

Fishery Management Report No. 04-02

**Fishery Management Report for Sport Fisheries in the
Arctic-Yukon-Kuskokwim Management Area, 2002-
2003**

by

John Burr

March 2004

Alaska Department of Fish and Game

Division of Sport Fish



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

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iv
LIST OF FIGURES.....	iv
LIST OF APPENDICES.....	v
EXECUTIVE SUMMARY.....	1
PREFACE.....	1
INTRODUCTION.....	2
Region III Description.....	2
The Alaska Board of Fisheries.....	4
Advisory Committees.....	4
ADF&G Emergency Order Authority.....	4
Region III Sport Fish Division Research and Management Staffing.....	5
The Statewide Harvest Survey.....	5
SECTION I: MANAGEMENT AREA OVERVIEW.....	5
Arctic, Yukon, and Kuskokwim Area Description.....	5
Yukon River Subarea.....	6
Kuskokwim River Subarea.....	6
North Slope Brooks Range Subarea.....	6
Fishery Resources.....	6
Alaska Board of Fisheries Activities.....	10
Alaska Board of Fisheries.....	10
Advisory Committees.....	10
Established Management Plans and Policies.....	11
Major Biological and Social Issues.....	12
Access Program.....	13
SECTION II: FISHING EFFORT AND HARVEST IN THE AYK MANAGEMENT AREA.....	14
Sport Angling Effort.....	14
Sport Fish Harvest and Catch and Release.....	14
Other User Groups – Commercial and Subsistence Fish Harvests.....	21
SECTION III: MAJOR FISHERIES OVERVIEW.....	21
Yukon River Drainage Salmon.....	24
Fishery Description and Historical Perspective.....	24
Recent Fisheries Performance.....	28
Summary of 2002 Yukon Salmon Runs.....	28
Summary of Catch and Harvests in Yukon Salmon Sport Fisheries in 2000.....	29
Summary of 2003 Yukon Salmon Runs.....	29
Fishery Objectives and Management.....	30
Fishery Outlook.....	32
Recent Board of Fisheries Action and In-season Management.....	32
Current Issues.....	32
Recommended Research and Management Activities.....	33
Upper Kuskokwim River Salmon.....	33
Fishery Description and Historical Perspective.....	33

TABLE OF CONTENTS (Continued)

	Page
Recent Fisheries Performance.....	36
Summary of the 2002 Kuskokwim Salmon Runs.....	36
Summary of Catch and Harvest in the Kuskokwim Salmon Sport Fisheries, 2002.....	36
Summary of the 2003 Kuskokwim Salmon Runs.....	38
Fishery Objectives and Management.....	39
Fishery Outlook.....	39
Recent Board of Fisheries Action and In-season Management.....	40
Current Issues.....	41
Recommended Research and Management Activities.....	42
Holitna River Salmon.....	42
Fishery Description and Historical Perspective.....	43
Recent Fisheries Performance.....	44
Fisheries Outlook.....	45
Recent Board of Fisheries Action and In-season Management.....	45
Current Issues.....	46
Recommended Research and Management Activities.....	46
Yukon River Northern Pike.....	47
Fishery Description and Historical Perspective.....	47
Recent Fisheries Performance.....	47
Nowitna River.....	50
Innoko River.....	50
Fishery Objectives and Management.....	51
Fisheries Outlook.....	51
Recent Board of Fisheries Action.....	51
Current Issues.....	52
Recommended Research and Management Activities.....	52
Dall River Northern Pike.....	54
Fishery Description and Historical Perspective.....	54
Recent Fisheries Performance.....	55
Fishery Objectives and Management.....	55
Fisheries Outlook.....	56
Recent Board of Fisheries Action.....	56
Current Issues.....	56
Ongoing and Recommended Research and Management Activities.....	56
Yukon River Arctic Grayling.....	57
Fishery Description and Historical Perspective.....	57
Recent Fisheries Performance.....	60
Fishery Objectives and Management.....	61
Fisheries Outlook.....	62
Recent Board of Fisheries Action.....	62
Current Issues.....	62
Recommended Research and Management Activities.....	63
North Slope Dolly Varden/Arctic Char.....	63
Fishery Description and Historical Perspective.....	63
Recent Fishery Performance.....	66
Fishery Objectives and Management.....	67
Fisheries Outlook.....	67
Recent Board of Fisheries Action.....	67
Current Issues.....	67
Ongoing and Recommended Research and Management Activities.....	67

TABLE OF CONTENTS (Continued)

	Page
ACKNOWLEDGEMENTS.....	68
LITERATURE CITED.....	68
APPENDIX A	73
APPENDIX B.....	79
APPENDIX C.....	89
APPENDIX D	109
APPENDIX E.....	113

LIST OF TABLES

Table	Page
1. Fishing effort by subarea for the AYK management area, 1977-2002.....	15
2. Number of fish harvested and total catch by species by recreational anglers within the Arctic Yukon Kuskokwim Management Area, 1984-2002.....	17
3. Commercial and subsistence harvest of salmon in the Yukon and Kuskokwim areas, 1977-2003.....	22
4. Sport harvest of chinook salmon in the Yukon River drainage (1992-2002).....	25
5. Sport harvest of chum salmon in the Yukon River drainage (1992-2002).....	26
6. Sport harvest of coho salmon in the Yukon River drainage (1992-2002).....	27
7. Sport fishing effort and harvest of principal species in the upper Kuskokwim River drainage (1990-2002).....	35
8. Sport catch of principal species in the upper Kuskokwim River drainage (1992-2002).....	37
9. Sport harvest of northern pike in the Yukon River drainage (1992-2002).....	48
10. Total fishing effort, and northern pike catch and harvest from principal fisheries in Yukon River area 1983-2002.....	49
11. Sport harvest and catch of Arctic grayling in the Yukon River drainage (1992-2002).....	58
12. Sport fishing effort, and harvest and catch of principal species in the North Slope subarea.....	64

LIST OF FIGURES

Figure	Page
1. Map of the sport fish regions in Alaska and the six Region III management areas.....	3
2. Yukon subarea, Tanana River drainage is excluded from the AYKMA.....	7
3. Kuskokwim subarea of AYKMA.....	8
4. Map of North Slope subarea.....	9
5. Sport fishing effort in the Arctic, Yukon, Kuskokwim Management Area.....	16
6. Sport fishing harvest in the AYKMA.....	20

LIST OF APPENDICES

Appendix	Page
A1. Reference information specific to 2004 Board of Fisheries proposals	74
A2. Summary of actions taken by the Alaska Board of Fisheries on proposals concerning AYKMA Sport Fisheries	75
B1. Sport harvest and catch from the Yukon subarea (SWHS Area Y), 1977-2002.....	80
B2. Sport harvest and catch from the upper Kuskokwim subarea, 1983-2002	82
B3. Sport harvest and catch from the Kuskokwim Bay (SWHS Area V), 1977-2002.....	84
B4. Sport harvest and catch from the North Slope subarea (SWHS Area Z), 1977-2002.....	86
C1. Commercial and subsistence and sport harvest of chinook salmon in the Yukon drainage	90
C2. Commercial and subsistence and sport harvest of summer and fall chum salmon in the Yukon River	91
C3. Commercial and subsistence harvest of coho salmon in the Yukon River drainage	92
C4. Commercial and subsistence and sport harvest of chinook salmon in the Kuskokwim River and Kuskokwim Bay.....	93
C5. Commercial and subsistence and sport harvest of chum salmon in the Kuskokwim River and Kuskokwim Bay.....	94
C6. Commercial and subsistence and sport harvest of coho salmon in the Kuskokwim River and Kuskokwim Bay.....	95
C7. Guideline harvest ranges and mid-points for commercial harvest of chinook, summer chum and fall chum salmon, Yukon Area, Alaska 2002.....	96
C8. The Yukon River drainage fall chum salmon management plan, 2002.....	97
C9. Yukon River Summer Chum Salmon Management Plan overview, 2002	99
C10. Yukon River salmon fisheries pre-season information sheet, 2002.....	100
C11. Yukon River Coho Salmon Management Plan.....	104
C12. Estimated passage through the Kogruluk River weir, Holitna River drainage.....	106
C13. Estimated passage for George, Tatlawiksuk, and Takotna rivers.....	107
C14. Changes in sport fishing regulations for the upper Kuskokwim River, Alaska BOF 1997	108
D. Dall River Fisheries Management Plan	110
E. Aerial estimates of Arctic char from the Ivishak, Anaktuvuk, and Kongakut rivers of the North Slope	114

EXECUTIVE SUMMARY

This document provides a wide array of information specific to the recreational angling opportunities that exist within the Arctic – Yukon - Kuskokwim Management Area. Information specific to the proposals that the Board of Fisheries will address at the January 12-19, 2004 meeting are contained within numerous sections of this report. As a means to assist board members in acquiring information in a timely manner, Appendix A1 has been constructed (page 74). This table guides the reader to specific information contained within text, table, and graphic format that, hopefully will be useful in evaluating regulatory proposals..

PREFACE

The goals of the Sport Fish Division of the Alaska Department of Fish and Game 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 those goals the Division has in place a fisheries management process.

This report provides information for the Arctic Yukon Kuskokwim Management Area (AYKMA) and is one in a series of reports annually updating 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, 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 the management 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 develop fisheries management plans, and propose regulatory strategies.

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

This report provides fisheries information for 2002 and 2003 seasons. Following the introduction, which includes an overview of the Region, this report is organized into three major sections. **Section I** provides an overview of the Arctic-Yukon-Kuskokwim (AYK) Management Area. Included is a description of the management area and subareas, Board of Fish activities,

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

INTRODUCTION

REGION III DESCRIPTION

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

Region III is the largest region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 1,251,300 km² (485,000 mi²) of land, some of the states largest river systems (the Yukon, the Kuskokwim, the Colville, Noatak, 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 Cape Newenham 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 fisheries management areas (Figure 1). They are:

- (1) The Northwestern Management Area (Norton Sound, Seward Peninsula and Kotzebue Sound drainages).
- (2) The AYK Management Area (the North Slope drainages, the Yukon River drainage upstream of Paimiut except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- (3) The Upper Copper/Upper Susitna Management Area (the Copper River drainage and the Susitna River drainage above the Oshetna River).
- (4) The Upper Tanana River Management Area (The Tanana River drainage upstream from Banner Creek and the Little Delta River).

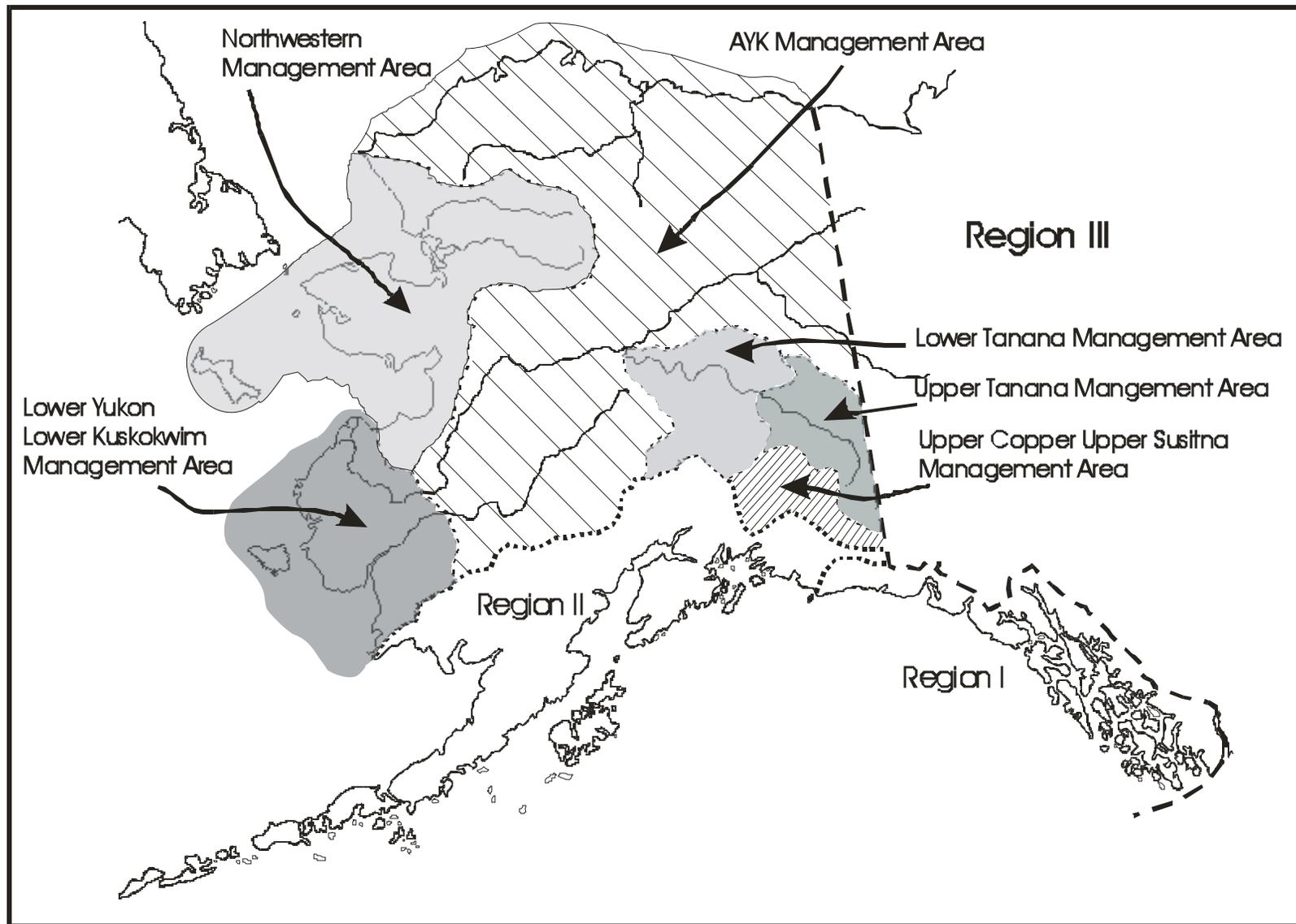


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

- (5) The Lower Tanana River Management Area (The Tanana River drainage downstream from Banner Creek and the Little Delta River).
- (6) The Lower Yukon/Lower Kuskokwim Management Area (The Yukon drainage downstream of Piapiut and the Kuskokwim drainage downstream of and including the Aniak River drainage and Kuskokwim Bay). This management area was added to Region III during the winter of 1999/2000.

Area offices for the five areas are located in Nome/Fairbanks, Fairbanks, Glennallen, Delta Junction, Fairbanks, and, Bethel respectively.

THE ALASKA BOARD OF FISHERIES

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

Statewide fisheries issues may be considered at any BOF meeting. Under the current operating schedule, the BOF considers fishery issues for regulatory areas or groups of regulatory areas on a 3-year cycle. The BOF meetings are usually in the wintertime, between early October and late March. Regulation proposals and management plans are received for evaluation by the BOF from ADF&G and the public (any Alaskan can submit a proposal to the BOF). During its deliberations the BOF receives input and testimony through oral and written reports from staff of the Alaska Department of Fish and Game, 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 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 have generally only one fall and one spring meeting due to funding constraints. Advisory meetings allow opportunity for direct public interaction with department staff that answer questions and provide clarification concerning proposed regulatory changes. The Boards Support Section within the Division of Administration provides administrative and logistical support for the BOF and Fish and Game advisory committees. During 2003, the department had direct support responsibilities for approximately 70 advisory committees in the state.

ADF&G EMERGENCY ORDER AUTHORITY

ADF&G has emergency order (E.O.) authority (5 AAC 2001) to modify time, area, and bag/possession limit regulations. Emergency orders are implemented to deal with conservation issues that arise that are not adequately controlled by existing regulations. In that scenario, they deal with the situation until it is resolved or the BOF can formally take up the issue. Emergency Orders are also the mechanism by which "in-season" management of fisheries is accomplished. In-season management is usually in accordance with a fisheries management plan approved by the BOF.

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 divisional goals. A critical part of these positions is interaction with the BOF, advisory committees, 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 biologists to meet divisional goals.

THE STATEWIDE HARVEST SURVEY

Recreational angling effort, catch, and harvest of important sport fish species in Alaska has been estimated and reported annually since 1977 (Mills 1979-1994, Howe et al. 1995, 1996, 2001a-d, Walker et al. 2003, Jennings et al. 2001-02 *In prep*). 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 September or October 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. Estimates based on 30 or more responses are generally representative of levels of fishing effort, catch and harvest.

SECTION I: MANAGEMENT AREA OVERVIEW

ARCTIC, YUKON, AND KUSKOKWIM AREA DESCRIPTION

The Arctic Yukon Kuskokwim Management Area (AYKMA) consists of approximately 562,000 km² (37% of the entire land area of Alaska) of extremely varied topography, climate, and zoogeography. The management area includes the North Slope of the Brooks Range and Arctic coastal plain, the Yukon drainage upstream of Paimiut, and the Kuskokwim drainage upstream of the Aniak River. Included within AYKMA are three of the state's largest river systems (Yukon, Kuskokwim, and Colville), thousands of lakes, and thousands of miles of streams. The area coastline boundary extends from Cape Lisburne on the west around northwestern and northern Alaska to the Canadian border on the Arctic Ocean. The area as a whole is sparsely populated. Small communities are scattered along the major river systems of Interior Alaska. On Alaska's North Slope, virtually all communities are located along the coast. The communities within the management area are invariably located near water, because of the importance of fish and or marine mammals as a food source to native people historically and today.

Access to most of the area is limited to water or air travel. The major river systems provide transportation corridors during winter as well as during open water months. Ground

transportation to the North Slope is limited to the Dalton Highway (Haul Road) constructed to provide ground transportation to the Prudhoe Bay area oil fields. Road access to the Yukon River is provided by the Dalton Highway, by the Steese Highway at Circle and by the Taylor Highway at Eagle. With the exception of the Dalton Highway, these gravel roads are not maintained during winter. There is no road access to the Kuskokwim River drainage.

Land ownership and jurisdictions fragment this huge area into a complex mosaic. The federal government is the major land manager through its jurisdiction over lands in two National Parks and Preserves (Yukon – Charlie and Gates of the Arctic), six National Wildlife Refuges (Arctic, Yukon Flats, Kanuti, Koyukuk, Nowitna, and Innoko), the White Mountains National Recreation Area, the Steese National Conservation Area, the National Petroleum Reserve-Alaska (NPRA) and numerous Wild and/or Scenic Rivers, as well as other classifications of federal lands. Lands held by the State of Alaska, native corporations, and other private landowners comprise the remaining landmass. Arvey et al. (1995) provides a detailed description of the geology and geography for each of the subareas within the AYK Management Area.

