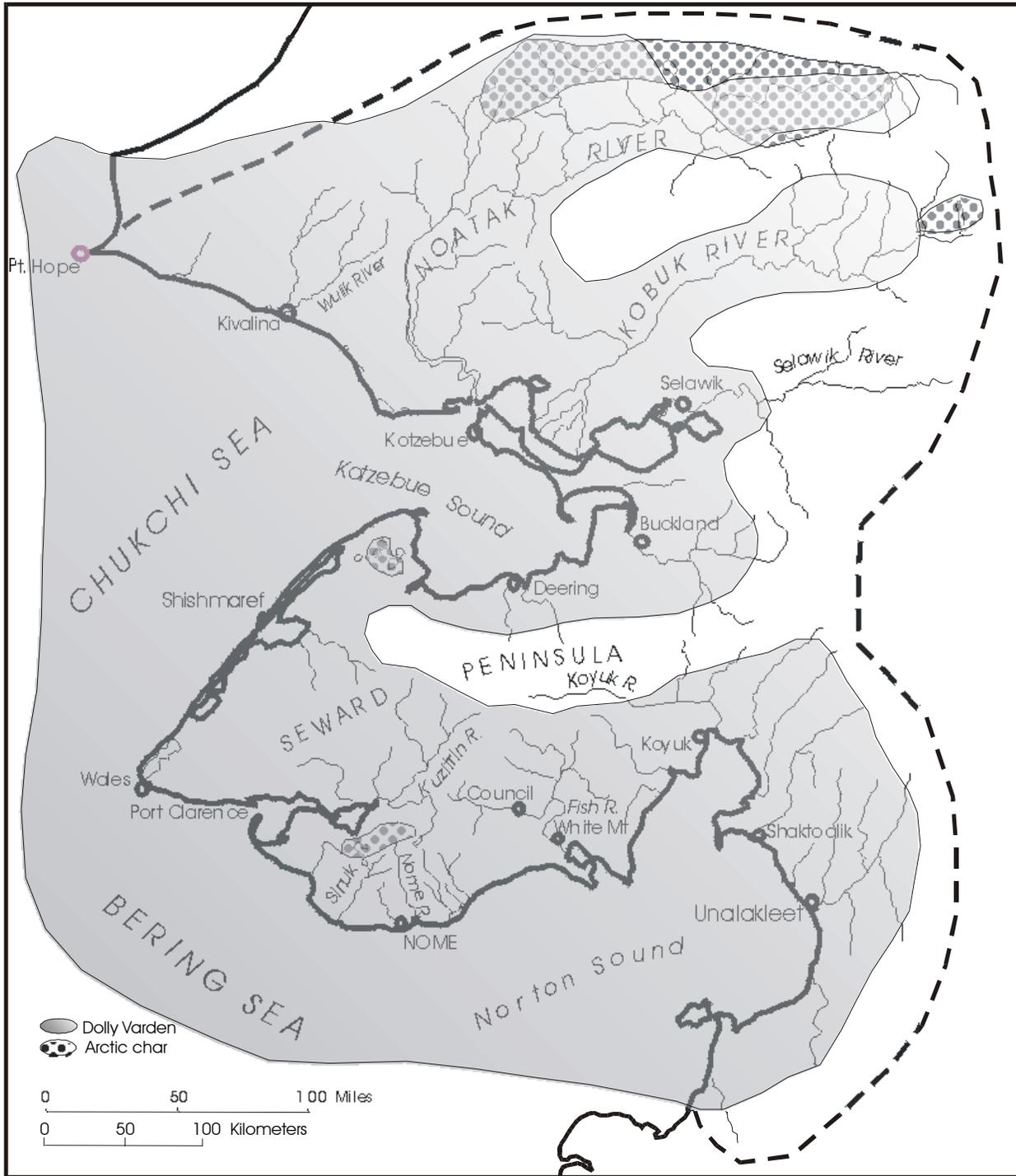


Figure 13.-Dolly Varden and Arctic char distribution in the NWMA.

Table 21.-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
2003			6,386
2004			11,697

^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 22.—Historic Dolly Varden harvests and catches in NWMA by sub-area, 1977-2004.

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
2003	2,187	12,403	5,531	12,258	45	1,156	6,121	533	4,292	12
2004	2,432	13,323	4,318	13,200	33	1,079	5,704	1,285	3,777	34
Avg (94-03)	2,881	15,507	4,259	11,270	39	12,47	5,997	1,176	7,177	20
Avg (99-03)	2628	15,050	5,123	13,061	39	12,19	6,468	1,301	6,380	21

Table 23.—Aerial counts of Dolly Varden spawning in the Noatak River and overwintering in the Wulik and Kivalina rivers, 1968-2005.

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
2003	nd	nd	nd
2004	nd	101,806	nd
2005	nd	120,848	nd

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

nd = no data

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.

Anadromous Dolly Varden make their first seaward migration at age-3 or age-4, and after moving to sea in the spring to feed during the summer, they return to freshwater each winter. Upon reaching sexual maturity at ages 6-9, they return to their home river to spawn. Each fall, nonspawning Dolly Varden return to freshwater to overwinter in mixed-stock aggregations. Some Dolly Varden spawn during August, while others spawn in September or October. 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. 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. Harvests can be substantial in streams along the Nome road system and 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 summer to feed on salmon eggs, especially during years of high pink salmon abundance. They are also 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

Over the past 5 years (1999-2003) sport harvests of Dolly Varden/Arctic char have averaged about 1,300 Dolly Varden annually in the Kotzebue/Chukchi Sea sub-area, and about 5,123 in the Seward Peninsula/Norton Sound sub-area (Table 24). Estimated mean annual catch (which includes fish that are kept and those released) since 1999 has been about 13,100 Dolly Varden in the Seward Peninsula/Norton Sound area, and 6,400 in the Kotzebue/Chukchi Sea area (Table 22). During the past 5-years, data suggest that about 60% of all Dolly Varden captured in the Seward Peninsula/Norton Sound area are released while about 80% 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

Table 24.—Historic Dolly Varden and Arctic char harvests in the NWMA by sub-area and river, 1987-2004.