For purposes of reporting and organizing statistics in the SWHS, the AYK Management Area is subdivided into three subareas; Yukon (Y), Kuskokwim (V), and Arctic (Z).

Yukon River Subarea

The Yukon is the largest river in Alaska and its drainage constitutes the fifth largest in North America. The Yukon subarea (most of statewide harvest Area Y; Figure 2) includes drainages of the Yukon River from the Canadian border downstream to Paimiut. This subarea does not include the lower Yukon or Yukon Delta or any portion of the Tanana or Kuskokwim River watersheds. Prior to 1990 the Lower Yukon and Kuskokwim rivers were combined into a single subarea for Sport Fish Division reporting purposes. Separate harvest reporting for the two river drainages has been performed since 1990.

Kuskokwim River Subarea

The Kuskokwim River subarea (a portion of statewide harvest area V; Figure 3) includes the Kuskokwim River watershed up stream of the Aniak River. Starting in 2000, the Sport Fish Division once again assigned management responsibility for the Aniak River and the remainder of the Kuskokwim River and Kuskokwim Bay to Region III and assigned responsibility to Sport Fisheries staff stationed in Bethel. Most of the sport fishing effort, catch and harvest that is reported by the SWHS for the Kuskokwim Area (Area V –Kuskokwim River and Kuskokwim Bay) comes from waters tributary to Kuskokwim Bay or tributaries downstream of and including the Aniak River system.

North Slope Brooks Range Subarea

The North Slope of the Brooks Range subarea (statewide harvest Area Z; Figure 4) includes all waters north of the Brooks Range flowing into the Beaufort and Chukchi seas from Point Hope on the west to the Canadian border on the east including adjacent saltwater areas. Total landmass within this subarea is approximately 209,800 km².

FISHERY RESOURCES

Virtually all fresh water and migratory fish species sought by anglers in Alaska are available in the AYKMA. All populations are wild; there is presently no enhancement of fish populations in

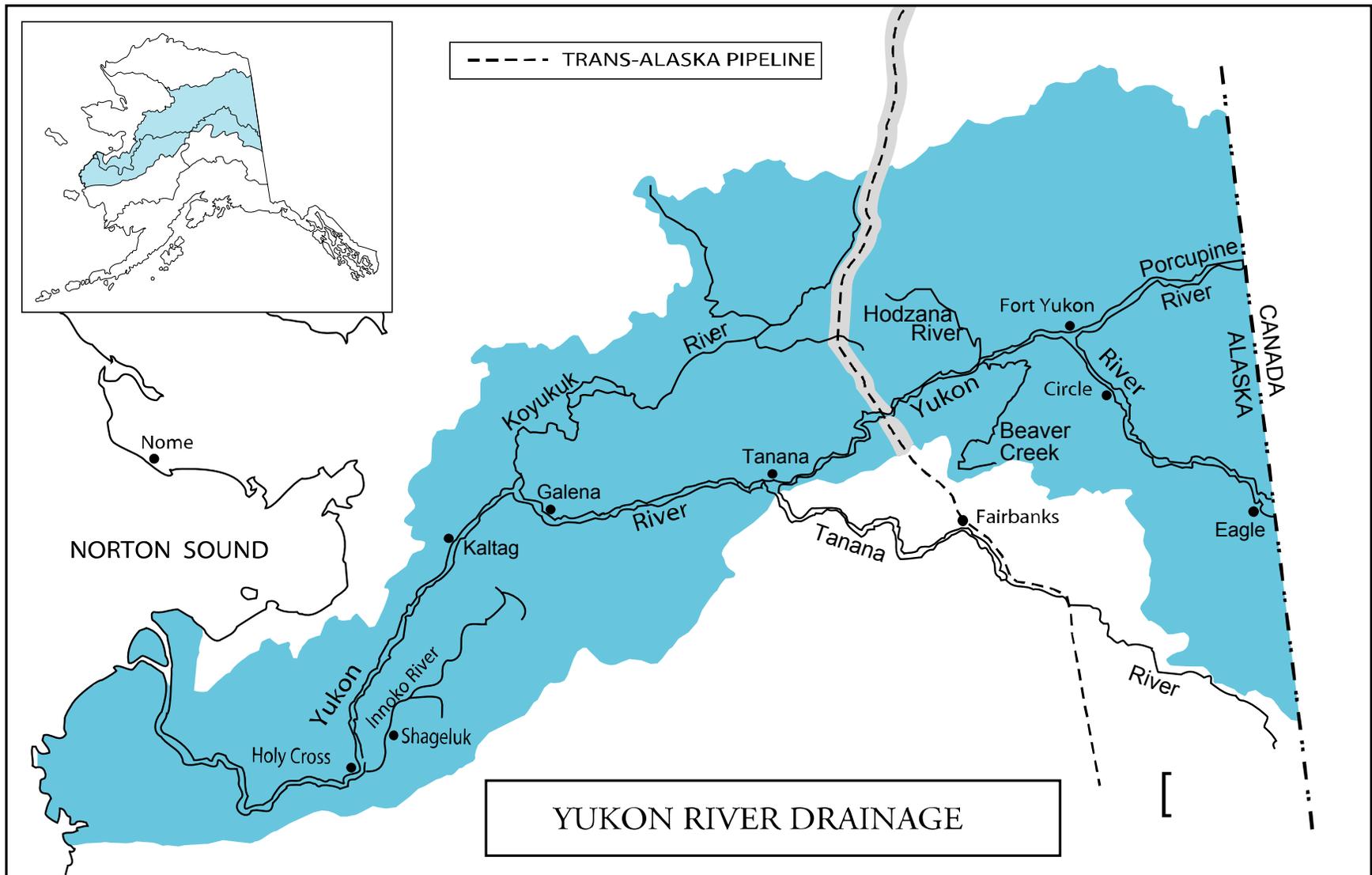


Figure 2.-Yukon subarea, Tanana River drainage is excluded from the AYKMA.

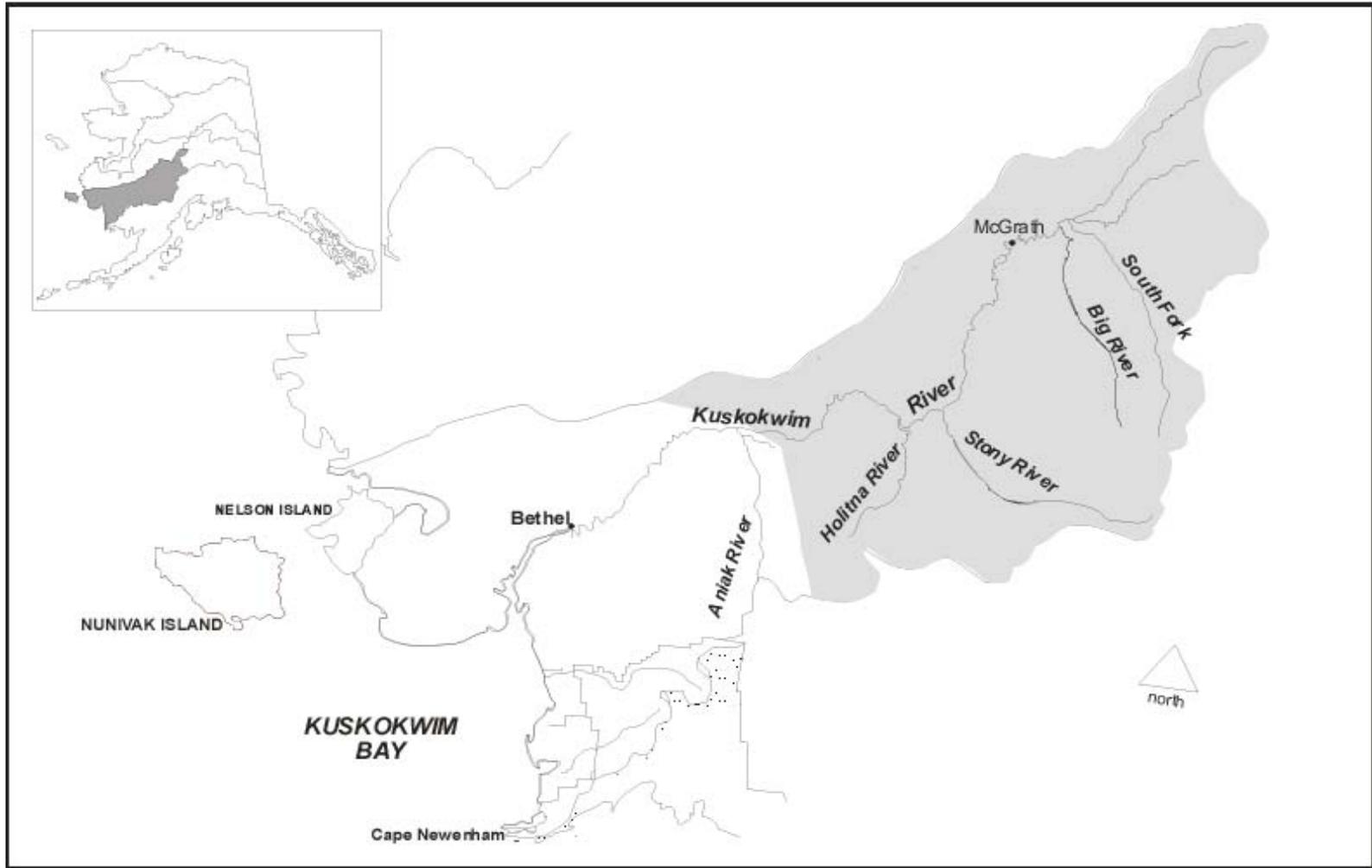


Figure 3.-Kuskokwim subarea of AYKMA.

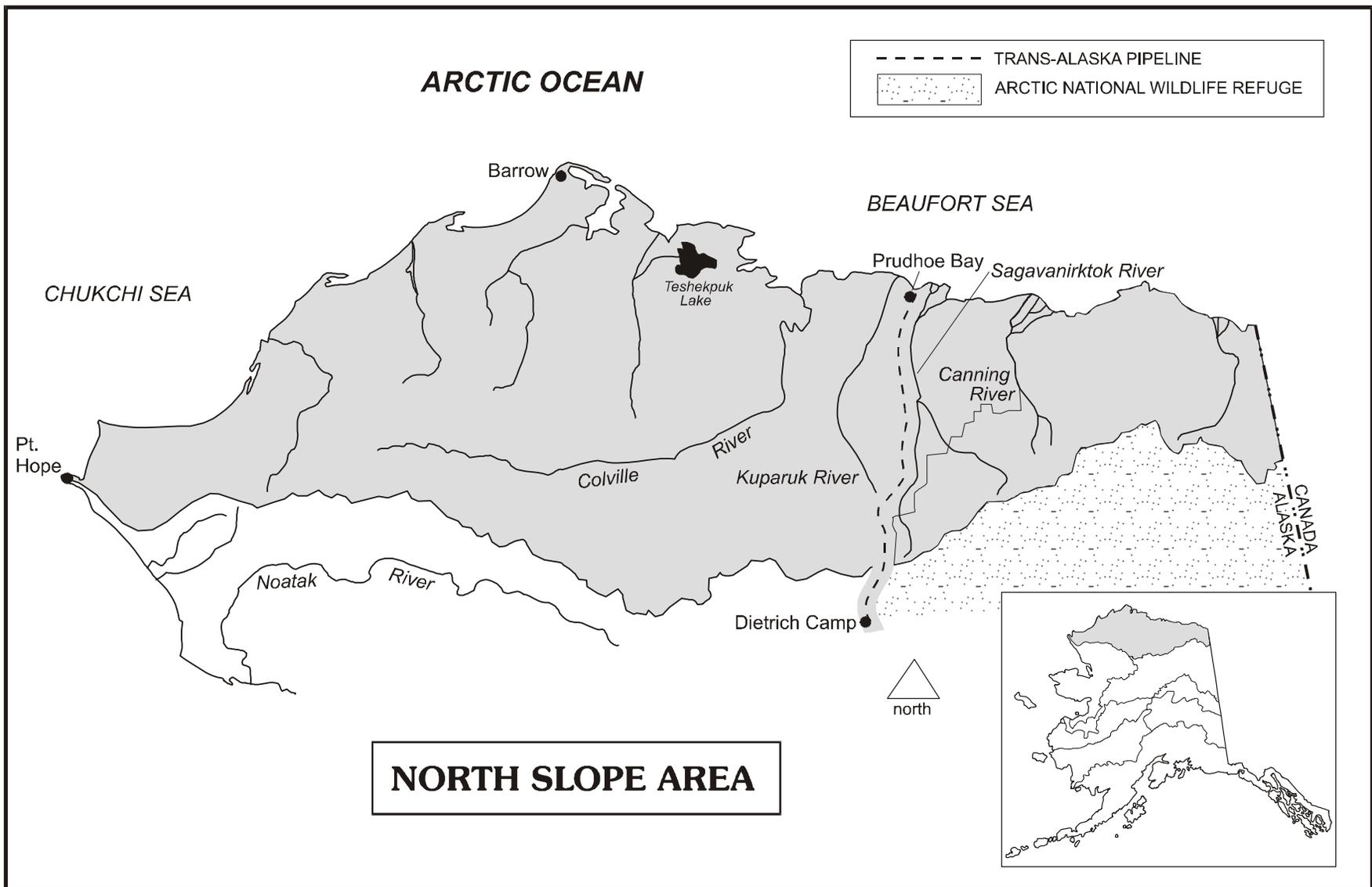


Figure 4.-Map of the North Slope subarea.

the management area. Five species of Pacific salmon, *Oncorhynchus gorbuscha* chinook salmon *Oncorhynchus tshawytscha*, coho salmon *Oncorhynchus kisutch*, chum salmon *Oncorhynchus keta*, sockeye salmon *Oncorhynchus nerka*, and pink salmon are available in tributaries of the Yukon and Kuskokwim subareas. Chum and pink salmon and occasionally chinook salmon are present on the North Slope in the Colville River drainage and in coastal streams, but in numbers generally too small to attract or support significant sport fisheries.

Popular fisheries in lakes and streams adjacent to the Dalton Highway are supported by stocks of resident species Arctic grayling *Thymallus arcticus*, Dolly Varden *Salvelinus malma*, northern pike *Esox lucius*, and lake trout *Salvelinus namaycush*. Unique opportunities to fish for these species as well as inconnu (sheefish) *Stenodus leucichthys*, burbot *Lota lota* and Arctic char *Salvelinus alpinus* in remote wilderness settings exist through out this management area. Wild stocks of rainbow trout *Oncorhynchus mykiss* are found in small numbers in the Kuskokwim River drainage upstream of the Aniak River. Rainbow trout do not occur naturally in drainages north of the Kuskokwim River. Additional species of whitefish that are of importance to fisheries in the AYK Area include the broad whitefish, *Coregonus nasus*, Arctic cisco, *Coregonus autumnalis*, and Bering cisco, *Coregonus laurettae*.

ALASKA BOARD OF FISHERIES ACTIVITIES

Appropriate fishing regulations are developed through a process that the State of Alaska has established by which the Alaska BOF adopts regulations based on input from all concerned members of the public and the Alaska Department of Fish and Game (ADF&G).

Alaska Board of Fisheries

Under the current operating schedule, the BOF meets on a three-year cycle. The next regularly scheduled meeting of the BOF for consideration of AYK fisheries will occur in January 2004. The BOF will consider seven regulatory proposals that will potentially affect sport fishing in the AYKMA. Oral and written reports by staff of the ADF&G and written and oral testimony by members of the public and by representatives of several advisory committees will be provided during this meeting. A list of the proposals that may affect AYKMA sport fisheries is provided in Appendix A.

Advisory Committees

Public input concerning regulation changes is provided by several means, including direct testimony to the BOF, and by participation in local fish and game advisory committees. Local advisory committees have been established throughout the state to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes in the affected areas. Most active committees meet at least once a year, usually in the fall prior to Board meetings. Personnel from the Division of Sport Fish and other divisions often attend the committee meetings. In this way, the public are afforded the opportunity for direct public interaction with department staff involved with resource issues of local concern.

During the reporting period, there were at least 15 active Fish and Game advisory committees in the AYKMA. In the Yukon subarea, active committees included: Eagle, Upper Tanana /Forty Mile, Yukon Flats, Tanana /Rampart /Manley, Ruby, Koyukuk, Grayling /Anvik /Shageluk /Holy Cross (GASH), Middle Yukon, and Lower Yukon. An additional committee was activated in the Yukon subarea during 1998, the Central Advisory Committee. This committee branched off from the Yukon Flats Advisory Committee following a long struggle by Central AK residents to find representation on the Yukon Flats committee. In

the upper Kuskokwim subarea, active committees included: McGrath, and Central Kuskokwim. In the North Slope subarea, two advisory committees are listed. However struggles with inadequate funding and with very low attendance by members from distant sites in this large area resulted in poor representation by local residents. The North Slope Borough (NSB) formed a North Slope Borough Fish and Game Advisory Committee approximately ten years ago, which has filled the void created by the inactive “official” advisory committees. The NSB continues to support this advisory effort and appears to provide this needed function.

During 2002-2003 Sport Fish Division staff participated in meetings of Upper Tanana /Forty Mile, Yukon Flats, Tanana /Rampart /Manley, Koyukuk River, Middle Yukon, (GASH), McGrath, and Central Kuskokwim committees and the North Slope Borough Fish and Game Advisory Committee. Division of Commercial Fisheries staff addressed most fisheries issues in other Yukon River areas.

ESTABLISHED MANAGEMENT PLANS AND POLICIES

Fisheries specific management objectives for the management area have been identified in management plans for Arctic grayling and northern pike. In addition, a series of general divisional criteria have been prepared to guide the establishment of fishery objectives, and include:

1. **Management and protection of existing fish resources.** Divisional activities should strive to manage and protect Alaska's wild fish stock 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; and,
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 impact other fisheries.

To date, management plans have been written for the following fisheries (two of these plans were revised in 2003): Yukon drainage northern pike, and Arctic grayling. A management plan for lake trout in the AYK region is currently being drafted. Revision of the existing plans as well as the development of additional fisheries management plans will occur as needed in response to changes in use patterns as new quantitative information becomes available.

- North Slope Sport Fishery Management Plan
- Sport Fishery Management for Salmon in the Yukon Drainage
- Sport Fishery Management Plan for Northern Pike in the Yukon Drainage (revised 2003; Burr *In prep a*)
- Sport Fishery Management Plan for Arctic Grayling in the Yukon Drainage (revised 2003; Burr *In prep b*)

A cooperative planning effort for the Dall River northern pike fishery provided a management plan for this fishery. Cooperators include the Department of Fish and Game, the Stevens Village

Natural Resources Office, the Yukon Flats National Wildlife Refuge, and members of the Fairbanks Advisory Committee.

MAJOR BIOLOGICAL AND SOCIAL ISSUES

1. Dalton Highway/ Prudhoe Bay recreational fisheries. The opening of the entire length of the Dalton Highway (North Slope Haul Road) to public travel in 1994 provided new access to lakes and streams along the route. Increases in recreational fishing effort and harvest have resulted in reductions in bag limits for northern pike and Arctic grayling and in a no-harvest regulation for lake trout within the highway corridor. The State of Alaska is in the process of paving the Dalton Highway north of the Yukon River. Sport fishing by road construction crews and by increasing numbers of visitors will likely bring greater fishing effort to fish stocks in the highway corridor. Due to the unproductive fisheries habitat in the region, chances for overexploitation of these stocks is considered high.
2. North Slope resource development. Development of extensive oil and gas deposits in and around Prudhoe Bay at the mouth of the Sagavanirktok River and west to the Colville River Delta carries the risk of petroleum contamination of the most important streams on Alaska's North Slope for anadromous Dolly Varden. Resident freshwater fish are also at risk because of limited overwintering habitat that is located in river delta areas where most development currently exists. In addition, new petroleum developments that are under consideration would extend exploration into the upstream, foothill areas. Critical over-wintering habitat for entire stocks of Dolly Varden are found in isolated sites within these upstream areas.
3. Development of New Sport Fisheries in Rural Alaska. Relatively rapid development of sport fisheries in remote areas has resulted in friction between local residents and the non-local anglers. In many instances, local people have historically enjoyed nearly exclusive use of fishery resources. Sport fishing guides and other anglers seeking less crowded fishing opportunities in wilderness settings continue to "discover" less well known but potentially high quality fisheries. As currently popular fishing destinations in Bristol Bay and South Central Alaska become increasingly crowded, anglers and guides are likely to continue to travel farther to participate in Alaska's fisheries. In addition to the social friction caused by this change in use patterns of remote areas and to some extent because of this friction, the department will increasingly be expected to provide information on the status of stocks for which there is currently only the most rudimentary information. This is likely to be the biggest challenge in the management of sport fisheries in the AYK Management Area. Recent experiences at the Dall, Holitna, and Innoko rivers are examples of the type of challenges that we should anticipate.
4. Rod and Reel Subsistence. In 2000, the Alaska BOF included rod and reel gear as legal a subsistence fishing method for harvest during the open water season in the AVCP area of the lower Yukon and Kuskokwim rivers. In 2001, rod and reel subsistence fishing was extended upstream in the Kuskokwim by emergency regulation in response to a petition to the BOF from Nikokai Native Village and the Western Interior Regional Advisory Council. Until these actions were taken, rod and reel for subsistence fishing was permitted only through the ice under state regulations. Harvest of fish with rod and reel during open water periods in the remainder of the state is regulated under Sport Fishing regulation. The primary concern with this potential change is how to manage for sustainable fish populations with legalization of rod and reel gear for subsistence fishing. We understand that rural resident use patterns have

likely incorporated rod and reel in past subsistence harvests, and legalization of this gear will not greatly affect local use patterns. Our greatest concerns relate to changes in urban resident behavior in regard to license sales, visitation to rural fisheries, and harvests of fish populations.

5. Rural resentment of sport fishing and sport anglers. Some rural Alaskans generally have a cultural bias against the concept of "sport fishing" and feel that people do not have the right to "play" with food resources. The bias is particularly strong towards catch-and-release practices. This conflict of values has led to resentment towards sport anglers who wish to fish on private and public lands within the AYK area.
6. Federal Fishery Management for Subsistence in Alaska's navigable waters. In October 1999, Federal fishery managers assumed responsibility for ensuring a rural subsistence priority on navigable waters adjacent to or within the boundaries of Federal Conservation units. There is widespread concern that one result of this action will be reduced opportunity for sport fishing throughout the state. Because of the large amount of Federal public land within AYKMA and because of the high proportion of subsistence users, this loss of opportunity is of acute concern for sport fishermen in the AYKMA. Recent proposals to the Federal Subsistence Board to exclude recreational anglers from popular fisheries have required substantial efforts by department staff to maintain current opportunities.

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 composed of two parts. The first involves capital improvement projects, which are of a durable nature, and involves major construction. Typical projects include construction of boat launches, parking areas, camping areas, handicap-accessible public fishing docks, access roads, improved trails, and the purchase or lease of lands or right-of-ways to ensure public access. The second portion of the program is called the Small Access Site Maintenance Project. This ongoing, annually funded program involves maintaining and upgrading existing angler access sites. Activities include placing and maintaining (replacing vandalized) signs at lake and river angling access sites, constructing and maintaining pedestrian and Off Road Vehicle (ORV) trails to fishing sites, securing permanent right-of-ways on public and private land to ensure continued public access to fishing and boat launching sites. Maintaining access roads to boating or angling sites that might not otherwise be maintained, providing portable toilets, picnic tables, and trash removal at heavily used roadside angling sites. Constructing and maintaining outhouses and tent platforms at remote angling sites and producing and printing publications which inform anglers about fishing and boat launching opportunities.

To date relatively few access projects have been proposed for rural AYKMA. This program provided funding for construction of a concrete boat launch to the Yukon River in cooperation with the City of Galena. A proposal for an additional major project on the Yukon River would upgrade access and parking at the Yukon River, Dalton Highway bridge boat launch. An upgrade of the boat launching site in the Kuskokwim River community of McGrath is planned for the summer of 2004.

SECTION II: FISHING EFFORT AND HARVEST IN THE AYK MANAGEMENT AREA

SPORT ANGLING EFFORT

Estimates of effort in the AYKMA have shown a modest increase during the past fifteen years from approximately 14,700 during 1985-1989 to more than 19,000 in the most recent five-year period (1997-2001; Table 1; Figure 5). An error in the estimation process for the 1996-1998 period was detected and corrected. The effect of this error was generally to inflate the estimates of effort, catch and harvest. The estimates reported in this document represent the corrected figures.

The proportion of angler effort in the three subareas of the AYKMA has remained similar since the early 1980s (Table 1; Figure 5). Effort in the North Slope subarea increased to about 5,000 angler days in the early 1980s but has grown very slowly since then, averaging about 4,900 days of effort (about 24% of AYKMA) during the last 5-year period. The Yukon area continues to provide more than 60% of the fishing effort in the management area. The estimated angler effort for the Yukon area for 2000 of 11,300 angler days is similar to the most recent five-year average of 13,000 (Table 1). The upper portion of the Kuskokwim drainage has on average provided about 2,200 angler days, 11% of angler effort for the AYKMA (Table 1; Figure 5).

SPORT FISH HARVEST AND CATCH AND RELEASE

The vast majority of the AYK management area and its fishable waters occur away from highways and motor vehicle roads of any kind. Small communities are scattered along the major river systems of Interior Alaska and along the coast of western Alaska as well. The communities are invariably located near water, either on a river or lake because of the importance of fish as a food source to native people historically and today. Native communities harvest a substantial amount of fish and game resources for personal subsistence use, but fishing is usually conducted with high catch-per-unit-of-effort gear types such as fish wheels and nylon gillnets. Recently, rod and reel fishing gear was added to the types of legal subsistence fishing gear in the Kuskokwim drainage and the lower portion of the Yukon drainage. Recreational or sport fishing with rod and reel is practiced to some extent by rural residents, but often as an extension of subsistence activities and less for recreational purposes. Consequently, harvest estimates of sport caught fish from rural Alaska are generally low because local residents usually fish under subsistence regulations and because the small amount of sport fishing done is usually conducted as a subsistence activity. Since statewide harvest estimates are based upon surveys of licensed sport fishers, the rural harvests are probably not fully documented.

Sport harvest of all species in the AYK Management Area has averaged about 16,000 fish annually since 1984 (Table 2). The most recent five-year data has shown a moderate decrease in harvest; averaging 12,000 between 1997 and 2001. Peak harvests were recorded in 1983 when approximately 27,000 fish were harvested. The harvest in the AYKMA has been dominated by freshwater resident species, primarily Arctic grayling, northern pike, Dolly Varden and sheefish (Figure 6). More recently, Pacific salmon have composed an increasing percentage of the harvest in the management area; 12% of the average total between 1997 and 2001 compared with

Table 1.-Fishing effort by subarea for the AYK management area, 1977-2002.

Year	AYK Area Angler Days	Arctic Angler-Days (%) ^a	Yukon Angler-Days (%)	Upper Kuskokwim Angler Days (%)
1977	Nd	2,434	4,729	nd
1978	Nd	1,422	6,314	nd
1979	Nd	1,526	7,714	nd
1980	Nd	2,142	6,849	nd
1981	Nd	2,601	6,679	nd
1982	Nd	4,879	11,034	nd
1983	18,766	5,738 (31)	11,070 (59)	1,958 (10)
1984	16,392	8,344 (51)	6,358 (39)	1,690 (10)
1985	14,217	4,490 (32)	8,670 (61)	1,057 (07)
1986	14,490	4,779 (33)	9,381 (65)	330 (02)
1987	14,883	5,256 (35)	7,017 (47)	2,610 (18)
1988	12,333	2,541 (21)	8,261 (67)	1,531 (12)
1989	17,471	4,118 (24)	10,712 (61)	2,641 (15)
1990	21,578	3,764 (17)	15,539 (72)	2,275 (11)
1991	20,036	7,291 (36)	10,749 (54)	1,996 (10)
1992	19,600	4,940 (25)	12,831 (65)	1,829 (09)
1993	22,261	5,600 (25)	14,011 (63)	2,650 (12)
1994	21,272	5,407 (25)	12,872 (61)	2,993 (14)
1995	26,502	5,644 (21)	18,677 (70)	2,181 (08)
1996	16,582	4,487 (27)	10,678 (64)	1,417 (09)
1997	20,646	5,278 (26)	12,725 (62)	2,643 (13)
1998	16,337	3,653 (22)	10,127 (62)	2,557 (16)
1999	20,343	5,230 (26)	12,906 (63)	2,207 (11)
2000	18,519	4,739 (26)	11,327 (61)	2,453 (13)
2001	20,094	6,032 (30)	10,531(52)	3,531(18)
2002	22,640	4,770(21)	15,044(66)	2,826(12)
Average				
1985-01	19,230	4,932(26)	11,931(62)	2,368(12)
1992-01	20,229	5,101(25)	12,669(63)	2,446(12)
1997-01	20,268	4,986(25)	11,523(57)	2,678(13)

^a Percentage of total for the Arctic, Yukon, Kuskokwim management area from this subarea.

nd Data on the proportion of effort from the upper Kuskokwim drainage prior to 1983 are not available.

Sport Fishing Effort in Arctic, Yukon, Kuskokwim Management Area

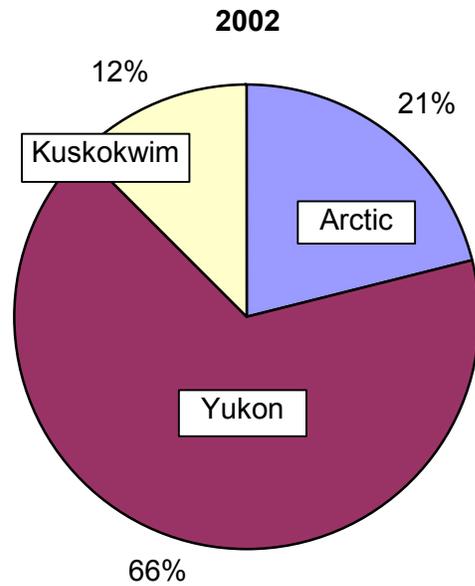
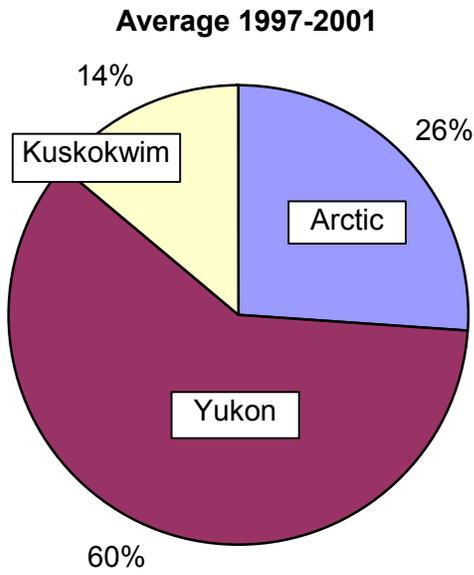
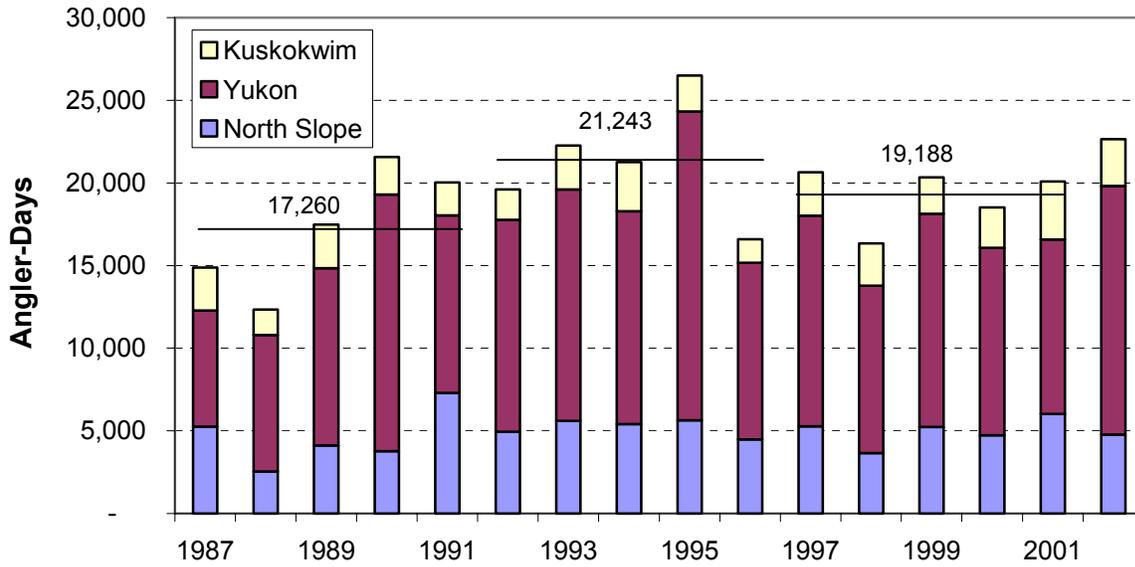


Figure 5.-Sport fishing effort in the Arctic, Yukon, Kuskokwim Management Area.

Table 2.-Number of fish harvested and total catch by species by recreational anglers within the Arctic Yukon Kuskokwim Management Area, 1984-2002.

Year	All Fish Total	Pacific Salmon					
		Total	Chinook	Coho	Sockeye	Pink	Chum
Harvest							
1984	18,662	806	117	585	0	78	26
1985	20,215	297	61	124	50	0	62
1986	21,455	867	15	454	98	98	202
1987	21,631	1,336	63	732	147	0	394
1988	18,403	1,293	109	456	127	55	546
1989	21,132	1,624	200	315	0	112	997
1990	12,155	1,014	105	264	12	0	633
1991	22,085	1,802	143	911	180	0	568
1992	15,263	2,126	368	826	107	63	762
1993	12,632	1,428	207	674	112	0	435
1994	12,729	1,640	518	972	43	17	90
1995	10,693	736	206	341	0	0	189
1996	12,904	1,516	416	759	9	134	198
1997	11,497	1,811	500	1,051	32	22	206
1998	12,653	1,310	381	249	64	98	518
1999	11,402	1,369	58	1,186	44	0	81
2000	11,265	2,639	1,548	974	23	6,480	840
2001	11,827	1,011	231	534	152	0	94
2002	14,748	1,812	116	1,510	19	66	101
Averages							
1987-01	14,551	1,501	244	683	70	77	437
		10.3%	1.7%	4.7%	0.5%	0.5%	3.0%
1992-01	12,287	1,638	304	757	59	98	341
		13.3%	2.5%	6.2%	0.5%	0.8%	2.8%
1997-01	11,729	1,729	265	799	63	154	348
		14.7%	2.3%	6.8%	0.5%	1.3%	3.0%
Catch							
1990	78,996	3,587	226	740	24	0	2,597
1991	72,934	4,288	316	1,576	281	77	2,038
1992	61,553	6,656	1,530	1,887	296	329	2,614
1993	70,146	5,950	1,365	1,265	989	27	2,304
1994	55,644	3,082	717	1,589	69	99	608
1995	49,588	2,749	578	1,023	0	0	1,148
1996	82,193	8,195	3,532	2,092	164	1,198	1,209
1997	78,834	8,444	3,096	4,170	487	59	632
1998	73,071	7,996	1,577	679	1,103	815	3,822
1999	72,180	6,844	1,388	4,264	418	0	774
2000	75,780	7,373	818	4,426	242	697	1,190
2001	80,919	13,180	3,812	5,859	1,765	34	1,710
2002	89,508	7,108	725	5,085	27	125	1,146
Averages							
1992-01	69,991	6,158	1,841	2,725	553	326	1,601
		8.8%	2.6%	3.9%	0.8%	0.5%	2.3%
1997-01	76,157	7,770	2,138	3,880	803	321	1,626
		10.2%	2.8%	5.1%	1.1%	0.4%	2.1%

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Table 2.-Page 2 of 3.