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 24.—Page 2 of 2.

Areas	Year					Average	
	2000	2001	2002	2003	2004	(1994-2003)	(1999-2003)
Seward Peninsula/Norton Sound Historic Dolly Varden and Arctic Char Harvests							
Salt Water	1,069	166	67	0	72	192	326
Nome River	340	43	511	1,223	226	530	582
Pilgrim River	0	270	72	482	0	147	174
Unalakleet R	4,462	1,002	789	134	3,593	1,319	1,754
Fish-Niukluk R.	1,687	1,197	259	110	120	888	1,041
Sinuk R.	59	86	47	712	42	260	198
Snake R.	199	108	18	13	0	81	76
Solomon R.	0	162	18	0	53	152	67
Other Streams	136	140	471	2,857	212	690	905
Lakes ^a	0	0	0	0	0	0	0
Freshwater Total	6,883	3,008	2,185	5,531	4,246	4,067	4,797
Grand Total	7,952	3,174	2,252	5,531	4,318	4,259	5,123
Kotzebue/Chukchi Sea Historic Dolly Varden and Arctic Char Harvests							
Salt Water	281	108	18	0	0	48	81
Kobuk R.	47	79	197	29	642	79	80
Noatak R.	763	1,026	1,495	354	69	571	779
Other Streams	467	430	174	137	574	441	336
Lakes ^a	41	50	0	13	0	16	25
Freshwater Total	1,318	1,585	1,866	533	1,285	1,108	1,220
Grand Total	1,599	1,693	1,884	433	1,285	1,155	1,301

^a Lake totals are for Arctic char.

sport fishing effort levels in both the Seward Peninsula/Norton Sound area and the Kotzebue have been fairly consistent over the past 5 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, declined to about 7,500 fish in 2001 and 2002 and increased to 12,000 in 2003 and 13,000 in 2004. Catches have remained stable in the Kotzebue/Chukchi Sea sub-area within the range of 4,000 to 8,000 fish over the past 5 years (Table 22). 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 or sheefish. 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 24). 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 21). During the most recent 5-year period (1999-2003), estimated sport fishing effort has averaged about 500 angler-days (Howe et al. 2001d; Walker et al. 2003; Jennings et al. 2004, 2006 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 2004 was 148 fish (Jennings et al. *In prep*) with the 2004 catch estimated at 844 Dolly Varden. Approximately 79% 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 397 angler days in 2003. Although local reports suggested that effort had increased in 2004, it was estimated at 219 angler days. The river is well known for its large run of anadromous Dolly Varden, but 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 from 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.

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 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 spawning runs into Noatak River tributaries in 2002–2004 may indicate a change in population structure. Spawning population will continue to 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 throughout northern Norton Sound 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 bag limits were 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 23). 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 21). 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 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 in Norton Sound, 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 and fry 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 ADNIR and the Red Dog Mine. 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 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 been ongoing for the past 4 years. It appears that stocks in western Alaska are structured along geographic lines with good separation among stocks. A report on this study is available through the USFWS Office of Subsistence Management. A detailed study of a single spawning stock in the Noatak drainage was begun in 2001. This spawning stock assessment project was completed but high water conditions during critical times of fish movement in both 2001 and 2002 resulted in incomplete data (Scanlon 2004). In October 2003, 15 Dolly Varden were radio-tagged in the Wulik River to determine movement over the course of the winter. These fish remained in the same vicinity as tagged until June 2005. At that time two, likely spawners, remained in the Wulik River, and one had been captured at Kivalina. The rest could not be located. The movement to sea had already occurred and it is believed that the remainder had already migrated to salt water.

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 1,300 in the Seward Peninsula/Norton Sound sub-area and 1,400 in the Kotzebue/Chukchi Sea sub-area (Tables 25 and 26).

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.

Table 25.—Historic Arctic grayling harvests and catches in Seward Peninsula/Norton Sound waters, 1987-2004.

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	7,066	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	1,571	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	12,408	16,132
Grand Total				6,119	23,160	5,772	13,223	7,081	5,788	10,406	20,187	12,408	16,132

-continued-

Table 25.—Page 2 of 2.

Areas	Year					Average	
	2000	2001	2002	2003	2004	(94-03)	(99-03)
Harvests							
Salt Water	0	0	0	0	0	13	0
Nome River	0	0	0	0	0	2	0
Pilgrim River	58	43	31	98	0	50	49
Unalakleet R	538	247	773	131	579	338	343
Fish-Niukluk R.	442	430	452	387	102	471	475
Sinuk R.	0	43	103	12	0	30	34
Snake R.	16	63	110	140	91	62	71
Solomon R.	0	0	0	0	0	0	0
Other Streams	149	168	96	1,010	52	289	300
Lakes	0	0	0	0	0	0	0
Freshwater Total	1,203	994	1,565	1,778	824	1,242	1,273
Grand Total	1,203	994	1,565	1,778	824	1,255	1,273
Catches							
Salt Water	0	0	0	0	0	0	0
Nome River	10	60	735	94	113	415	309
Pilgrim River	221	403	144	397	0	381	397
Unalakleet R	6,814	2,331	4,229	6,189	3,478	3,863	4,440
Fish-Niukluk R.	1,701	3,972	6,87	5,495	1,594	5,199	6,054
Sinuk R.	29	218	432	249	0	369	347
Snake R.	449	1,385	279	559	238	606	599
Solomon R.	853	0	0	80	130	217	219
Other Streams	992	1,098	351	1,954	533	1,091	1,202
Lakes	0	0	0	0	0	0	0
Freshwater Total	11,069	9,467	12,757	15,017	6,086	12,140	13,567
Grand Total	11,069	9,467	12,757	15,017	6,086	12,140	13,567

Table 26.—Historic Arctic grayling harvests and catches in the Kotzebue Sound/Chukchi Sea sub-area, 1989-2004.