Year	Non-Salmon											
	Total	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern			Halibut	Other Fish
Harvest												
1984	17,856	624	1,702	78	10,271	195	299	3,129	52	0	0	1,506
1985	19,918	2,209	4,270	0	10,065	315	385	2,464	210	0	0	0
1986	20,588	923	1,367	0	10,056	4,251	262	3,489	240	0	0	0
1987	20,295	274	3,956	0	12,399	323	436	2,840	67	0	0	0
1988	17,110	218	1,836	54	8,428	1,010	783	4,763	18	0	0	0
1989	19,508	767	2,261	0	10,210	384	1,027	4,310	515	0	0	34
1990	11,141	424	898	0	6,053	339	376	2,527	524	0	0	0
1991	20,283	653	2,177	15	9,440	422	1,482	5,934	160	0	0	0
1992	13,137	796	1,581	24	5,423	294	726	3,846	447	0	0	0
1993	11,204	216	1,699	0	5,180	173	481	2,547	300	0	19	589
1994	11,089	132	1,260	0	5,673	147	521	2,282	508	0	45	521
1995	9,957	129	1,096	0	4,761	100	665	2,318	285	0	0	603
1996	11,388	53	2,074	13	5,503	196	653	2,633	244	0	0	19
1997	9,686	57	1,505	29	4,568	398	541	2,165	415	0	0	8
1998	11,343	248	1,726	0	6,952	228	301	1,730	158	0	0	0
1999	10,033	685	1,244	0	4,512	579	263	2,562	168	0	20	0
2000	8,626	179	1,622	0	4,392	388	464	1,463	118	0	0	0
2001	10,816	93	2,210	0	4,497	954	634	2,102	68	0	0	258
2002	12,936	364	1,471	0	5,313	529	568	3,531	1,160	0	0	0
Averages												
1987-01	13,693	328	1,810	9	6,533	396	624	2,935	266	0	6	135
	94.1%	2.3%	12.4%	0.1%	44.9%	2.7%	4.3%	20.2%	1.8%	0.0%	0.0%	0.9%
1992-01	11,675	259	1,602	7	5,146	346	525	2,365	271	0	8	200
	95.0%	2.1%	13.0%	0.1%	41.9%	2.8%	4.3%	19.2%	2.2%	0.0%	0.1%	1.6%
1997-01	10,215	252	1,661	6	4,984	509	441	2,004	185	0	4	53
	87.1%	2.2%	14.2%	0.0%	42.5%	4.3%	3.8%	17.1%	1.6%	0.0%	0.0%	0.5%

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Table 2.-Page 3 of 3.

Year	Non-Salmon											
	Total	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern Pike	Burbot	Smelt	Halibut	Other Fish
Catch												
1990	75,409	2,695	6,973	0	42,902	1,216	2,444	18,368	526	0	0	285
1991	68,646	1,789	11,357	106	36,740	509	1,893	16,092	160	0	0	0
1992	54,897	1,983	8,241	309	25,683	515	2,077	16,031	58	0	0	0
1993	64,196	471	10,399	347	32,868	494	3,444	15,202	363	0	19	589
1994	52,562	688	5,619	108	27,067	427	1,329	13,625	775	0	45	2,879
1995	46,839	622	5,042	0	18,917	127	1,957	18,908	357	0	0	909
1996	73,998	420	10,788	66	31,114	524	3,427	27,357	277	0	0	25
1997	70,390	893	7,434	166	43,447	593	1,847	15,212	713	0	0	85
1998	65,075	1,366	10,071	0	36,862	768	1,339	14,443	200	0	0	26
1999	65,336	2,517	7,213	0	30,024	622	1,625	23,127	168	0	20	20
2000	68,407	1,256	9,570	80	37,696	1,311	2,027	16,324	143	0	0	0
2001	67,739	322	10,620	431	30,290	1,351	2,032	22,257	89	0	0	347
2002	82,400	2,134	6,259	542	30,996	1,001	1,790	38,461	1,217	0	0	0
Averages												
1992-01	63,035	1,054	8,500	151	31,397	673	2,110	18,249	314	0	8	488
	90.1%	1.5%	12.1%	0.2%	44.9%	1.0%	3.0%	26.1%	0.4%	0.0%	0.0%	0.7%
1997-01	68,641	1,271	8,982	135	35,664	929	1,774	18,273	263	0	4	96
	90.1%	1.7%	11.8%	0.2%	46.8%	1.2%	2.3%	24.0%	0.3%	0.0%	0.0%	0.1%

^a Percent of all AYKMA fish.

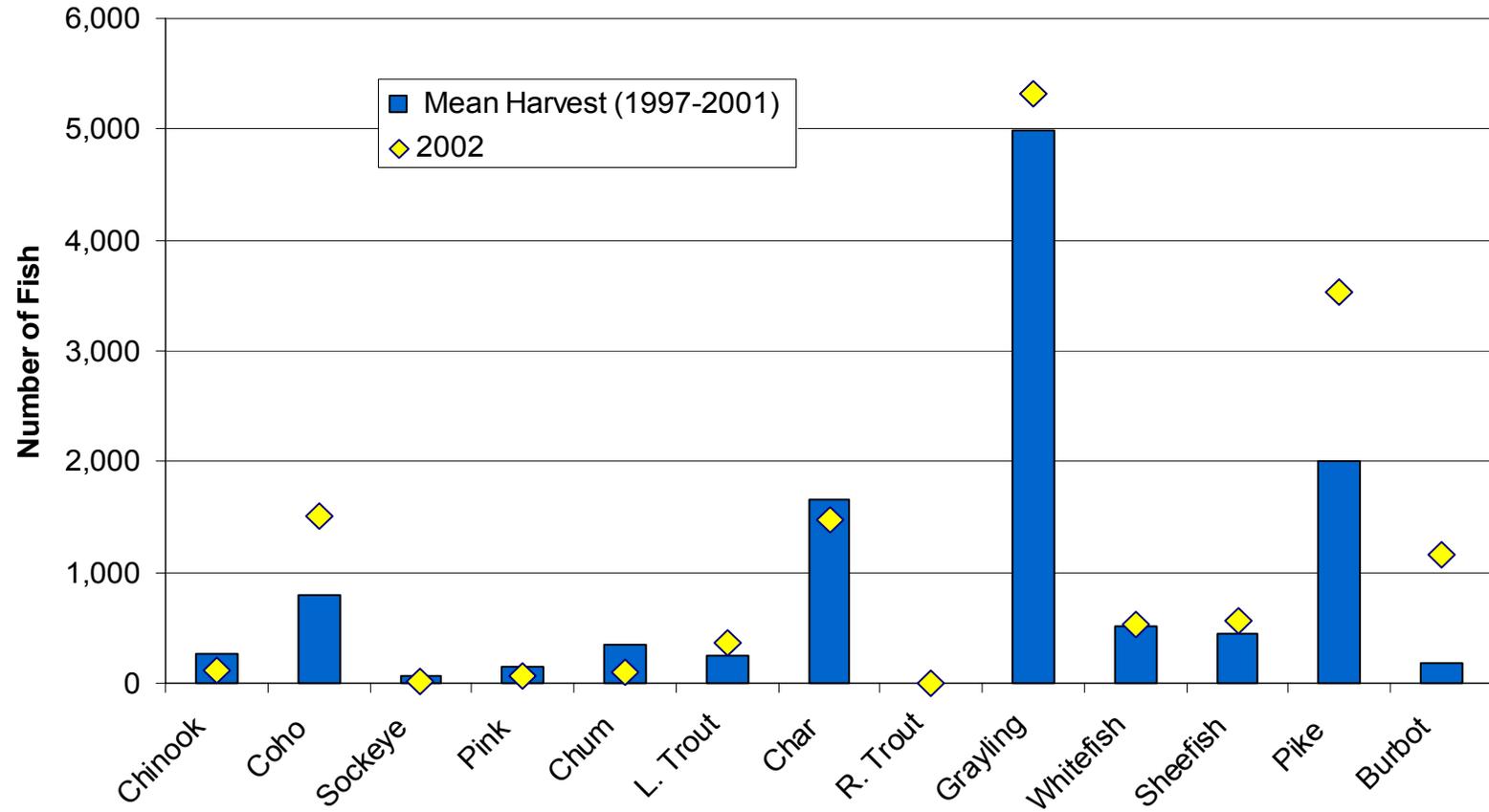


Figure 6.-Sport fishing harvest in the AYKMA.

about 5% between 1984 and 1988. Historically, the Yukon and Upper Kuskokwim subareas have provided roughly equal proportions of the harvests of salmon species in the AYKMA. However during the last five year period (1997-2001) sport fisheries in the upper Kuskokwim subarea have harvested proportionally more chinook and coho salmon than have Yukon subarea sport fisheries (Appendices B1 and B2).

Sport catch of all species in the AYK Management Area has been estimated since 1990 (Table 2). Numbers reported as catch include fish that are caught and kept (harvested) and those that are caught and released. During the most recent five-year period, 83% of all fish caught in the AYKMA were released. The proportion of catch and release activity varies by species. For example, only 29% of burbot caught between 1997 and 2001 were released compared with 89% of northern pike, 86% of Arctic grayling, and 88% of chinook salmon.

OTHER USER GROUPS - COMMERCIAL AND SUBSISTENCE FISH HARVESTS

Important subsistence and commercial fisheries exist in the AYK Area and form an economic base for income and employment in many local communities. Commercial and subsistence harvests for salmon, and herring are much larger than sport harvests for those species (Appendix C1 – C6). Extremely limited commercial fisheries exist for freshwater species such as sheefish, burbot, northern pike and whitefish, so that the majority of the freshwater harvest is for subsistence and sport use.

Salmon harvests for subsistence and commercial use are relatively less important in the North Slope subarea than in the other subareas of the AKYMA, mainly because salmon are only sparsely distributed north of Point Hope on the Chukchi Sea coast. Commercial fisheries in the Kuskokwim are restricted to waters downstream of Chuathbaluk near Aniak and do not occur within the AYKMA portion of the Kuskokwim drainage. However commercial and subsistence catches in the lower Kuskokwim drainage affect runs targeted by anglers in up river locations. Harvests are dominated by chum salmon in all subareas except in the Kuskokwim area (Table 3; Appendices C4 – C6), where coho salmon comprise a slightly larger proportion of the harvest. Chinook salmon, while less abundant, are the most important fish for commercial sale and for subsistence in many parts of the area. Sockeye salmon are taken commercially in the Kuskokwim Bay subarea, especially in the Kuskokwim Bay subdistricts of Quinhagak and Goodnews Bay, but the species is almost absent north of the Kuskokwim River. Pink salmon occur throughout the AYKMA in streams near the coast, but, while numerically dominant in some years, the species is not exploited to a great extent in commercial or subsistence fisheries.

Commercial catches have averaged two million salmon annually of all species in the AYK Region from 1977 to 1997. Poor returns of chinook, and chum salmon since 1997, particularly for the Kuskokwim area, resulted in much lower than average commercial harvests. In 2001 there was no directed commercial fishery for chinook or chum salmon in the Kuskokwim or Yukon rivers.

SECTION III: MAJOR FISHERIES OVERVIEW

Waters within the AYK Management Area offer some of the most remote and diverse opportunities for anglers available in Alaska. Opportunities to harvest trophy northern pike, sheefish, Dolly Varden, lake trout, and Arctic grayling within a wilderness setting are well known. Sport fishing opportunities for salmon are currently not as well known. However,

Table 3.-Commercial and subsistence harvest of salmon in the Yukon and Kuskokwim areas, 1977-2003.

Year	Area					
	Tanana River		Yukon River ^a		Kuskokwim River ^b	
	Commercial ^c	Subsistence ^d	Commercial	Subsistence	Commercial	Subsistence
1977	25,282	52,998	903,199	223,189	639,997	273,748
1978	63,697	48,267	1,386,621	281,828	668,211	175,634
1979	67,300	63,914	1,275,483	406,419	699,201	220,504
1980	61,830	67,025	1,467,065	440,912	1,010,509	278,369
1981	66,743	48,925	1,872,392	398,802	949,974	256,129
1982	39,291	37,884	1,063,534	420,034	1,089,724	302,013
1983	68,596	65,516	1,395,765	441,181	739,832	203,026
1984	85,759	64,551	1,212,685	432,467	1,494,476	220,335
1985	123,709	80,717	1,284,433	462,618	802,191	200,937
1986	56,094	59,219	1,420,000	475,355	1,289,748	247,167
1987	14,398	86,746	742,903	541,538	1,318,438	186,069
1988	80,159	81,820	1,904,591	420,267	2,329,790	306,055
1989	121,254	87,909	1,842,710	382,276	1,505,864	325,363
1990	82,768	69,084	728,671	306,472	1,269,226	314,522
1991	79,186	69,614	1,057,077	278,611	1,310,138	298,517
1992	34,982	55,209	661,771	293,848	1,554,871	246,896
1993	5,150	22,627	229,076	259,556	975,449	240,105
1994	42,861	73,000	342,170	271,049	1,520,377	251,112
1995	121,192	81,410	1,152,465	264,530	1,533,466	236,888
1996	72,053	60,023	845,789	270,048	1,548,722	241,570
1997	28,015	37,681	407,354	251,342	404,847	198,466
1998	1,533	29,765	70,965	192,747	757,912	218,598
1999	838	30,271	120,110	203,927	211,132	202,413
2000	0	7,660	15,142	127,205	493,084	204,714
2001	0	15,543	0	170,568	196,189	152,914
2002	4,034	14,604	34,398	151,681	87,679	185,924
2003	25,488	Nd	62,672	Nd	289,096	Nd

-continued-

Table 3.-Page 2 of 2.

Year	Area					
	Tanana River		Yukon River ^a		Kuskokwim River ^b	
	Commercial ^c	Subsistence ^d	Commercial	Subsistence	Commercial	Subsistence
	Averages					
1977-02	51,797	58,373	897,060	285,244	741,901	200,155
1993-02	30,058	39,152	331,496	202,970	501,811	172,094
1998-02	1,281	19,659	48,123	168,798	209,627	159,959

^a Yukon River exclusive of Tanana River

^b Kuskokwim River only; Kuskokwim Bay and coastal villages excluded.

^c Commercial harvest includes fish harvested by commercial fishery and fish harvested to produce roe sold

^d Subsistence harvest includes subsistence and personal use.

Nd = no data

angling for chinook and coho salmon has increased during recent years in the Kuskokwim and Yukon areas as pressure on other popular sites outside AYKMA continued to increase. Marine sport fisheries are not an important component in the area.

This section provides a summary of sport fisheries that were considered significant in the AYK Management area during 2002-2003. The section includes a discussion of the sport fisheries in the AYKMA by species. Discussion of each fishery will address 1) historical perspective, 2) recent fishery performance (stock status), 3) fishery objectives and management, 4) fishery outlook, 5) recent actions by Alaska BOF, 6) current issues and 7) ongoing and recommended management and research activities. Recent fishery performance will focus on data from 2002. Information regarding the 2003 season will be included as available, but estimates of sport effort and harvest are not yet available for the 2003 season. Tables summarizing historic sport fish harvests by species and subarea are provided for reference (Table 2; Appendices B1–B4).

YUKON RIVER DRAINAGE SALMON

The chinook, chum, and coho salmon are important subsistence and commercial species in the Yukon River drainage; however, utilization by sport anglers has, to date, been minimal.

Fishery Description and Historical Perspective

Chinook salmon spawn throughout the Yukon River drainage. Chum salmon, including a summer run and a fall run are numerically the most abundant species, and are distributed throughout the drainage. Coho salmon are less abundant and spawn in large numbers in only few identified streams. Pink salmon are locally abundant in some years but are not thought to migrate upstream of the Anvik River. Sockeye salmon occur occasionally, but only a few individuals are taken annually in commercial or subsistence harvests. There may be a small spawning stock of this species in the Innoko River, but the locations of spawning sites have not been identified.

Annual sport harvests of Yukon River drainage salmon have historically been, and continue to be primarily from streams of the Tanana River drainage. Sport fisheries in the Tanana drainage are discussed within the Annual Management Reports for the Tanana Management area (Doxey *In prep*; Parker *In prep*). Mills 1977-1994, Howe et al. 1995-1996, Howe et al. 2001a-d, Walker et al. 2003, Jennings et al. 2001-02 *In prep* report sport harvests from other streams and drainages in the Yukon watershed, primarily from the Andreafsky, Anvik, Porcupine and Koyukuk rivers and their drainages (Tables 4–6). Approximately 12,000 people live along the Yukon River and its tributaries (excluding the Tanana River). Most of these people depend on salmon for livelihood, subsistence, or both. Rural residents customarily use high yield fishing methods such as gill-net and fish wheel, where a larger volume harvest can be taken in the turbid mainstem of Yukon River. Rod and reel fishing for salmon is practiced by some rural residents on occasion and by non-area residents who visit for the purpose of sport fishing. Consequently, the size of reported sport harvest does not reflect the abundance of salmon in the drainage.

Table 4.-Sport harvest of chinook salmon in the Yukon River drainage (1992-2002).

Harvest	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Ft. Yukon to Canadian Border)													
Sub Total	94	0	381	28	0	10	0	0	0	0	0	51	2
Fortymile River	0	0	0	0	0	0	0	0	0	0	0	0	0
Charley River	0	0	0	0	0	0	0	0	0	0	0	0	0
Yukon R. drainages (Koyukuk R – Ft. Yukon)													
Sub Total	101	85	0	0	32	39	0	22	81	12	0	37	31
Porcupine River	39	28	0	0	0	0	0	0	0	0	0	9	0
Chandalar River	0	0	0	0	0	0	0	0	0	0	0	0	0
Beaver and Nome Creeks	0	0	0	0	0	0	0	0	0	0	0	0	0
Dall River	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Road Streams	0	0	0	0	0	0	0	0	0	0	0	0	0
Nowitna River	0	0	0	0	32	0		0	12	0	12	4	12
Melozitna River	0	0	0	0	0	0	0	0	0	0	0	0	0
Koyukuk River	0	0	0	0	0	0	0	22	9	0	0	3	6
Yukon R. drainages (downstream from Koyukuk R.)													
Sub Total	102	19	29	9	96	172	207	0	18	0	0	65	79
Nulato River	0	0	0	0	0	0	0	0	0	0	0	0	0
Anvik River	94	0	10	0	21	12	45	0	0	0	0	18	11
Innoko River	0	0	0	0	0	0	0	0	0	0	0	0	0
Andreafsky River	8	19	19	9	11	160	6	0	18	0	0	25	37
Total	313	122	410	37	128	221	207	22	99	12	8	157	112

Table 5.-Sport harvest of chum salmon in the Yukon River drainage (1992-2002).

Harvest	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Ft. Yukon to Canadian Border)													
Sub Total	84	0	0	0	0	0	0	0	0	0	0	8	0
Fortymile River	0	0	0	0	0	0	0	0	0	0	0	0	0
Charley River	0	0	0	0	0	0	0	0	0	0	0	0	0
Yukon R. drainages (Koyukuk R – Ft. Yukon)													
Sub Total	168	0	0	0	11	197	0	81	0	21	0	48	60
Porcupine River	8	0	0	0	0	0	0	0	0	0	0	0	0
Chandalar River	0	0	0	0	0	0	0	0	0	0	0	0	0
Beaver and Nome Creeks	8	0	0	0	0	0	0	0	0	0	0	0	0
Dall River	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Road Streams	0	0	0	0	0	0	0	0	0	0	0	0	0
Nowitna River	0	0	0	0	0	0	0	0	0	0	0	0	0
Melozitna River	15	0	0	0	0	0	0	0	0	0	0	0	0
Koyukuk River	23	0	0	90	0	197	0	81	0	21	0	41	60
Yukon R. drainages (downstream from Koyukuk R.)													
Sub Total	175	73	90	99	55	9	351	0	64	32	77	95	91
Nulato River	5	0	0	0	0	0	0	0	0	0	53	1	0
Anvik River	137	18	10	0	0	0	216	0	64	32	9	49	64
Innoko River	0	0	0	0	0	0	58	0	0	0	0	0	12
Andreafsky River	0	55	80	99	56	0	15	0	0	0	15	31	3
Total	618	193	90	189	66	206	351	81	64	53	77	191	151

Table 6.-Sport harvest of coho salmon in the Yukon River drainage (1990-2002).

Harvest	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Ft. Yukon to Canadian Border)													
Sub Total	24	0	0	0	28	40	0	0	0	0	0	9	8
Fortymile River	0	0	0	0	0	0	0	0	0	0	0	0	0
Charley River	0	0	0	0	0	0	0	0	0	0	0	0	0
Yukon R. drainages (Koyukuk R – Ft. Yukon)													
Sub Total	130	0	0	0	30	17	0	0	129	0	0	31	29
Porcupine River	81	0	0	0	0	0	0	0	0	0	0	0	0
Chandalar River	0	0	0	0	0	0	0	0	0	0	0	0	0
Beaver and Nome Creeks	0	0	0	0	0	0	0	0	0	0	0	0	0
Dall River	0	0	0	0	0	0	0	0	0	0	0	0	0
Haul Road Streams	0	0	0	0	0	10	0	0	0	0	0	1	2
Nowitna River	49	0	0	0	0	0	0	0	25	0	0	7	25
Melozitna River	0	0	0	0	0	0	0	0	0	0	0	0	0
Koyukuk River	0	0	0	0	0	0	0	0	0	0	0	0	0
Yukon R. drainages (downstream from Koyukuk R.)													
Sub Total	235	619	728	162	315	33	154	85	115	80	551	253	93
Nulato River	0	0	0	0	0	0	0	0	0	0	0	0	0
Anvik River	0	36	0	0	0	11	93	85	53	23	56	30	53
Innoko River	0	0	0	0	0	0	61	0	0	0	0	0	12
Andreafsky River	235	583	688	162	220	0	0	0	37	0	412	193	7
Total	551	619	728	162	432	179	154	158	244	126	551	335	172

Recent Fisheries Performance

A trend of declining runs of Yukon River chinook, summer, and fall chum salmon began in 1997 and 1998, depending upon which species, with the 2000 runs the worst on record for all three species. Recent increases in run strength indicate runs may be improving for chinook.

Summary of 2002 Yukon Salmon Runs

The Yukon River 2002 pre-season outlook for chinook salmon was for a below average to poor run similar in size to 2001 which would likely support an average subsistence harvest and possibly a small commercial harvest (less than 20,000 chinook). The outlook for summer and fall chum salmon was poor based on poor recent run performance and on below average parent-year escapements. No commercial fishery for chum salmon was anticipated except for the incidental harvest of summer chum salmon in the chinook fishery.

Based on harvest and escapement information, the 2002 chinook salmon run abundance was poor and similar to 2001 but contained a higher proportion of 4-year old fish. The escapement index for the drainage was 45,520, about a third of the index for 2001 (68,365) and 7% less than the most recent five-year average of 48,696. Minimum escapement goals were achieved in nearly all of the surveyed tributaries primarily as a result of conservative in-season management. Subsistence needs appear to have been met for most areas. Three commercial openings were allowed in District 1 and 2 yielding about 23,050 chinook. There were no commercial openings in District 3 because of a lack of buyers. Limited openings in upriver districts produced approximately 1,600 fish. The total commercial harvest was estimated to be 24,650 chinook salmon. The 2002 commercial harvest was the third lowest since statehood and 75% lower than the 1990-1999 average of 390,000 (Appendix C1).

The 2002 summer chum salmon run was below average but approximately twice the abundance of the 2001 run. Conditions were poor during aerial index surveys in 2002 and survey results were not reported. Biological escapement ranges (BEG) based on spawner recruit analysis have been established for two Yukon tributaries, the Anvik and Andreafsky rivers. Estimated escapement to the Andreafsky was 31% below the low end of the BEG range. Escapement into the Anvik River was just above the low end of the BEG range and 30% below the recent 10-year average. Assessment of escapement to other tributaries from ground-based projects (weirs, counting towers) reported poor or below average escapement of summer chum salmon. The cumulative passage estimated by the Pilot Station sonar through 18 July was 1,025,000 summer chum salmon. A commercial fishery for summer chum salmon was permitted only in the Tanana River portion of the drainage (district 6) due to uncertainties concerning run timings and the lack of commercial buyer interest. A total of 13,776 summer chum salmon were harvested, 10,587 of which were harvested in the chinook commercial fishery; only 3,198 were harvested from the Tanana River commercial fishery. The 2002 commercial harvest was the third lowest since the inception of the fishery in 1967 (Appendix C2).

The 2002 fall chum salmon return based on the main river sonar at Pilot Station was estimated to be approximately 379,000 fish. This was within the pre-season projected return of 209,000 to 646,000 fall chum salmon. The high end of the range was based on normal production from parent year escapements in 1997 and 1998; the low end was based on the very poor production observed in recent seasons. For the fourth season in the last five years, no commercial fishing for fall chum salmon was permitted in the Alaskan portion of the Yukon drainage. During the early part of the fall chum salmon run, managers were optimistic that run abundance would be greater than predicted in the pre-season outlook because of the stronger than anticipated 2002

summer chum run. However, by the average date for the mid-point, the projected total run fell to less than 350,000 fish. A run of this size will not meet escapement and subsistence needs. A drainage-wide closure of all fishing for fall chum salmon including subsistence was implemented in early August in accordance with the Fall Chum Salmon Management Plan (Appendix C8).

The escapement assessment for coho salmon is very limited and without information from commercial and personal use harvests only general inferences are possible. The only escapement goal that is presently in place for the Yukon drainage is the Delta Clearwater in the Tanana River drainage. The minimum escapement goal is 9,000 fish based on a boat survey during peak spawning. In 2002 the survey estimated a total escapement of 38,625 coho in the survey area. This escapement level is 92% above the average (1992-2001) of 20,139 coho salmon. Hook and line and dip net subsistence openings were allowed in portions of district 1-4 to provide fishing opportunity for coho salmon while protecting fall chum salmon. The subsistence net fishery was reopened sequentially through out the drainage as the majority of fall chum salmon passed through the various river districts.

Summary of Catch and Harvests in Yukon Salmon Sport Fisheries in 2002

Estimated sport harvest of chinook salmon from the entire Yukon subarea (Tanana River excluded) during 2002 was 8 fish (Table 4). This harvest is substantially less than the most recent five-year average of 112 chinook salmon. Total sport catch (including harvested and released fish) of chinook salmon in the Yukon subarea was estimated to be 18 fish in 2002 (Appendix B1). As in previous years, most of the estimated catch and harvest of chinook salmon during the 2002 season came from lower Yukon drainages.

Sport fisheries harvested an estimated 77 chum salmon in 2002 (Table 5). Total catch of chum salmon (harvested and released) from the recreational fisheries during this period was estimated at 363 fish; the average total sport catch from 1997-2001 was 412 chum salmon (Appendix B1). In 2002 all reported harvest of chum salmon was from lower Yukon drainages including the Anvik, Nulato and Andreafsky rivers.

Sport harvest of coho salmon during 2002 was estimated to be 551 fish (Table 6). The recent five-year average harvest was 172 coho salmon. Total catch from the sport fishery during the reporting period was estimated to be 1,064; the 5-year average is 616. Most of the coho fishery occurs downstream of the Koyukuk River primarily in the Anvik and Andreafsky river drainages.

The sport fisheries for these three principal species of salmon have demonstrated only modest change in participation and harvest in recent years. Relative to the size and the productivity of the Yukon system, the estimated sport harvest is extremely light and is unlikely to impact the runs to a measurable degree.

Summary of 2003 Yukon Salmon Runs

The pre-season outlook for chinook salmon in 2003 was for a below average to poor run that would support normal subsistence harvests and possibly a small commercial fishery of not more than 20,000 chinook salmon. The summer and fall chum salmon runs were anticipated to be weak and would likely support normal subsistence harvests but no more than a small commercial fishery in the Alaska portion of the drainage. Poor parent year escapements of chum salmon in 1998 and 1999 suggested poor returns of age-5 and age-4 fish in 2003, the dominant age classes of returning chum salmon. The recent trends of very poor survival and productivity were two additional factors used to predict poor returns in 2003.

The 2003 chinook salmon run was stronger than anticipated. Escapement goals for chinook salmon were met or exceeded throughout the drainage. The Chena and Salcha rivers may have had record escapements but flooding precluded a complete assessment of the escapement. Potential yield may have been near the previous 10-year average of approximately 150,000. Because of the better than expected strength of the run, the commercial harvest reached 41,000 fish, the largest commercial harvest since 1999. Based on possible record escapements into the Tanana River and into Canada, an additional harvest of up to 40,000 chinook salmon may have been possible..

Post-season analysis of the 2003 summer chum salmon run indicates poor to below average run strength. Escapement goals were not met for summer chum salmon during the last five years except for the Anvik River in 1999 and 2002, even though management actions were taken to provide for escapement. The estimated passage of summer chum salmon by the main river sonar (Pilot Station) was 1.2 million fish and well within the OEG (Optimal Escapement Goal) of 0.8 to 1.6 million fish. However all tributary escapement projects reported inadequate escapements. Except for a limited directed commercial harvest in District 6, a terminal harvest area in the Tanana River, all commercial harvest of summer chum salmon was incidental to commercial fishing targeting chinook salmon.

The fall chum salmon run showed significant improvement in 2003. The run was assessed to be approximately 900,000 fish, more than double the recent 5-year average and was produced from parent years that fell below drainage wide escapement goals. The run was managed in a very conservative manner due to the poor pre-season outlook and the disappointing summer chum salmon run. Once the strength of the run was demonstrated, subsistence fishing restrictions were lifted and commercial, personal and sport fisheries were opened. The relatively small commercial harvest in the Alaska portion of the drainage of approximately 9,500 was a result of conservative management and very limited commercial markets for chum salmon flesh.

The escapement assessment of coho salmon is very limited and without information from commercial and personal use harvests only general inferences are possible. Estimated passage at the Pilot Station sonar of nearly 300,000 coho salmon is more than double recent average estimates and indicates that the 2003 return was well above average. The only escapement goal that is presently in place for the Yukon drainage is the Delta Clearwater in the Tanana River drainage. The minimum escapement goal is 9,000 fish based on a boat survey during peak spawning. In 2003 the survey estimated a total escapement of 130,591 coho in the Delta Clearwater River, the largest escapement recorded.

Fishery Objectives and Management

The commercial, subsistence, and personal use fisheries are managed by the Commercial Fisheries Management and Development Division. As with other fish and wildlife populations, subsistence use has been designated as the highest priority among beneficial uses. Management of these fisheries is complex due a wide range of stock specific abundances, overlap of inter and intra-specific run timing, the immense size of Yukon River drainage, allocation between numerous user groups and international management treaties. The department is generally unable to manage individual stocks in this mixed stock fishery because of inadequate stock specific information.

Guideline harvest ranges have been established for commercial fisheries targeting chinook, summer chum, and fall chum salmon throughout the Alaskan portion of the Yukon drainage (Appendix C7). The department attempts to manage the commercial fisheries such that the

harvest in each district is proportionally similar to respective guideline harvest ranges. Management plans have been developed and adopted by the BOF for summer and fall chum salmon (Appendices C8 and C9)

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the BOF classified the Yukon River chinook stock as a yield concern in September 2000. This determination was based on an inability, despite the use of specific management measures, to maintain expected yields or harvestable surpluses above the stock's escapement needs since 1998 and the anticipated low return and harvest in 2001. The BOF classified the Yukon River summer chum salmon stock as a management concern. This classification was based a chronic inability to meet existing escapement goals for the summer salmon stock since 1998.

During the winter of 2000/2001 the BOF developed a rebuilding plan for Yukon chinook and chum salmon stocks in accordance with the Sustainable Salmon Fisheries Policy for Alaska. This plan emphasizes improving salmon spawning escapements while providing opportunities to maintain subsistence uses, when surpluses are available. The BOF developed a subsistence salmon fishing schedule. The purpose of the schedule was to provide more equitable allocation of fish among subsistence fishers throughout the drainage and to improve the quality of the escapement. The department has developed a preseason management strategy in cooperation with the U.S. Fish and Wildlife Service and the National Park Service staff annually since 2001. This strategy was described and distributed in an information sheet (Appendix C10). The preseason strategy was to begin the season following the subsistence fishing season developed by the BOF and if necessary, reduce the schedule at approximately the quarter point of the chinook salmon run. The sport fishery regulation was adjusted preseason to a bag limit of one chinook or one chum salmon, and would be managed commensurate with abundance.

Coho salmon returns are of lesser magnitude in the Yukon River than are fall chum salmon and have a slightly later but overlapping run timing. Under the current management strategy coho salmon are taken incidentally to the commercial fishery directed at fall chum salmon. However, in November 1998 the BOF adopted *the Yukon River Coho Salmon Management Plan* (Appendix C11). This plan provides for a directed commercial fishery for coho salmon only under unique circumstances. It is very unlikely that the conditions outlined in the coho salmon plan would occur in a given year. In most years fall chum salmon will continue to be the primary species of management concern during the fall season with only incidental catches of coho salmon. In 2003 sufficient numbers of fall chum salmon and coho salmon were present to meet conditions outlined in the Coho Salmon Management Plan for a commercial fishery targeting coho salmon. However markets were unprepared for this unexpected potential harvest of coho salmon.

Sport fishery management objectives are identified in the *Sport Fishery Management Plan for Salmon in the Yukon Drainage* (ADF&G 1993). In comparison to commercial, subsistence, and personal use fisheries, sport fisheries for salmon in the Yukon sub-area of the AYKMA have very limited impact on stocks of salmon. Hence, there is very little effect that management of the sport fishery can have on the annual status of the various salmon stocks. Therefore the goal of sport fishery management is to maintain a reliable level of opportunity for anglers to participate in the fisheries throughout the season. To this end, emergency actions to restrict harvest and/or in season regulations for the sport fishery are generally not contemplated unless it becomes apparent that the size of the run is so small that restrictions in the subsistence fishery will be necessary. In the case of summer chum salmon and fall chum salmon management, the

BOF has identified the threshold run size at which emergency restrictions in the sport and personal use fisheries will occur.

Fishery Outlook

The outlook for 2004 is for a lower return of chinook salmon than observed in 2003; the 5-year-old component is expected to be weak with a 6-year old component no better than average. Escapements of chinook salmon were improved in 2002 and in 2003 due primarily to conservative management. The weak chinook salmon runs realized in 2000 and 2001 are likely to produce below average returns through at least 2007. Continued poor returns of summer and fall chum salmon in recent seasons results in a poor outlook for Yukon River chum salmon runs for the next several seasons. In addition to poor parent year escapements, a large degree of uncertainty exists concerning the ocean survival of chum salmon. As in recent seasons, only limited commercial salmon fishing is anticipated during the 2004 chinook or chum salmon seasons and the subsistence fishery is expected to be conducted within the schedule developed by the Alaska BOF during January 2001. Continued pressure to restrict or close sport fisheries for salmon in the Yukon River can be expected with the restrictions in the commercial fishery.

Consistent with the uncertain outlook for chinook salmon runs in 2003, the department intends to open the 2004 sport fishery with a reduced daily bag limit of one chinook or chum salmon. The intent of this action is to provide a reduced but predictable level of opportunity for anglers throughout the season. The sport fishery for chinook and chum salmon will likely be further restricted or closed if additional restrictions are implemented in the subsistence fishery.

Recent Board of Fisheries Action and In-season Management

In 1987, bag and possession limits were established throughout the drainage for sport fisheries for all salmon species. In 1994, the BOF opened the Ray River and the Yukon River within the Dalton Highway Corridor to chinook salmon fishing (Burr et al. 1998). The BOF adopted the Yukon River King Salmon Management Plan in January 2001 and modified the plan in 2002 (5AAC 05.360). In this plan the subsistence fishing schedule is described, and guideline harvest ranges for Yukon River District are modified. The *Yukon River Fall Chum Salmon Management Plan* (Appendix C8) was adopted in 1994 and has been subject to numerous modifications; the most recent in 1998. The *Yukon River Drainage Summer Chum Salmon Management Plan* (Appendix C9) was adopted in January 2001. A *Coho Salmon Management Plan* (Appendix C11) for the drainage was adopted in November 1998. The plan seeks to provide a new directed commercial fishery on coho stocks in the drainage.

On May 29, 2003 the department issued an emergency order that reduced the daily bag and possession limit for chinook and chum salmon to one chinook or one chum salmon for the Yukon drainage. This preseason reduction was consistent with the poor preseason outlook for Pacific salmon returns and with the direction of the BOF. On July 11, 2003 this EO was rescinded and the sport daily bag and possession limit for king and chum salmon was restored. The fall chum salmon sport fishery was closed on August 17, 2003 as directed by the Fall Chum Salmon Management Plan when early assessment of the run estimated the run size would be less than 500,000 fall chum salmon. The sport fishery was reopened and bag and possession limits were restored on August 26, 2003 once the predicted run size exceeded 700,000 chum salmon.

Current Issues

In addition to recent poor performance of salmon returning to the Yukon drainage, a primary issue affecting all users (including recreational anglers) of stocks of salmon in the Yukon subarea

is the assumption of management of subsistence fisheries by the federal government in October 1999. Recent decisions in federal courts have found that the navigable waters for which the federal government maintains a reserved water right are federal public land. As a result of this determination, the federal land management agencies assert the right to manage fish and wildlife resources to provide a rural subsistence priority. The state of Alaska also provides for a priority subsistence use of these resources but is unable to discriminate between rural and urban users due to constitutional restraints. There has been widespread concern that federal management will result in loss of opportunity for non-subsistence uses of fish resources particularly recreational uses. This concern was realized in 2001 when the federal managers issued a special action prior to the beginning of the season. The action closed salmon fishing in all federal waters in the Yukon and Kuskokwim rivers to all but qualified rural residents. This action precluded all commercial and recreational use of salmon in federal waters.