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 26.—Page 2 of 2.

Area	Year					Average	
	2000	2001	2002	2003	2004	(94-03)	(99-03)
Harvests							
Salt Water	0	0	0	0	0	1	0
Kobuk R.	836	355	1,674	781	1157	460	864
Noatak R.	223	620	79	528	317	450	372
Other Streams	45	111	233	129	509	201	123
Lakes	129	158	8	35	0	62	79
Freshwater Total	1,233	1,244	1,994	1,473	1,983	1,473	1,438
Grand Total	1,233	1,244	1,994	1,473	1,983	1,474	1,438
Catches							
Salt Water	0	0	0	0	0	1	0
Kobuk R.	5,753	4,103	18,080	5,860	8,369	5,778	8,095
Noatak R.	1,668	2,123	452	3,875	652	2,072	2,348
Other Streams	1,934	975	2,703	658	1,274	2,920	2,277
Lakes	376	171	460	233	0	517	261
Freshwater Total	9,731	7,372	21,695	10,626	10,295	11,287	12,981
Grand Total	9,731	7,372	21,695	10,626	10,295	11,288	12,981

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, 2002, and *In prep*; 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 the Snake River were sampled for maturity in 2003 (DeCicco and Gryska *In prep*). They were found to be 50% mature at 307 mm FL (13 in TL) and 99% mature at 404 mm FL (17.3 in TL). Arctic grayling from northwestern Alaska can live for more than 20 years and a grayling from the Eldorado River was recently aged at 29 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 5 years the estimated harvest rates have been about 11% of those captured (Table 26).

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 1,200 per year (Table 25). Estimated harvests have recently trended downward, from about 1,600 in 1993 to about 300 in 1998. Since then estimated harvests have ranged between 800 and 1,800 Arctic grayling annually. The estimated catch of Arctic grayling increased twofold from 10,406 in 1996 to 20,187 in 1997, dropping in 1998 to 12,408 fish and rebounding to 16,132 in 1999. Since then estimated catches have ranged from 6,000 to about

15,000. 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 10-14% over the past 5 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 10 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, estimated harvests over the past 5 years have ranged between 1,200 and 2,000 fish (Table 26). Catches over the same period have ranged quite widely from about 7,400 in 2001 to about 21,700 in 2002. The percentage of catch that was harvested has ranged from about 8% in 1990 to 19% in 2004. It has averaged about 11% annually over the past 5 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 from 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 lost during reproduction. 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 a given 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 7 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 may vary by river. Rivers that share these characteristics and regulations include the Fish/Niukluk River system, the Eldorado, 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. The Nome Roadside Arctic Grayling Management Plan (Appendix E) now falls under the region wide grayling plan. Recent stock assessments of Arctic grayling populations in road accessible waters suggest that the approach prescribed in the plan is working, and that population size and size compositions are being sustained.

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 presumed to be in pristine condition. The general regulations for these waters provide for a daily bag and possession limit of 5 fish with no size limits. Until effort and harvests increase, it is likely that regulations will remain unchanged. The recently developed region-wide Arctic grayling management plan prescribing a 5 fish background limit was approved by the BOF in January 2004.

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 in 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, and the population in the Pilgrim River appears stable. Encouraging signs were observed in the Nome River in 2004 when 210 Arctic grayling were counted on a float survey in the upper half of the index area, however abundance estimated in 2005 indicated that the population has not yet shown signs of recovery.

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 EO. 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 5 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. The BOF adopted an area-wide Arctic grayling management plan in January 2004 BOF meeting. This plan changed the background daily bag limit for Arctic grayling in the AYK region from 10 fish to 5 fish.

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 5 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 were conducted more recently using a different rearing pond. In 2002 and 2003 1,574 pen-reared Arctic grayling were released into the Nome River. The population was assessed in 2005 to estimate its abundance and the contribution of pen-reared fish to the population. The abundance of fish >15 inches has declined since 1999. Although the number of small fish captured was insufficient to estimate their abundance, more were captured than in past assessments indicating that there may be an increase in smaller Arctic grayling in this river. 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 effort and 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 resulted in the closure of these rivers to all harvest of Arctic grayling, and an experimental restoration project in the Nome River (DeCicco 2004). The 2005 stock assessment project failed to show that the population had recovered and fishing will remain closed. 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. A stock assessment in the Niukluk River in 2005 found that the population is being maintained at the higher level of abundance. Recent stock assessments in the Sinuk, Snake and Pilgrim rivers have found that Arctic grayling populations are maintaining both their length structure and abundance suggesting that they are able to sustain current levels of harvest (Gryska 2004, 2006; Joy 2006). In 2004 several large Arctic grayling were collected from the Tubuktulik River, a lightly exploited population, to estimate maximum age. These fish ranged in age from 9 to 17 years. A management plan has been developed to address Nome roadside Arctic grayling fisheries (Appendix E), and a region-wide Arctic grayling management plan was approved in 2004.