The unanticipated closure of sport fisheries for chinook salmon in the Yukon River in 2000 and 2001 placed a severe economic burden on fledgling local businesses without any real biological benefit. Maintaining a constant level of fishing opportunity throughout the season is critical for the local economic benefits that can accrue from these cottage industries. Complete closure of the recreational fishery should be contemplated only when substantial subsistence restrictions are needed.

Recommended Research and Management Activities

Currently, there is no active research program concerning the salmon sport fishery in the Yukon River drainage because of the minor nature of the fishery.

The Anvik River is one of very few locations in the Yukon drainage outside of the Tanana basin where catch and harvest of salmon has regularly been reported (Tables 4, 5, and 6). Up to three sport fish guiding businesses are presently using this drainage. These sport fisheries target chinook and coho salmon primarily for catch and release. Resident species including northern pike, grayling and Dolly Varden are sought as secondary targets. Most anglers participating in the fishery are guided and are non-residents although local residents do participate in the fishery. Current levels of harvest are low and are reflected in the results from the SWHS. An aerial escapement goal of 500 chinook salmon is in place for an index section of the Anvik River. Escapement counts for the Anvik River have consistently exceeded the escapement goal even in years when the Yukon drainage as a whole showed generally poor overall returns. A revised escapement goal for the Anvik River aerial index of 1,050 to 1,700 has been recommended and will be considered during the BOF meeting in January 2004.

UPPER KUSKOKWIM RIVER SALMON

Most of the sport fishing effort, catch and harvest that is reported by the SWHS for the Kuskokwim Area (Area V–Kuskokwim River and Kuskokwim Bay) comes from waters tributary to Kuskokwim Bay or tributaries downstream of and including the Aniak River system. Sport fishing for salmon and other species upstream of the Aniak River confluence has historically been very limited.

Fishery Description and Historical Perspective

Six species of salmon occur in the Kuskokwim area, with chum and coho being the most abundant species. Chinook, sockeye and chum salmon enter streams in late May and early June. Coho salmon begin entering streams in mid July with entry continuing into September. Pink salmon occur throughout the drainage but subsistence use and commercial markets are limited.

In the Kuskokwim River drainage, most salmon fishing is conducted under commercial and subsistence regulations by local residents.

The chinook salmon fishery was the mainstay of the commercial and subsistence fisheries of the Kuskokwim River until the mid-1980s when escapements dropped below levels believed necessary to sustain recent harvests. Various harvest restrictions on the commercial fishery since 1985 reversed the trends of declining escapement. The targeted commercial fishery for chinook salmon has been largely eliminated, leaving the subsistence fishery as the largest-volume fishery for the species (Appendix C4). Since 1987 the commercial chinook salmon catch has been incidental to the chum salmon fishery, although, substantial numbers of chinook are harvested in the commercial fishery. There were no commercial fisheries targeting chum salmon in the Kuskokwim River in June and July of 2002 and 2003 because of lack of processor interest. A harvestable surplus of chum salmon was identified but the potential harvests have not been estimated.

Coho salmon are abundant in the Kuskokwim River drainage and returns of coho salmon to the Kuskokwim River may be the largest to a single river drainage in Alaska. Western Alaska coho salmon are thought to spawn primarily in spring-fed portions of streams. The upper Kuskokwim River and its tributaries that drain the northern slopes of the Alaska Range are extensively underlain with alluvial gravels as a result of outwash from the Alaska Range. The resulting gravel aquifers provide high quality spring water for spawning and rearing of coho salmon in the Kuskokwim drainage.

Chinook salmon escapement in the Kuskokwim River is assessed by aerial survey in at least 13 tributary drainages, by weirs on six tributaries and, beginning in 2002, by a radio telemetry/marketing program. The radio telemetry/marketing program estimates total chinook salmon passage upstream on the village of Upper Kalskag. Chinook salmon escapements have been average or better for most recent years. In contrast, from 1998 through 2000 escapements were below average although weather conditions prevented aerial surveys of many of the index streams in 1998 and 1999.

Chum salmon escapements are evaluated by weir passage counts on six tributaries, by sonar enumeration in the Aniak River and, since 2002 by a mainstem Kuskokwim River mark recapture project near Upper Kalskag. Chum salmon escapements during most recent years have been average or better except for the period 1999 through 2001 when escapements were below average.

Escapement of coho and other salmon species are evaluated at the weirs and by aerial surveys when feasible. The high water and poor weather conditions often present during the coho run makes assessment of coho challenging. Enumeration of coho salmon at the Kogruklu River weir has been attempted annually since 1981. Field operations during the coho run were incomplete in more than 50% of the seasons during this period (Appendix C12).

Sport fishing is conducted by persons visiting the area on guided and personal fishing trips, or in conjunction with hunting activity in the fall. Annual total sport harvests of the four principal species of Pacific salmon from the upper portion of the Kuskokwim drainage have averaged approximately 1,000 per year or less since inception of the Statewide Harvest Survey in 1977 (Appendix B2; Mills 1977-1994; Howe et al. 1995, 1996, 2001a-d; Walker et al. 2003, Jennings et al. *In prep*). While sport harvests of chinook and coho salmon have increased in recent years

Table 7.-Sport fishing effort and harvest of principal species in the upper Kuskokwim River drainage (1997-2002).

	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
All Kuskokwim drainages upstream from Aniak River													
Fishing Effort (days fished)	1,829	2,650	2,993	2,181	1,417	2,643	2,557	2,207	2,453	3,531	282	2,446	2,678
	Harvests												
Chinook Salmon	55	85	108	169	288	279	174	36	55	219	108	147	153
Chum Salmon	129	225	-	-	121	-	167	-	13	41	19	70	44
Sockeye Salmon	49	112	43	-	9	32	-	33	23	152	16	45	48
Coho Salmon	275	55	244	170	327	872	95	1,028	730	408	959	420	627
Arctic Grayling	107	218	284	357	309	209	1,858	142	179	458	266	412	569
Northern Pike	256	142	314	381	131	295	278	144	186	330	189	246	247
Sheefish	173	45	130	151	47	310	43	130	92	124	30	125	140
Dolly Varden	65	79	156	78	85	143	67	112	71	253	147	111	129
Holitna River													
Fishing Effort (days fished)	480	763	949	640	747	1,678	771	1,236	791	1,853	1,296	991	1,266
	Harvests												
Chinook Salmon	23	68	40	19	256	166	54	25	22	73	53	75	68
Chum Salmon	91	208	-	-	33	-	-	-	-	41	19	37	8
Sockeye Salmon	-	43	-	-	-	21	-	-	12	48	16	12	16
Coho Salmon	130	-	-	170	157	379	-	893	426	153	339	231	370
Arctic Grayling	23	-	-	184	121	101	124	74	38	154	144	82	98
Northern Pike	145	9	155	166	102	134	103	106	112	145	78	118	120
Sheefish	173	45	130	113	26	168	35	102	58	124	18	97	97
Dolly Varden	-	79	-	52	61	64	25	112	-	143	77	54	69
Holitna Total Harvest	585	452	325	704	756	1,046	363	1,312	668	899	744	711	858
Total Harvest	1,411	1,578	1,404	1,378	1,459	2,191	2,789	1,688	1,550	1,985	1,747	1,743	2,041

in down-river and Kuskokwim Bay areas, growth in the recreational fishery in the upstream area has been modest and has occurred only very recently (Table 7).

Most of the change in the sport fishery observed in the Kuskokwim drainage upstream of the Aniak River has occurred within the Holitna River system. A small sport fishery for chinook salmon at the George River has grown in size during the last few years. The Salmon River (tributary to the Big River) near Nikolai and McGrath also supports a small rod and reel fishery on a chinook salmon spawning stock by local residents. Except for the Holitna River fishery, estimates of recreational effort or catch are generally not reported by the SWHS because of the small level of participation in these fisheries.

Recent Fisheries Performance

Summary of the 2002 Kuskokwim Salmon Runs

Chinook salmon escapement appears to have been adequate in most (11 of 15) streams. Chum salmon escapements were good with goals achieved or exceeded in assessed tributaries. Coho salmon escapements were below average in half (3 of 6) of the monitored tributaries and the single escapement goal that is in place was not achieved.

The estimated number of salmon passing through the Kogrukluk River weir during 2002 by species was 10,104 chinook salmon (10,000 goal), 51,570 chum salmon (30,000 goal), 4,050 sockeye (48% below 20-year average), and 14,5165 coho salmon (42% below goal of 25,000, Appendix C12).

The 2002 Kuskokwim River chinook and chum salmon runs were judged adequate to provide for a commercial fishery for chum salmon with an incidental commercial harvest of chinook. However, no commercial fishing periods were announced during June and July because processors had little interest in buying chum salmon. In August there were six commercial periods targeting coho salmon in the lower river. The commercial harvest of 83,688 coho salmon was the second lowest on record although catch rates were near average. The low commercial harvest was the result of limited processor capacity, low prices, and low numbers of permit holders fishing.

Summary of Catch and Harvest in the Kuskokwim Salmon Sport Fisheries, 2002

Sport harvest of all salmon species in the upper Kuskokwim River in 2002 was again light, conforming to the historic pattern. Estimated total harvest of salmon in the upper portion of the Kuskokwim River in 2002 was 1,102 fish and is consistent with average harvest of 871 salmon during the recent five-year period (Table 7). Sport harvests of coho salmon were once again higher than other salmon species; 959 coho salmon were harvested in 2002 (87% of all salmon, Table 7, Appendix B2). Uncertainty caused by poor chinook runs from 1998 to 2000 combined with the emergency closures of the sport fishery are factors contributing to the modest sport use of chinook salmon in 2002. Estimates of total catch (fish harvested and fish released) for these fisheries show a similar magnitude and pattern of use (Table 8). During the recent five-year period approximately half of the salmon harvested from the upper Kuskokwim area came from the Holitna River (Table 7). In 2002 the chinook fishery was distributed among more locations; only 39% of the harvest and 24% of the total catch was from the Holitna River drainage. Other sites that have been identified in the upper Kuskokwim area include Holokuk, Oskawalik, George, Tatlawiksuk, Swift and Salmon (Big River drainage) rivers.

Estimated levels of effort, harvest and catch for the entire Kuskokwim River and Kuskokwim Bay are provided in Appendix B3 to facilitate comparison with commercial and subsistence uses

Table 8.-Sport catch of principal species in the upper Kuskokwim River drainage (1992-2002).

	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
All Kuskokwim drainages upstream from Aniak River													
Chinook Salmon	288	725	207	401	747	2,423	1,121	1,332	216	3,497	707	1,096	1,718
Chum Salmon	578	1,063	247	414	406	116	278	474	61	1,013	762	465	388
Sockeye Salmon	189	980	60	-	164	457	84	75	242	1,765	24	402	525
Coho Salmon	558	242	453	472	1,279	3,784	294	3,460	3,742	5,037	3,887	1,932	3,263
Arctic Grayling	1,775	2,103	2,556	2,036	2,241	3,881	11,015	1,636	2,149	7,255	2,428	3,665	5,187
Northern Pike	1,230	1,565	1,877	3,080	1,855	1,845	2,094	2,914	2,735	3,469	2,133	2,266	2,611
Sheefish	508	1,317	208	575	512	1,394	771	813	883	510	307	749	874
Dolly Varden	622	2,204	528	1,062	644	1,892	364	589	313	2,974	1,922	1,119	1,226
Holitna River													
Chinook Salmon	109	375	110	91	662	786	335	240	22	823	210	355	441
Chum Salmon	471	881	38	327	230	116	25	135	-	350	426	257	125
Sockeye Salmon	-	902	-	-	-	64	84	-	124	951	24	-	-
Coho Salmon	154	-	-	472	939	1,145	-	2,005	1,404	4,027	613	1,015	1,716
Arctic Grayling	8	372	228	631	615	1,803	8,303	1,016	381	4,859	1,200	1,822	3,272
Northern Pike	752	842	973	1,488	1,427	1,308	1,379	2,146	2,292	2,579	699	1,519	1,941
Sheefish	508	1,317	189	472	304	1,098	729	745	512	381	270	626	693
Dolly Varden	164	1,326	9	430	364	968	305	589	200	2,229	618	658	858
Holitna Total Catch	2,194	6,370	1,565	3,911	4,554	7,319	11,169	6,876	5,210	16,245	4,060	6,541	9,364
Total Catch	6,550	10,572	6,507	8,137	8,183	16,020	16,367	11,567	11,300	26,182	12,869	12,139	16,287

of fish in the region. Recreational fisheries, while growing, continue to take a small portion of the annual harvest of fish in the area. For example, in 1998 the Kuskokwim River recreational fisheries harvested an estimated 1,434 chinook salmon, the largest estimated sport harvest of chinook salmon on record. In 1998 the subsistence fishery harvested an estimated 81,265 chinook salmon and the incidental harvest in the commercial fisheries was 17,569 chinook salmon (Appendix C4). The sport harvest of chinook salmon in 1998 represents less than 1.5% of the estimated total use of this species in the Kuskokwim River. In 2002 the total estimated sport harvest of chinook in the Kuskokwim River was 360 fish.

Summary of the 2003 Kuskokwim Salmon Runs

The 2003 Kuskokwim River chinook salmon run exceeded preseason expectations and escapements drainage wide were judged adequate. Aerial survey estimates exceeded target levels in nine of the 12 tributaries successfully surveyed in all but one drainage upstream of and including the Aniak River. The sustainable escapement goal for the Kogruklu River weir was attained in 2003; high water levels reduced operational time in the remaining weirs although total passage through these projects were similar to recent records (Appendices C12 and C13). Most subsistence fishermen reported that they were able to meet their subsistence needs under the four-day -per week fishing schedule; subsistence harvest from the Kuskokwim River was estimated to be approximately 79,000 chinook salmon.. With no commercial openings in June or July for chum salmon the commercial harvest of chinook salmon (559 fish commercial and test-fish harvest) continues to be far below historic levels.

The chum salmon run in 2003 was also stronger than anticipated from preseason outlooks; most escapement goals were attained. Enumeration by sonar in the Aniak River estimated escapement to be approximately 364,000 chum salmon, a figure very similar to the estimate for 2002 and well above the sustainable escapement goal of 250,000. There were no commercial fishery openings in June and July in the in-river districts (W-1 and W-2) resulting in a commercial harvest far below historical levels (2,764 fish, 10 year average is 136,467). The subsistence fishery was open a 4 days a week as prescribed by the BOF schedule. Preliminary analysis indicates that harvest of chum salmon in the subsistence fishery was above average in magnitude (approximately 75,000 fish; Appendix C5).

The drainage experienced a large run of coho salmon in 2003. Overall, escapement of coho salmon exceeded drainage-wide goals. Each of the weirs in the drainage that operated during the coho season reported “highest ever” escapements. A commercial fishery targeting coho salmon was opened beginning July 30 and continued through August for two days a week. The duration of each opening was limited in an attempt to keep harvests within processor capacity. The total in-river coho salmon commercial harvest was 284,064 fish about 80% of the recent 10-year average. In 2003 three weirs were operated in the upper portion of the Kuskokwim River drainage (George, Takotna, and Kogruklu rivers). The Kogruklu weir in the upper portion of the Holitna River has been in place since the mid 1970s. The other weirs have a much shorter history. The estimated number of salmon passing through the Kogruklu River weir during 2003 by species was 11,771 chinook salmon (118% of 10,000 goal), 23,411 chum salmon (78% of 30,000 goal), 9,138 sockeye (20-year average is 8,942), and 74,754 coho salmon (299% of 25,000 goal and the highest recorded weir passage; Appendix C12). Passage estimates for salmon through the other weirs in the upper portion of the Kuskokwim drainage are listed in Appendix C13.

Fishery Objectives and Management

The commercial and subsistence fisheries are managed by the Commercial Fisheries Management and Development Division. As with other fish and wildlife populations, subsistence use has been designated as the highest priority among beneficial uses. Management of these fisheries is complex due a wide range of stock specific abundances, overlap of inter and intra-specific run timing, the large size of Kuskokwim River drainage, and allocation between numerous user groups. The department is unable to manage individual stocks in this mixed stock fishery because nearly all harvest occurs well down stream of any quantitative in-season run assessment tools.

The sport fishery management objectives that have been identified for the upper Kuskokwim area are found in the Kuskokwim River Salmon Rebuilding Plan adopted by the Alaska BOF. The sport fishery in the Kuskokwim River drainage will be managed consistent with sustained yield principles found in the Sustainable Salmon Fisheries Policy (5 AAC 2001a) and the state priority for subsistence. When restrictions are necessary for conservation, they will be made commensurate with the level of abundance (5 AAC 2001b).

In comparison to commercial, and subsistence fisheries, sport fisheries for salmon in the Kuskokwim subarea of the AYKMA have very limited impact on the salmon stocks (Appendices C4 – C6). Hence, there is very little effect that management of the sport fishery can have on the annual status of the various salmon stocks. Therefore, the goal of sport fishery management is to maintain a reliable level of opportunity for anglers to participate in the fisheries throughout the season. To this end, emergency actions to restrict harvest and/or season regulations for the sport fishery are generally not contemplated unless it becomes apparent that the size of the run is so small that significant restrictions in the subsistence fishery will be necessary.

The department monitors all sport fisheries with the statewide harvest survey. Selected fisheries are closely monitored with creel surveys and other research projects. The ADF&G uses this information to remain responsive to changes in these fisheries.

A review of escapement goals for Kuskokwim drainage tributaries is being conducted with the expectation that recommendations for new goals in the monitored tributaries will be provided to the BOF for consideration during their meeting scheduled for winter 2003/2004.

Fishery Outlook

In 2004 the chinook salmon run is expected to be average in abundance but probably less than the 2003 run. This outlook is based on evaluation of the most recent return and assessment of parent year escapements. Escapements of chinook salmon were improved in 2002 and in 2003 due primarily to conservative management. Continuation of this positive trend in 2004 is uncertain due to below average escapements in 1998 and 1999 (chinook salmon return primarily as age-5 and age-6) and due to uncertainty concerning the ocean survival. Chinook salmon stocks in the Kuskokwim continue to be considered a stock of concern because of the below historical average returns. The subsistence fishery is expected to be conducted within the schedule developed by the Alaska BOF during January 2001.

The abundance of returning chum salmon in the Kuskokwim has been average or better since 2001 and the department anticipates a similar return in 2004. Recent chum returns have provided for amounts necessary for subsistence. There has been little commercial interest in Kuskokwim chum salmon with the current market conditions. However, a large degree of uncertainty exists concerning the return of chum salmon. Kuskokwim area chum salmon

continue to be classified a yield concern because of inconsistent ocean survival and the chronic inability to provide historical yields.