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 among 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 sheefish also 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 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 Mauneluk River and Beaver River. After spawning is complete in late September or early October, 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 fall activities. The same population(s) contributes to all harvests. The annual commercial sales of sheefish in Kotzebue have ranged from 20 to 850 fish since 1991 (Kohler et al. 2004). The estimated subsistence harvest in the villages of the Kobuk River has averaged about 6,250 fish over the past 5 years. All villages were not surveyed during 2001 and 2002, so the actual harvests were higher. In 2004, the subsistence harvest was estimated at 10,163 fish (Table 27). Since subsistence practices have not changed appreciably in recent years, it is likely that Kobuk River subsistence harvests reflect trends in the spawning population of sheefish. 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. Spawner abundance in the Kobuk River was estimated at about 32,250 in 1995, 43,000 in 1996 and 27,000 in 1997 (Taube 1997, Taube and Wuttig 1998). 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. Anecdotal reports based on catches by residents of Kotzebue, Sheshalik and Kobuk River villages indicate that there are more sheefish now than anyone remembers. The USFWS repeated abundance estimates in the Selawik River in 2004 and 2005. Preliminary estimates

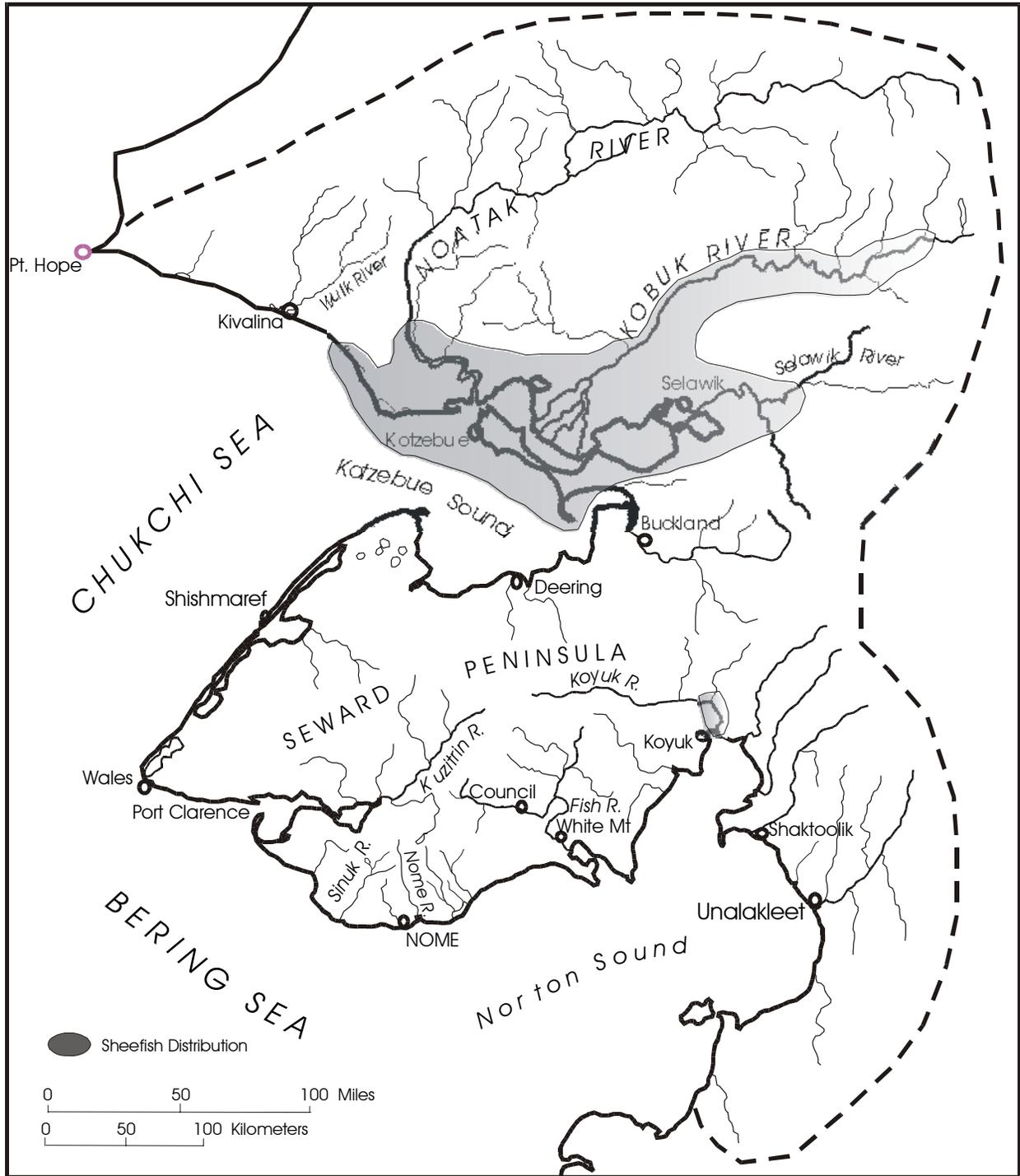


Figure 14.-Sheefish distribution in the NWMA.

Table 27.—Reported subsistence sheefish harvests, Kotzebue District, 1966-2004^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	

-continued-

Table 27.—Page 2 of 2.

Year	Number of Fishermen Interviewed	Reported Harvest	Average Catch Per Household	Hotham Inlet Winter Harvest
2003	488	7,823	16	
2004	440	10,163	21.5	

^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.

indicated that the spawner abundance was about 23,000 in 2004 and 45,000 in 2005 (Randy Brown, USFWS; personal communication). Most of the increase was in the smaller size classes of spawners and indicates strong recruitment into the spawning population. If similar increases are occurring in the Kobuk stock, the anecdotal reports of high sheefish abundance are indeed correct.

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 1,200 fish annually are easily sustainable (Table 28). 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. 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 reports from long time Kotzebue residents indicate that sheefish are very abundant, and this is supported by data from the USFWS on the Selawik River.

Recent Fishery Performance

Estimated annual sport harvests of sheefish by anglers in northwestern Alaska since 1977 have fluctuated from a high of about 3,400 to a low of about 150 with an average annual harvest of about 950 fish over the past 10 years (Table 28). The sport harvest in 2003 was estimated at 2,509 fish and in 2004 at 1,634 fish. The most recent 5 year (1999-2003) average harvest has been about 970 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 5 years was about 3,623 fish, indicating that about 71% 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 495 anglers fished for a total of 2,743 angler-days on the Kobuk River during 2004. The Kobuk River accounted for about 48% of the overall estimated freshwater sport fishing effort in the Kotzebue sub-area (5,704 angler-days) in 2004.

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 B). In the spawning area upstream from the Mauneluk River, only two fish per day are allowed to be

Table 28.—Historic sport fish catches and harvests of sheefish from northwest Alaska waters, 1977-2004.

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
2003	2,509	7,324	34.3	676	4,517	15.0	59	59	100.0
2004	1,634	2,837	57.6	477	1,575	30.3	58	58	100.0
94-03 Avg	966	3,365	33	427	2,560	20	73	112	61
99-03 Avg	1,230	4,594	27	513	3,548	15	45	75	37

harvested or in possession. The majority of anglers visiting the Kobuk River to fish for sheefish use the area upstream from the Mauneluk River. The Selawik River has similar regulations.

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 increasing 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.

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 sport fishing opportunity; however, this has not yet been the case.

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. The USFWS repeated the abundance estimate for the Selawik River in 2004 and 2005. Results from that study indicate that the number of sheefish spawning in the Selawik River has increased dramatically.

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, the lower Inglutalik 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 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 5 years (1999-2003) was about 250 fish (Table 29). 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 5 years (1999-2003) was about 375 fish (Table 30).

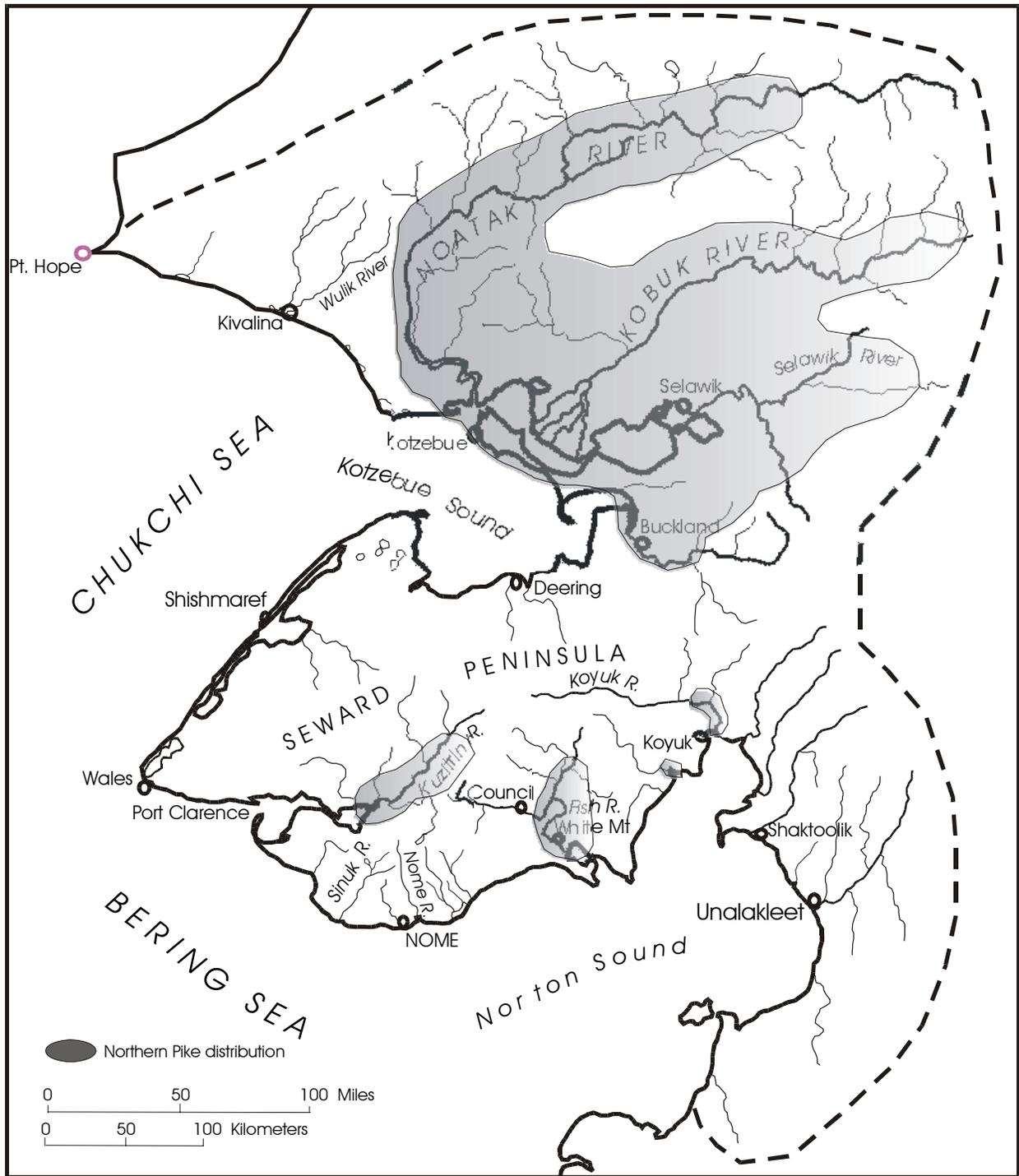


Figure 15.-Northern pike distribution in the NWMA.

Table 29.—Historic northern pike harvests and catches in NWMA by sub-area, 1977-2004.