An above average return of coho salmon to the Kuskokwim is anticipated for 2004 similar to recent trends. Abundance in 2003 was above average and escapements drainage-wide were at historical levels. The primary parent year escapement for the 2004 return (age-4, 2000) was average. A limited commercial fishery is anticipated in August; capacity of the remaining commercial processor will likely continue to limit the level of commercial harvest.

Consistent with the uncertain outlook for chinook salmon runs in 2003, the department intends to open the 2004 sport fishery with a reduced daily bag limit of one chinook or chum salmon. The intent of this action is to provide a reduced but predictable level of opportunity for anglers throughout the season. The sport fishery for chinook and chum salmon will likely be further restricted or closed if additional restrictions are implemented in the subsistence fishery.

Recent Board of Fisheries Action and In-season Management

The BOF established bag and possession limits in 1987 for all salmon species throughout the drainage. Bag and possession limits for chinook salmon were revised downward to one per day in 1987 when status of local stocks of chinook was unquestionably depressed and maintenance of historic escapement levels were threatened. Between 1988 and 1994 the Kuskokwim Area chinook salmon populations increased along with guideline harvest levels for the commercial fishery. In 1994, the BOF reestablished the bag and possession limit for chinook to three fish with only two over 28 inches in length. In 1997 the BOF imposed a season restriction for chinook salmon in the Kuskokwim River drainage downstream of and including the Holitna River drainage; open season is May 1 – July 25.

Rod and reel fishing gear was added to the list of legal subsistence fishing gear types for the portion of the Kuskokwim River drainage downstream of and including the Holitna River prior to the 2000 fishing season. There are no harvest limits or seasonal restrictions associated with the use of rod and reel gear while subsistence fishing. Prior to the 2001 season, the BOF extended use of rod and reel gear for subsistence fishing for the entire Kuskokwim River drainage. Because all Alaskan residents are able to participate in state managed subsistence fisheries, these decisions mean that only non-resident anglers are required to adhere to sport fishery bag, possession, size and seasonal restrictions.

Based on guidelines established in the Sustainable Salmon Fisheries Policy, the BOF classified chinook salmon in the Kuskokwim River as a yield concern during September 2000. This determination was based on an inability, despite the use of specific management measures, to maintain expected yields or harvestable surpluses above the stock's escapement needs since 1998 and the anticipated low return and harvest in 2001. The BOF also classified the Kuskokwim River summer chum salmon stock as a yield concern. This classification was based on an inability to maintain expected yields or harvestable surpluses above the stock's escapement needs for the chum salmon stock since 1997.

During the winter of 2000/2001 the BOF developed a rebuilding plan for Kuskokwim chinook and chum salmon stocks in accordance with the Sustainable Salmon Fisheries Policy for Alaska. This plan emphasizes improving salmon spawning escapements while providing opportunities to maintain subsistence uses, when surpluses are available. The BOF developed a schedule for the subsistence salmon net and wheel fishery. The schedule permitted net fishing for four consecutive days a week with no net fishing during the remaining three days. Subsistence

fishing with rod and reel was unaffected; it remained open without limit. The purpose of the schedule was to provide more equitable allocation of fish among subsistence fishers throughout the drainage and to improve the quality of the escapement by opening a window that would allow fish to pass unimpeded by the gill net and wheel fisheries.

Since 2001, the department has developed a preseason management strategy in cooperation with U.S. Fish and Wildlife Service staff. In 2003 the strategy announced that the season would open following the subsistence fishing schedule developed by the BOF and would if necessary, be reduced as needed based on in-season run strength information. A preseason emergency order announced that the sport fishery salmon season opening would be delayed until June 15 and that the sport harvest regulation was reduced to a bag limit of one chinook or one chum salmon. The sport fishery would be managed commensurate with abundance. No commercial fishery during June and July was anticipated. The outlook for the 2003 season along with management strategies for the fisheries was distributed to the public through a series of newspaper articles and local radio programs. The Kuskokwim River Salmon Working Group would be fully involved in implementation of the management strategy.

No additional emergency orders were issued during the season that affected sport fisheries in the upper Kuskokwim area.

Current Issues

Uncertainty concerning returns of chinook, chum, and coho salmon to most western Alaska drainages will exacerbate the issues that affect recreational users of salmon in the Kuskokwim area.

The assumption of management of subsistence fisheries by the federal government in October 1999 will continue to affect all users (including recreational anglers). Decisions in federal courts found that the navigable waters for which the federal government maintains a reserved water right are federal public land. As a result of this determination, the federal land management agencies assert the right to manage fish and wildlife resources to provide a rural subsistence priority. The state of Alaska also provides for a priority subsistence use of these resources but is unable to discriminate between rural and urban users due to constitutional constraints. There has been widespread concern that federal management will result in loss of opportunity for non-subsistence uses of fish resources particularly recreational uses. This concern was realized in 2001 when the federal managers issued a special action prior to the beginning of the season. The action closed salmon fishing in all federal waters in the Yukon and Kuskokwim rivers to all but qualified rural residents. This action precluded all commercial and recreational use of salmon in federal waters.

The inseason closure of sport fisheries for chinook salmon in the Kuskokwim River that occurred during recent seasons placed a severe economic burden on fledgling local businesses without any real biological benefit. Maintaining a constant level of fishing opportunity throughout the season is critical for the local economic benefits that can accrue from these cottage industries. Complete closure of the recreational fishery should be contemplated only when substantial subsistence restrictions are needed.

Increasing participation in area sport fisheries is a concern to some local residents. Although site specific information is limited, all available information indicates that these low use, remote sport fisheries are in good condition. Refer to Burr (2002) for a description of the distribution and magnitude of chinook salmon fishery in the middle Kuskokwim drainage.

Recommended Research and Management Activities

In 2001 fishing effort by both non-resident anglers and Alaska resident (subsistence) anglers was displaced upstream from the Aniak River to the Holokuk, the Oskawalik, and the George rivers. This shift was caused by the federal closure of chinook and chum salmon fishing to all but rural residents together with poor water conditions in the Aniak River during the chinook salmon season. The rod and reel subsistence and sport fisheries were closed because the escapement counts through the George River weir were “relatively poorer” than counts of chinook through other weirs in the Kuskokwim River drainage.

In order to monitor changes in use by sport and subsistence anglers, a site visit to the George and Oskawalik rivers was conducted between July 1 and July 6, 2002; historically the peak of the chinook salmon fishery.. During this time one local boat with a total of three anglers (all Alaskan residents) was contacted at the George River. The anglers were targeting sheefish and chinook salmon. A local family of four was contacted at the Oskawalik River. This group was primarily targeting resident species; salmon had already been harvested with higher efficiency gear from the Kuskokwim. Local residents interviewed reported that one or two boats per week of up to six guided anglers visited the George River in late June to fish for chinook salmon. The boat and guide were based in Sleetmute. Other local guiding businesses using the George River area declined to book customers for the 2002 chinook season because of the possibility of the fishery being closed mid-season.

On July 6, 2003 an aerial survey was conducted to assess the number and distribution of anglers in the Kuskokwim valley between the Oskawalik and the Tatlawiksuk rivers. In the Oskawalik River two boats were observed; a total of four anglers were observed fishing from shore. At the George River no boats or anglers were observed; the water was high and turbid due to recent heavy rainfall. According to local reports most sport anglers were using the Holitna River because other local tributaries were high from recent rain. We recommend aerial surveys be continued during the chinook season to monitor changes in use patterns by sport and rod and reel subsistence fishers.

A research project was started in 2002 in the Kuskokwim River using funds from federal sources (salmon disaster relief, the federal subsistence management). This main-stem Kuskokwim radio telemetry and mark/recapture project provides estimates of in-river abundance of chinook salmon for the whole Kuskokwim River from the Aniak River upstream, age sex length compositions and the proportion of chinook salmon destined for major tributaries. In 2002 the project estimated the abundance of chinook salmon 450 mm and larger to be approximately 101,000 fish (Stuby 2003). The preliminary estimate of in-river chinook salmon abundance in 2003 is approximately 111,000 (Stuby *In prep*). An estimated 40% of the chinook salmon upstream of the Aniak River were found to migrate up the Holitna River drainage. This project is currently funded through 2005. A brief overview of a related project using radio telemetry and mark/recapture procedures in the Holitna River drainage to assess in-river abundance of chinook, chum and coho is found in the following section on Holitna River salmon.

HOLITNA RIVER SALMON

Waters of the Holitna River drainage have supported most of the sport fishing effort and harvest that occurs in the Kuskokwim River drainage upstream of the Aniak River (Tables 7 and 8). During the last five-year period 1997-2001 the Holitna River supported nearly half of the fishing effort, harvest and catch in the sport fishery occurring in the upper portion of the Kuskokwim

drainage. Sport fisheries that target chinook salmon, coho salmon, sheefish and northern pike in the Holitna River have been identified. Chum and sockeye salmon compose a small portion of the sport catch; harvest and use of these species is largely incidental to the effort directed toward other salmon.

Fishery Description and Historical Perspective

The Holitna River is the most important stream for sport fishing in the upper portion of the Kuskokwim drainage because of the diversity and abundance of resident and anadromous species. The Holitna River is an important producer of chinook, chum and coho salmon in the Kuskokwim drainage.

Chinook salmon begin moving into the Holitna River in late June with peak numbers usually arriving sometime in early July. The numbers of sites or “holes” that provide good chinook salmon sport fishing in the Holitna River are quite limited. One site popular with local residents is actually downstream of the mouth of the Holitna River near Vreeland Creek, a small tributary of the Kuskokwim River. The most popular hole in the Holitna River is located just downstream of the confluence with the Hoholitna River. Other sites are located near the mouths of other smaller tributary streams farther up the Holitna River. These sites are well known to local anglers and a limited amount of guided fishing has occurred for many years. Historically, guides were either local or were guides from Southwestern Alaska that worked through local residents to provide services.

Sport fisheries in the Holitna River experienced a period of growth in recent seasons, particularly in the mid 1990s. New sport fishing guides moved into the area seeking quality salmon fishing opportunities in relatively uncrowded settings. The first permanent lodge was established on the Holitna River in 1994 or 1995 near the mouth of the Hoholitna River. The lodge and all onsite equipment were burned by an unidentified arson during the winter of 1997. Prior to the 1998 season the owners purchased another site in the vicinity and continued to provide outfitting, guided fishing and big game guiding services. There are presently about seven sport fishing guiding/outfitter businesses operating on the river. The volume of guided angling activity directed at chinook salmon has increased markedly according to local reports.

Guided activity decreases in mid July until coho salmon begin arriving in substantial numbers in early August. The sport fishery for coho salmon is far less concentrated than is the chinook fishery. Sites currently supporting guided coho sport fishing are found from near the mouth of the Holitna upstream to Titnuk Creek (approximately 55 river miles from the mouth). While some guided visitors arriving in August and September travel to the Holitna River with sport fishing as their primary activity, a substantial portion of non-local residents visit to hunt caribou (August) and/or moose (September). For these visitors, fishing is a secondary activity.

Fly-in salmon opportunities also exist in the upper portion of the Holitna drainage. At least two guiding businesses provide day trips for chinook and/or coho salmon to upstream areas (Taylor Creek to Chuilnuk River), although the level of use is currently very limited. Air Taxi operators provide access to the headwaters of the Kogruklu River for visitors desiring to float downstream to a pick up point near the weir site. Angling for chinook salmon is a primary activity for these visitors. Concern has been expressed by local residents over the potential for damage to spawning redds by visitors during the spawning season.

Recent Fisheries Performance

Estimates of fishing effort directed at individual species are not available from the SWHS. Total estimated fishing effort of 1,296 angler days from the Holitna River in 2002 was average; the recent five-year average is 1,266 (Table 7). As in most recent years, the Holitna River in 2002 supported a large portion of the fishing effort, harvest and catch in the sport fishery occurring in the upper portion of the Kuskokwim drainage.

The SWHS estimated that 108 chinook salmon were harvested in the Holitna River in 2002 (Table 7). The 2002 estimate is about 25% less than the recent five-year average. Total catch of chinook salmon (both harvested and released) in 2002 was estimated to be 210 fish which is about one half of the recent five-year average (Table 8).

Coho salmon continue to be the most important species in the Holitna River sport fishery. Recent catch and harvest estimates from the SWHS show an increased use of coho salmon by anglers (Tables 7 and 8). The total catch in 2002 was estimated to be 613 coho salmon and is less than the recent five-year average of 1,716 (Table 8). The more moderate use of coho salmon in 2002 is consistent with the lower abundance of coho in the Holitna River as evidenced by the lower count at the Kogruluk River weir. The estimated weir passage of coho of 14,516 fish failed to attain the escapement goal of 25,000 (Appendix C12).

Catch and harvest estimates for the 2003 season will not be available until mid summer 2004. Estimates of catch and harvest of chinook salmon in 2003 are likely to be greater than 2002. According to local reports, participation in the chinook fishery in the upper Kuskokwim drainage was higher in 2003 as a result of the stronger run of chinook salmon. The strong run of coho to the Kuskokwim along with reduced commercial fishing in the lower Kuskokwim River resulted in good numbers of coho salmon available to upriver fisheries. Accordingly, levels of catch and harvest of coho in the Holitna River are likely to exceed recent averages.

Fishery Objectives and Management

The sport fishery management objectives that have been identified for the Holitna River are the same as other salmon fisheries in the upper Kuskokwim area. These objectives are found in the Kuskokwim River Salmon Rebuilding Plan adopted by the Alaska BOF. The sport fishery in the Kuskokwim River drainage will be managed consistent with sustained yield principles found in the Sustainable Salmon Fisheries Policy (5 AAC 2001a) and the state priority for subsistence. When restrictions are necessary for conservation, they will be made commensurate with the level of abundance (5 AAC 2001b).

Sport fisheries for salmon in the Holitna River drainage have very limited impact on stocks of salmon and are functionally insignificant when compared with subsistence fisheries that occur in the area and with commercial and subsistence fisheries that take place downstream in the Kuskokwim River. Hence, the management of the sport fishery has little real effect on the annual status of the various salmon stocks. Therefore the goal of sport fishery management is to maintain a reliable, season-long level of opportunity for anglers to participate in the fisheries. To this end, emergency actions to restrict harvest and/or season regulations for the sport fishery are generally not contemplated unless it becomes apparent that the size of the run is so small that significant restrictions in the subsistence fishery will be necessary.

The presence of the Kogruluk weir in the upper portion of the Holitna system together with an established weir passage goal derived from a long-term database, provides a unique opportunity (for AYKMA) to assess catch and harvest with measures of run strength. Consistent with the

Kuskokwim River Salmon Rebuilding Plan, adjustments in the sport fishery regulations will be made when weir passage levels indicate low abundance and a failure to reach the escapement goals.

The department monitors all sport fisheries with the statewide harvest survey. Selected fisheries are closely monitored with creel surveys and other research projects. The ADF&G uses this information to remain responsive to changes in these fisheries. New regulations adopted by the Alaska BOF during the winter of 1997-98 appear to have been sufficient and timely to address the growing sport fishing effort (Appendix C14).

Fisheries Outlook

The outlook for salmon returns to the Holitna River in 2004 is consistent with the general outlook for the upper drainage. Chinook abundance is likely to be average but less than the 2003 run. The abundance of returning chum salmon is anticipated to be average or better consistent with recent trends. However, Kuskokwim area chum salmon continue to be classified a yield concern because of inconsistent ocean survival and the chronic inability to provide historical yields. The subsistence fishery is expected to be conducted within the schedule developed by the Alaska BOF during January 2001. An above average return of coho salmon to the Kuskokwim is anticipated for 2004 similar to recent trends. Abundance in 2003 was above average and escapements drainage-wide were at historical levels.

Consistent with the uncertain outlook for chinook salmon runs in 2003, the department intends to open the 2004 sport fishery with a reduced daily bag limit of one chinook or chum salmon. The intent of this action is to provide a reduced but predictable level of opportunity for anglers throughout the season. The sport fishery for chinook and chum salmon will likely be further restricted or closed if additional restrictions are implemented in the subsistence fishery.

Recent Board of Fisheries Action and In-season Management

In 1997 the BOF reduced the open season for chinook in much of the Kuskokwim system including the Holitna River to May 1 to July 26. Bag limits were also reduced for resident species including sheefish, northern pike and Dolly Varden. A summary of changes in the regulation of Holitna River fisheries as a result of action taken by the AK BOF is listed in Appendix C15. There have been no additional changes to sport fishery regulations of in the Holitna River since that time. No proposals were submitted for Holitna River sport fisheries for the 2003/2004 BOF meeting.

Rod and reel fishing gear was added to the list of legal subsistence fishing gear types for the portion of the Kuskokwim River drainage downstream of and including the Holitna River prior to the 2000 fishing season. There are no harvest limits nor seasonal restrictions associated with the use of rod and reel gear while subsistence fishing. Prior to the 2001 season, the BOF extended use of rod and reel gear for subsistence fishing for the entire Kuskokwim River drainage. Because all Alaskan residents are able to participate in state managed subsistence fisheries, these decisions mean that only non-resident anglers are legally required to adhere to sport fishery bag, possession, size and seasonal restrictions.

A preseason emergency order was issued in 2003 that restricted sport fishing opportunity in the Holitna River. The bag and possession limits for the chinook and chum salmon sport fisheries were reduced to one chinook or one chum salmon on May 28, 2003, prior to opening of the season. This action was consistent with the Salmon Rebuilding Plan, the poor preseason outlook for these species and the coordinated conservation effort by the department

Current Issues

Increasing competition for the limited number of “holes” for chinook salmon fishing is likely to increase. This increased use by non-local anglers has caused a level of resentment in local residents that have until the last few years enjoyed very low use by outside anglers during the summer salmon season. At this time, the level of catch and harvest of salmon by sport fishermen in comparison to use levels by commercial and subsistence fishermen downriver is functionally insignificant. Without demonstrated local benefits and a sense of local control in the use of the local resources, expanding opportunity for anglers in this remote area will have high social costs.

The special action issued by federal managers prior to the beginning of the 2001 season closed a large portion of the Kuskokwim River valley to non-local anglers. It appears that some unknown portion of these disenfranchised anglers shifted their effort to upriver locations including the Holitna River. Because the Holitna River is not under federal jurisdiction, future federal restrictions are likely to increase fishing effort in this fishery.