Year	Seward Peninsula/Norton Sound sub-area					Kotzebue/Chukchi Sea sub-area				
	Number of Anglers	Effort Angler Days	Northern Pike		% Harvest	Number of Anglers	Effort Angler Days	Northern Pike		% Harvest
			Harvest	Catch				Harvest	Catch	
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
2003	2,187	12,403	424	1,017	42	1,156	6,121	423	1,191	36
2004	2,432	13,323	840	1,378	61	1,079	5,704	729	2,682	27
Avg (94-03)	2,881	15,507	363	1,779	26	1,247	5,997	225	1,230	21
Avg (99-03)	2,628	15,050	375	1,664	33	1,219	6,468	251	1,241	24

Recent Fishery Performance

Estimated harvests of northern pike by sport anglers on the Seward Peninsula have averaged about 360 fish over the past 10-years, with the largest annual harvest estimated at nearly 2,000 in 1990 (Table 29). The estimated harvest in 2004 was 840 fish. Estimates of catch (which includes fish that are kept and those released) since 1990 indicate that about 80% of all pike caught in the past 10 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 225 fish over the last 10-years (Table 29). Estimated harvests reached a high of 2,752 fish in 1986, and a low of 64 fish in 1989. The estimated harvest in 2004 was about 729 fish, the highest harvest since 1988. The average annual harvest for the past 5 years has also been about 250 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 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 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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REFERENCES CITED

- AAC (Alaska Administrative Code). 2004. 5AAC 75.003. In Alaska Fish and Game Laws and Regulations Annotated 2004-2005 Edition. Mathew Bender & Company, Inc., Charlottesville, VA.
- Alaska Department of Fish and Game (ADF&G). 1984. Sport Fish Survey. Booklet published by Alaska Department of Fish and Game, Division of Sport Fisheries. Juneau, Alaska.
- Alaska Department of Fish and Game (ADF&G). 1986. Alaska Habitat Management Guide, Arctic Region. Vol. II: Distribution, abundance, and human use of fish and wildlife. Division of Habitat, Alaska Department of Fish and Game, Juneau.
- Alaska Department of Labor (ADL). 1991. Alaska population overview 1990 Census and Estimates. Demographic Unit, Research and Analysis. Juneau, Alaska. 144 pp.
- Alt, K. T. 1975. A life history study of sheefish and whitefish in Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration. Annual Performance Report. 1974-1975, Project F-9-7, 16(R-II): 19 pp.
- Alt, K. T. 1977. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Project F-9-9, Completion Report, 1975-1977.
- Alt, K. T. 1978. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Volume 19, Study G-I-P, Annual Performance Report 1977-1978.
- Alt, K. T. 1984. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, F-9-16, Volume 25, Study G-I, Annual Performance Report 1983-1984.
- Alt, K. T. 1987. Review of sheefish (*Stenodus leucichthys*) studies in Alaska. Alaska Department of Fish and Game, Fishery Manuscript No. 2, Juneau.
- Brennan, E. L., C. F. Lean, F. J. Bue and T. Kohler. 1999. Annual Management Report 1998, Norton Sound-Port Clarence-Kotzebue. Regional Information Report No. 3A99-32. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Anchorage.
- Brennan, E. L., F. J. Bue, J. Menard and T. Kohler. 2002. Annual Management Report 2000, Norton Sound-Port Clarence-Kotzebue. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A01-02. Anchorage.
- Burkholder, A. 1993. Abundance and length-at-age composition of northern pike near the confluence of the Pilgrim and Kuzitrin rivers, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-16, Anchorage.

REFERENCES CITED (Continued)

- Burkholder, A. 1994. Abundance and length composition of northern pike near the confluence of the Pilgrim and Kuzitrin rivers, 1992-1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-20, Anchorage.
- DeCicco, A. L. 1990. Seward Peninsula Arctic grayling study 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-11, Anchorage.
- DeCicco, A. L. 1991. Seward Peninsula Arctic grayling study 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-24, Anchorage.
- DeCicco, A. L. 1992a. Assessment of Dolly Varden overwintering in selected streams of the Seward Peninsula, Alaska, during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-11, Anchorage.
- DeCicco, A. L. 1992b. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1991, Alaska Department of Fish and Game, Fishery Data Series No. 92-13, Anchorage.
- DeCicco, A. L. 1993a. Assessment of Dolly Varden overwintering in selected streams of the Seward Peninsula, Alaska, during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-20, Anchorage.
- DeCicco, A. L. 1993b. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1992,. Alaska Department of Fish and Game, Fishery Data Series No. 93-36, Anchorage.
- DeCicco, A. L. 1994. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-12, Anchorage.
- DeCicco, A. L. 1995. Assessment of selected stocks of Arctic grayling in streams and a survey of Salmon Lake, Seward Peninsula, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-19, Anchorage.
- DeCicco, A. L. 1996. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-21, Anchorage.
- DeCicco, A. L. 1997. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-15, Anchorage.
- DeCicco, A. L. 1998. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-19, Anchorage.
- DeCicco, A. L. 1999. Niukluk River Arctic grayling stock assessment, Seward Peninsula, 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-23, Anchorage.
- DeCicco, A. L. 2001. Over-wintering areas used by Dolly Varden in the Nome, Solomon, and Bonanza rivers, Seward Peninsula, Alaska 2000/2001. Alaska Department of Fish and Game, Fishery Data Series No. 01-25, Anchorage.
- DeCicco, A. L. 2002. Stock assessment of Arctic grayling in the Nome River, and age validation of Arctic grayling in the Eldorado River, Seward Peninsula, Alaska 2000. Alaska Department of Fish and Game, Fishery Data Series No. 02-01, Anchorage.
- DeCicco, A. L. 2004. Nome River Arctic grayling restoration, Seward Peninsula, Alaska 2002 and 2003. Alaska Department of Fish and Game, Fishery Data Series No. 04-05, Anchorage.
- DeCicco, A. L. *In prep.* Stock assessment of Arctic grayling in the Nome River, Seward Peninsula, Alaska 2005. Alaska Department of Fish and Game, Fishery Data Series, Anchorage
- DeCicco, A. L. and R. M. Barnes. 1992. Listing of guiding services for recreational fishing in the Arctic-Yukon-Kuskokwim (AYK) Region. Alaska Department of Fish and Game, Special Publication No..92-3, Anchorage.
- DeCicco, A. L. and A. D. Gyska. *In prep.* Length and age at maturity of Arctic grayling in the Snake River during 2003. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.
- DeCicco, A. L. and M. J. Wallendorf. 2000. Fish River Arctic grayling stock assessment, Seward Peninsula, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-29, Anchorage.

REFERENCES CITED (Continued)

- Foote, D. C., and H. A. Williamson. 1966. A human geographical study. Pages 1041-1111 *in* N. Wilimovsky and J. Wolfe, editors. Environment of Cape Thompson Region, Alaska. U.S. Atomic Energy Commission, Washington, D.C.
- Georgette, S. and A. Shiedt. 2005. Whitefish: traditional ecological knowledge and subsistence fishing in the Kotzebue Sound Region, Alaska. Alaska Department of Fish and Game and Maniilaq Association, Technical Paper No. 290.
- Georgette, S. and C. Utermohle. 1998. Subsistence salmon harvest summary, northwest Alaska 1997. Alaska Department of Fish and Game, Division of Subsistence, Nome.
- Georgette, S., D. Caylor and S. Tahbone. 2003a. Subsistence salmon harvest summary, northwest Alaska 2001. Alaska Department of Fish and Game, Division of Subsistence and Kawarak, Inc.
- Georgette, S., D. Caylor and S. Tahbone. 2003b. Subsistence salmon harvest summary, northwest Alaska 2002. Alaska Department of Fish and Game, Division of Subsistence and Kawarak, Inc.
- Georgette, S., D. Caylor and E. Trigg. 2004. Subsistence salmon harvest summary, northwest Alaska 2003. Alaska Department of Fish and Game, Division of Subsistence and Kawarak, Inc.
- Georgette, S., D. Caylor and S. Tahbone. *In prep.* Subsistence salmon harvest summary, northwest Alaska 2003. Alaska Department of Fish and Game, Division of Subsistence and Kawarak, Inc.
- Gryska, A. D. 2004. Abundance and length and age composition of Arctic grayling in the Snake River, 2001. Alaska Department of Fish and Game, Fishery Data Series No. 04-15, Anchorage.
- Gryska, A. D. 2006. Abundance and length and age composition of Arctic grayling in the Pilgrim River, 2002. Alaska Department of Fish and Game, Fishery Data Series No. 06-62, Anchorage.
- Howe A. H., G. Fidler and M. Mils. 1995. Harvest, catch and participation in Alaska sport fisheries during 1994. Alaska Department of Fish and Game. Fishery Data Series No. 95-24.
- Howe, A. L., G. Fidler, A. E. Bingham, and M. J. Mills. 1996. Harvest, catch, and participation in Alaska sport fisheries during 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-32, Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001a. Revised Edition: Harvest, catch, and participation in Alaska sport fisheries during 1996. Alaska Department of Fish and Game, Fishery Data Series 97-29 (revised), Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001b. Revised Edition: Harvest, catch, and participation in Alaska sport fisheries during 1997. Alaska Department of Fish and Game, Fishery Data Series 98-25 (revised), Anchorage.
- Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001c. Revised Edition: Participation, catch, and harvest in Alaska sport fisheries during 1998. Alaska Department of Fish and Game, Fishery Data Series 99-41 (revised), Anchorage.
- Howe, A. L., G. Fidler, C. Olnes, A. E. Bingham, and M. J. Mills. 2001d. Participation, catch, and harvest in Alaska sport fisheries during 1999. Alaska Department of Fish and Game, Fishery Data Series 01-8, Anchorage.
- Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2004. Participation catch, and harvest in Alaska sport fisheries during 2001. Alaska Department of Fish and Game, Fishery Data Series 04-11, Anchorage.
- Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2006 a. Participation catch, and harvest in Alaska sport fisheries during 2002. Alaska Department of Fish and Game, Fishery Data Series No. 06-34, Anchorage.
- Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2006 b. Participation catch, and harvest in Alaska sport fisheries during 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-44, Anchorage.
- Jennings, G. B., K. Sundet, T. A. Wettin, K. R. Kamletz and A. E. Bingham. *In prep.* Participation catch, and harvest in Alaska sport fisheries during 2004. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

REFERENCES CITED (Continued)

- Joy, P. 2006. Abundance and age and length compositions of Arctic grayling in the Sinuk River, 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-63, Anchorage.
- Kretsinger, C. 1987. Fishery inventory of lakes and streams in the Kigluaik mountains and Imuruk Basin watershed (Seward Peninsula). Unpublished paper, U.S. Bureau of Land Management. Kobuk District Office, Fairbanks.
- Kohler, T., A. Banducci, E. Brennan and J. Minard. 2004. Annual Management Report 2003 Norton Sound-Port Clarence-Kotzeube. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A04-19 Anchorage.
- Kohler, T., A. Banducci, J. Soong and J. Menard. 2005. Annual Management Report 2004 Norton Sound-Port Clarence-Kotzebue. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A05-04, Anchorage.
- Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1978-1979, Project F-9-11, 20 (SW-I-A), Juneau.
- Mills, M. J. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-I-A), Juneau.
- Mills, M. J. 1981a. Alaska statewide sport fish harvest studies - 1979 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.
- Mills, M. J. 1981b. Alaska statewide sport fish harvest studies - 1980 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.
- Mills, M. J. 1982. Alaska statewide sport fish harvest studies - 1981 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1981-1982, Project F-9-14, 23 (SW-I-A), Juneau.
- Mills, M. J. 1983. Alaska statewide sport fish harvest studies - 1982 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1982-1983, Project F-9-15, 24 (SW-I-A), Juneau.
- Mills, M. J. 1984. Alaska statewide sport fish harvest studies - 1983 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1983-1984, Project F-9-16, 25 (SW-I-A), Juneau.
- Mills, M. J. 1985. Alaska statewide sport fish harvest studies - 1984 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1984-1985, Project F-9-17, 26 (SW-I-A), Juneau.
- Mills, M. J. 1986. Alaska statewide sport fish harvest studies - 1985 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1985-1986, Project F-10-1, 27 (RT-2), Juneau.
- Mills, M. J. 1987. Alaska statewide sport fisheries harvest report, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau.
- Mills, M. J. 1988. Alaska statewide sport fisheries harvest report, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau.
- Mills, M. J. 1989. Alaska statewide sport fisheries harvest report, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau.
- Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage.

REFERENCES CITED (Continued)

- Mills, M. J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage.
- Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-40, Anchorage.
- Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage.
- Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage.
- National Park Service (NPS). 1984. Kobuk Valley National Park draft statement for management. USDI: NPS, Alaska Regional Office, Anchorage, Alaska.
- National Park Service (NPS). 1985. Gates of the Arctic National Park General Management Plan. USDI: NPS,
- Pearse, G. A. and P. A. Hansen. 1993. Estimates of sustainable yield for the northern pike populations in George, Volkmar, T, and Harding Lakes. Alaska Dept. of Fish and Game, Fishery Data Series No. 93-01, Anchorage.
- Phillips, R. B., L. I. Gaudex, K. M. Westrich and A. L. DeCicco. 1999. Combined phylogenetic analysis of ribosomal ITS1 sequences and new chromosome data supports three subgroups of Dolly Varden char (*Salvelinus malma*). Canadian Journal of Fisheries and Aquatic Sciences 56:1504-1511.
- Sarrio, R. and B. Kessel. 1966. Human ecological investigations at Kivalina. Pages 969-1040 [in] Environment of the Cape Thompson region, Alaska. N. Wilimovsky and J. Wolfe, eds. U. S. Atomic Energy Commission.
- Savereide, J. W. 2002. Under ice gill net harvest of sheefish in Hotham Inlet in 2000-2001. Alaska Department of Fish and Game, Fishery Data Series No. 02-04, Anchorage.
- Scanlon, B. 2004. Assessment of the Dolly Varden spawning population in Kagvik Creek, Alaska. Final Report for Study 01-137 USFWS Office of Subsistence Management Fishery Information Service Division. Alaska Department of Fish and Game, Fishery Data Series No. 04-06, Anchorage.
- Stuby, L. and T. Taube. 1998. Mortality of sheefish captured and released on sport fishing gear in the Kobuk River, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-15. Anchorage.
- Taube, T. T. 1997. Abundance and composition of sheefish in the Kobuk River, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-1, Anchorage.
- Taube, T. T. and K. Wuttig. 1998. Abundance and composition of sheefish in the Kobuk River, 1997. Alaska Department of Fish and Game, Fishery Manuscript Report No. 98-3, Anchorage.
- Underwood, T., K. Whitten, and K. Secor. 1998. Population characteristics of spawning Inconnu (sheefish) in the Selawik River, Alaska, 1993-1996, Final Report. Alaska Fisheries Technical Report Number 49, U.S. Fish and Wildlife Service, Fairbanks Fishery Resource Office, Fairbanks, Alaska.
- U.S. Army Corps of Engineers, Alaska District. 1967. Harbors and Rivers in Alaska. Interim Report No. 6. Northwestern Alaska.
- Wild and Scenic Rivers Act. 1968. U.S. Public Law 90-542. Amended December, 1980 with Public Law 96-603-605.
- Walker, R. J., C. Olnes, K. Sundet, A. L. Howe, and A. E. Bingham. 2003. Participation, catch, and harvest in Alaska sport fisheries during 2000. Alaska Department of Fish and Game, Fishery Data Series 03-05, Anchorage.
- Wuttig, K. G. 1998. Escapement of Chinook salmon in the Unalakleet River in 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-8, Anchorage.
- Wuttig, K. G. 1999. Escapement of Chinook salmon in the Unalakleet River in 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-10, Anchorage.

**APPENDIX A. NATIONAL WILD AND SCENIC RIVERS IN THE
NWMA**

Appendix A1.—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 B. NORTHWESTERN AREA SPORT FISHING
REGULATIONS SUMMARY FOR 2004**

Appendix B1.—Northwestern area sport fishing regulations summary for 2004.

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	5	(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		

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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, not 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, not 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. King salmon: Annual limit is 4 king salmon over 20 inches long only 2 of which may be taken from the North River.
The daily bag and possession limit is 2 king salmon of which only 1 may be greater than 20 inches in length.
- 2: Other salmon: Daily bag and possession limit is 10 fish of which only 4 may be coho salmon, 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.

**APPENCIX C. SPORT FISH EMERGENCY ORDERS ISSUED
DURING 2004 AND 2005**

Appendix C1.—NWMA sport fish emergency orders issued during 2004 and 2005.

<u>E.O. Number</u>	<u>Dates</u>	<u>Action</u>
EO-3-S-01-04	June 15 – Aug 1, 2004	Closed the Nome Subdistrict (Cape Rodney to Cape Prince of Wales to sport fishing for all salmon.
EO-3-S-02-04	July 2 – further notice	Rescinded the action of EO-3-S-01-04 Opened waters of the Nome Subdistrict to sport fishing for salmon
EO-3-KS-02-04	July 1– Aug 3, 2004	Prohibited the retention of king salmon in the Unalakleet and Shaktoolik rivers and prohibited the use of bait.
EO-3-CS-01-04	Jul 21- Sept 30, 2004	Prohibited the retention of chum salmon in the Fish River drainage.
EO-3-SS-01-04	Aug 25–Oct 31, 2004	Prohibited the retention of coho salmon in the Fish River drainage, and prohibited the use of bait.
EO-3-S-01-05	June 15-July 15, 2005	Closed the Nome Subdistrict (Cape Rodney to Cape Prince of Wales to sport fishing for all salmon.
EO-3-SS-01-05	Sept 10 – Oct 31, 2005	Reduced the daily bag and possession limit of coho salmon from 3 to 1 fish in the Fish River drainage.

**APPENDIX D. 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 5 years to determine if the regulatory framework for each stream is proper for maintaining the population at the desired level.

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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 5 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.