Recommended Research and Management Activities

Surveys of the Holitna River sport fishery were conducted in 1998 and 2000 (Burr 1999, 2002). The 1998 study found limited effort and harvest but evidence of recent growth in participation in the sport fishing. Most new effort was from guided, non-local anglers. Most anglers were seeking chinook, coho, or pike. Information from this study along with information from the SWHS indicate that the sport fishery in the area is not likely to be a significant or immediate threat to the current populations of resident and migratory fish. The 2000 survey investigated a larger area of the Holitna River and the mouths of tributaries of the Kuskokwim River from the Oskawalik to the Tatlawiksuk rivers. The larger study area was included in 2000 based on results of the 1998 study and because the SWHS results for 1998 indicated that the salmon fishery may be expanding into previously undocumented areas. The 2000 survey was conducted during the peak chinook salmon season (June 26 – July 8, 2000) and found modest levels of sport fishing effort. Approximately 220 anglers were counted by aerial survey of which a portion were interviewed by a technician traveling by boat. Angling effort was distributed as follows: Oskawalik River - 26 anglers (12%), George River – 62 anglers (28%), Holitna River/Vreeland Creek – 101 anglers (45%), Swift River/Tatlawiksuk River – 34 anglers (15%). Nearly all anglers were targeting chinook salmon although some anglers were also targeting sheefish and northern pike (Tatlawiksuk and Holitna). As in 1998, most anglers were guided or were fishing guides. Periodic reassessment of the chinook fishery is recommended.

A multiyear project began in 2001 that is using radio telemetry to estimate the proportion of chinook, chum and coho salmon that enter the Holitna River and subsequently either travel up the Hoholitna River or travel up the Holitna River and pass through the Kogrukluk River weir. The project also seeks to estimate the abundance of chinook, chum and coho salmon entering the Holitna River by proportional expansion of the Kogrukluk weir counts. In 2001 an estimated 26% of the chinook and 31% of the coho salmon migrated past the weir. The proportion of radio tagged chum salmon passing the weir could not be estimated because too few of the chum salmon passed the weir to provide a reliable estimate. The study estimated that 24,500 chinook salmon and 60,000 coho salmon returned to the Holitna River (Wuttig and Evenson 2002). During the 2002 season, the percentages of Holitna River chinook, chum and coho salmon passing through the weir were 23%, 9% and 8% respectively. An estimated 42,902 chinook salmon, 542,172 chum salmon and 157,277 coho salmon returned to the Holitna River drainage (Chythlook and Evenson 2003). Preliminary estimate of Chinook salmon in the Holitna river in

2003 is about 42,000 fish (S. Stroka Alaska Department of Fish and Game, Fairbanks, personal communication). Estimates of the proportion of chum salmon passing the weir and the number of chum salmon returning to the Holitna are not yet available. This study is scheduled to continue for two additional seasons.

YUKON RIVER NORTHERN PIKE

Sloughs, interconnected lakes, and the lower sections of large rivers throughout most of the AYKMA are inhabited by northern pike. Lowland areas of the Yukon and Kuskokwim rivers are particularly noted for large northern pike. Northern pike are abundant in all parts of AYKMA containing appropriate habitat except on the North Slope of the Brooks Range, where distribution of this species is limited. On the North Slope, northern pike have been documented only in the Ikpikpuk River on the Arctic coastal plain west of the Colville River, and in middle reaches of the Killik River, tributary to the Colville River (Bendock and Burr 1985). In recent years Yukon River tributaries have contributed about 90% of the total catch and harvest of this species within AYKMA (Table 2; Appendix B2).

Fishery Description and Historical Perspective

Within the Yukon subarea, most catch of northern pike has come from five primary locations: the Porcupine, Dall, Nowitna, Koyukuk, and Innoko rivers. The Porcupine and Koyukuk rivers are the two largest first order tributaries of the Yukon River. Sport fishing within these drainages is dispersed and site-specific fishing effort is light. The level of effort directed at northern pike in the Nowitna, Innoko and Dall rivers is relatively large.

Most fishing for northern pike occurs during the open water season. Pike are targeted in early summer immediately following spawning and throughout the summer months. Pike are often fished in the fall in combination with hunting activities. Some of the sport and subsistence harvest in the AYKMA is taken during winter months through the ice with hook and line gear.

Most of the sport harvest of northern pike is taken with hook and line. Spearing, bow and arrow, and hand jigging techniques are also legal means and account for a small proportion of the total harvest.

Historically, fishing for northern pike in the Yukon area has been conducted by Alaska residents near towns or villages or where access is provided by road or by boat. New or recently reestablished sport fish guiding businesses are promoting opportunities to catch trophy pike in the Nowitna, Koyukuk, Kaiyuh/Khotol, Anvik and Innoko rivers. In these remote locations where sport fish guiding services have become available, most of the angling effort is by guided anglers and most of the guided fishermen are non-residents.

Recent Fisheries Performance

Little quantitative information is available concerning the status of northern pike stocks in much of the AYK management area, but because of limited access, fishing effort is light except on those stocks near towns and villages where angling and subsistence gill netting effort may be more intense.

In the most recent ten-year period (1992-2001) little change was observed in total harvest or catch from the Yukon River reporting area (Tables 9 and 10). Harvest estimates for 1992-2001 averaged 2,113 compared with 1,758 for 1997-2001. Catch estimates during the most recent five-year period averaged 15,661 fish, showing a large degree of catch and release fishing for this species (Table 10).

Table 9.-Sport harvest of northern pike in the Yukon River drainage (1992-2002).

	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Ft. Yukon to Canadian Border)				0	86	63	39	19	102	0	259	69	45
Fortymile River	0	0	0	0	0	15	18	0	0	0	0	0	0
Charley River	9	38	0	0	0	0	0	0	0	0	0	0	0
Yukon R. drainages (Koyukuk R – Ft. Yukon)			673	759	1,670	1,580	959	2,032	1,108	333	1,899	1,174	1,202
Porcupine River	351	339	448	50	138	50	340	9	10	47	774	178	91
Chandalar River	196	0	0	30	0	21	0	0	10	0	0	0	0
Birch Creek	43	47	36	77	26	41	32	19	29	28	0	38	30
Beaver & Nome Crks	558	9	54	126	43	7	0	16	38	0	157	85	12
Dall River	342	352	215	350	334	414	182	862	257	13	115	332	346
Haul Road Streams	0	0	0	116	108	14	0	0	0	0	0	24	3
Nowitna River	196	63	161	302	651	148	218	286	201	0	114	223	171
Melozitna River	0	47	18	0	11	76	11	8	0	0	13	17	19
Koyukuk River	650	191	138	99	171	701	105	634	204	97	299	299	348
Yukon R. drainages (downstream from Koyukuk R.)			610	367	646	227	433	358	102	0	1,122	335	224
Nulato River	9	0	0	86	0	7	0	0	0	10	41	11	3
Anvik River	128	74	0	11	51	14	34	0	41	0	40	35	18
Innoko River	43	151	9	90	110	56	93	145	10	28	40	74	66
Andreafsky River	17	113	341	30	97	115	42	0	0	1,318	629	207	295
Total	3,590	2,347	1,968	1,937	2,502	1,870	1,452	2,418	1,277	1,772	3,291	2,113	1,758

Table 10.-Total fishing effort, and northern pike catch and harvest from principal fisheries in Yukon River area, 1988-2002.

Year	Yukon	Dall River			Nowitna River			Innoko River		
	Total	Effort	Number	Percent ^a	Effort	Number	Percent	Effort	Number	Percent
Harvest										
1988	3,526	217	418	12%	946	982	28	164	18	1%
1989	3,516	438	125	4%	773	548	16	206	368	8%
1990	2,474	273	372	15%	652	118	5	415	118	5%
1991	4,454	359	559	13%	1,238	1,617	36	520	118	3%
1992	3,590	224	342	10%	491	196	6	53	43	1%
1993	2,347	845	352	15%	446	63	3	637	151	6%
1994	1,968	455	215	11%	733	161	8	93	9	1%
1995	1,937	1,018	350	18%	1,977	302	16	430	90	5%
1996	2,502	341	334	13%	834	651	26	654	110	4%
1997	1,870	694	414	22%	605	148	8	445	56	3%
1998	1,452	360	182	13%	645	218	15	847	93	6%
1999	2,418	687	862	36%	862	286	12	551	145	6%
2000	1,277	316	257	20%	843	201	16	327	10	1%
2001	1,772	300	13	1%	434	-	0%	1,458	28	2%
2002	3,291	165	115	3%	525	114	3%	2,533	40	1%
Averages										
1992-01	2,113	524	332	15.8%	787	223	10.8%	550	74	3.5%
1995-99	1,758	471	346	18.2%	678	171	10.1%	726	66	3.6%
Catch										
1990	17,717	273	1,810	10%	652	694	4%	415	964	5%
1991	13,895	359	1,029	7%	1,238	2,749	20%	520	1,544	11%
1992	14,801	224	1,042	7%	491	1,426	10%	53	171	1%
1993	13,502	845	2,645	20%	446	1,362	10%	637	1,661	12%
1994	11,694	455	1,308	11%	733	2,868	25%	93	18	0%
1995	15,828	1,018	2,463	15%	1,977	3,049	19%	430	1,039	7%
1996	25,502	341	1,358	5%	834	9,493	37%	654	4,090	16%
1997	13,349	694	1,961	15%	605	1,154	9%	445	3,024	23%
1998	12,349	360	1,304	11%	645	1,290	10%	847	4,433	36%
1999	20,213	687	3,320	16%	862	1,357	7%	551	3,770	19%
2000	13,589	316	1,740	13%	843	4,509	33%	327	1,912	14%
2001	18,788	300	1,550	8%	434	478	3%	1,458	12,866	68%
2002	35,975	165	1,356	4%	525	5,488	15%	2,533	17,551	49%
Averages										
1992-01	15,963	524	1,869	12.1%	787	2,699	16.2%	550	3,298	19.6%
1997-01	15,661	471	1,975	12.5%	678	1,758	12.3%	726	5,201	31.9%

^a Percent of total catch or harvest of northern pike in the Yukon area.

Northern pike populations close to the Yukon River Haul Road Bridge have experienced more angling pressure because the opening of the road allowed easy boat access for Fairbanks area residents. The Dall River northern pike sport fishery has been the source of user conflicts and the focus of stock assessment and use survey studies in the last decade. This fishery is discussed separately in a later section.

Nowitna River

The Nowitna River is located approximately 130 km downstream from the mouth of the Tanana River. This major Yukon River tributary enters the Yukon River from the south. It was designated a Wild and Scenic River in 1980. Most of the main stem and major tributaries are included in the Nowitna National Wildlife Refuge. Sport fishing effort is by guided and unguided anglers targeting trophy sized northern pike in a remote wilderness setting. During the most recent five-year period (1997-2001), estimated angler effort has averaged approximately 700 angler-days by guided and unguided anglers (Walker et al. 2003; Jennings et al. 2001-02 *In prep*). Sport fishing occurs throughout the open water season, however anecdotal reports indicate that the majority of the fishing effort and harvest occurs during September concurrent with hunting activities and within the lower 30 km of the river.

Estimated sport harvest of northern pike from the Nowitna River during 2002 was 114 fish. This level of harvest is similar to the recent five-year average harvest of 171 fish (Table 10). While angler effort has changed little, the estimated total catch appears to have increased. In 2000 and 2003 the catch was estimated to be 4,500 fish and 5,488 fish. The estimated average catches during the recent five and ten-year periods were 2,699 and 1,758 fish. In 2002 the Nowitna River fishery accounted for about 3% of the sport harvest and 15% of the total catch of this species from the Yukon River subarea.

A study was conducted of the northern pike population inhabiting the lower 15 miles of the Nowitna River during 1997 (Burr 1999; Burr and Roach 2003). The goal of the study was to obtain current information on this pike stock. The study found large numbers of northern pike in mature age and size categories. Based on movements of individually marked fish, it appears that pike using the lower 20 miles of the river are part of a single large stock. The study concluded that the population is currently lightly exploited and that current levels of fishing pressure were within sustainable limits.

Innoko River

The Innoko River and its tributaries drain a large flat wetland area and the foothills of the Kuskokwim mountains. The Innoko River enters the Yukon River a few miles downstream from the village of Holy Cross. This river system with its extensive wetlands provides excellent habitat for whitefish and northern pike. The lower Innoko and this part of the Yukon River continue to produce some of the largest northern pike in the state. In about 1995 a new sport fish guiding business which caters to anglers seeking catch and release opportunities for trophy sized northern pike, began operating in the lower Innoko, using a large house boat as a movable base of operations. Nearby, on the Anvik River, a long-standing sport fishing lodge was renovated and reopened. More recently, additional smaller businesses have begun to provide sport fish guiding services in the Innoko system; two of these businesses are operated by residents of the Holy Cross area.

Sport fishing effort in the Innoko River has generally increased during the last decade, but increased markedly in 2001 and 2002; in 2002 fishing effort was estimated to be about 2,500

angler days compared with five and 10-year averages of less than 1,000 days of fishing effort (Table 10). During this timeframe, estimates of harvest of northern pike have changed little, averaging about 100 pike per year. In contrast, estimates of total catch increased to 3,000 to 4,000 fish since between 1995 and 2000 and to more than 17,000 in the most recent annual estimate. Most of this increase probably has come from guided anglers taking advantage of the recently developed facilities and services.

Fishery Objectives and Management

The management of northern pike in the Yukon is reviewed in the Fishery Management Plan for the Yukon River Northern Pike Fishery, 2001-2004 (Burr *In prep a*). The goal of sport fishery management for northern pike is to maintain naturally reproducing populations of northern pike with characteristics that will provide high quality sport fisheries. Population characteristics that management will seek to maintain or restore include historic abundance and size compositions compared to available base line data.

Management of northern pike in most of the Yukon area is structured to encourage participation in the fishery through liberal harvest limits. These regulations reflect the light level of use of northern pike within most of the Yukon subarea. The liberal regulations also provide harvest opportunity with rod and reel gear for rural residents within the sport fish regulation framework. In areas where northern pike fisheries are more intensive, management seeks to provide consumptive use (harvest) while maintaining northern pike in large size (>30 in TL) groups. As fishing effort increases, management for continued harvests will be structured around a daily bag limit of more than one northern pike, with a size limit structured to preserve northern pike in large size groups.

The department monitors sport fisheries with the SWHS to track levels of harvest and effort at various sites and to detect changes in the distribution of fishing among sites. Selected fisheries are closely monitored with creel surveys and other research projects. Length composition is used as an indicator of stock status for northern pike populations; the presence of large size fish within samples collected is used as an indicator of lightly exploited riverine populations. The department uses this information to remain responsive to changes in these fisheries.

Fisheries Outlook

At the present time, all available information suggests that northern pike stocks in the Yukon drainage are healthy. Levels of catch and harvest, although low, have remained stable or have increased modestly throughout the area. Where assessments of local stocks have been conducted, the presence of substantial portions of fish sampled in large size and old age categories further suggests light levels of exploitation.

Increasing levels of sport fishing activity in the Innoko River resulted in new regulations for this fishery in 2001. However until better communication and acknowledgement of differing perceptions is established between local subsistence users and non-local anglers, conflicts are likely to continue. The department will continue to seek the opportunity for all users to participate in the fishery.

Recent Board of Fisheries Action

Current sport fishing regulations for northern pike in the AYKMA were established in 1987. Prior to 1987, there were no bag, possession, or size limits for northern pike within most of the AYKMA. Proposals submitted by ADF&G to and adopted by the Alaska BOF in 1987 established the current background regulation of 10 per day, with no size limit for most of the

Yukon, Kuskokwim and North Slope subareas. Because of concern for the maintenance of Yukon River northern pike stocks near the Dalton Highway Bridge, the BOF adopted a more restrictive regulation of five per day, with only one fish over 30 inches for Yukon River tributaries between the Hodzana and the Tanana rivers.

Opening of the entire Dalton Highway to public travel in 1994 caused concern that increases in recreational use would result in localized depletions of fresh water fish populations in waters adjacent to the road way. The BOF addressed this concern in 1994 by adopting new regulations for many of the resident fish species in the highway corridor (Burr et al. 1998). The northern pike bag and possession limit was reduced to five fish with only one over 30 inches.

In 2001 the BOF adopted regulations governing the sport fishery for northern pike in the Innoko River. The bag limit is three northern pike per day of which only one may be 30 inches or larger. The sport fishery regulation adopted for the Innoko fishery is consistent with the regulatory strategy outlined in the Yukon River northern pike fishery management plan and recommendations of the GASH (Grayling, Anvik, Shagaluk and Holy Cross) Fish and Game advisory committee.

Current Issues

Growth of the guided sport fishery for northern pike in the Innoko River is the source of concern with many residents of local GASH communities. Many residents of this area hold traditional beliefs and live traditional subsistence lifestyles. There is limited acceptance of catch-and-release fishing as practiced by many visiting anglers. Local residents report reduced catch rates during winter and summer fishing with rod and reel. The residents also are concerned over increased winter-time use of northern pike stocks by non-local rural residents. They report that groups travel from communities downstream in the Yukon drainage and from the nearby Kuskokwim area to jig for northern pike through the ice.

Recommended Research and Management Activities

The northern pike sport fishery in the Yukon area has gained a higher profile as a result of better access provided by guiding services and facilities established in recent years. The department will continue to closely monitor the levels of fishing effort, catch and harvest throughout the area with the intent of identifying additional sites for stock assessment. Stocks of northern pike in the Innoko River and surrounding area support both subsistence and high quality sport fisheries. With continued growth anticipated in both fisheries, better stock status and movement information is needed to ensure the continued quality of these stocks.

Beginning in 1998, samples of northern pike from the catch of the Innoko River sport fishery have been measured and marked with uniquely numbered dart tags. This sampling is conducted with department oversight by volunteers from the guiding industry from northern pike caught and released by clients. On average about 600 unique, northern pike have been tagged and released each year. One or two percent of these tagged fish are recaptured in the sport fishery each year. A portion of the tagged fish are captured more than once each season. For example, in 2000, 16 pike were captured more than once; six were marked in 1999, four were marked in 1998. Samples examined in this sampling include very large and old fish; maximum lengths exceeded 50 inches (total length) and estimated ages were greater than age-20. A small number of the tagged fish have been captured and reported by subsistence fishers residing in area communities on the Yukon and Innoko rivers.

During spring 2001 and 2002 department personnel visited the Innoko area communities of Holy Cross and Shagaluk to meet informally with local residents. The goals of these visits were to learn more about local perspectives on resource issues and to discuss options for beginning to address fish and wildlife concerns in the region. An important local concern is that important subsistence resources, such as pike and moose are not receiving adequate protection from non-local use and may be at risk. It became clear that the department has historically failed to effectively communicate with residents of the area concerning fish and wildlife management. For northern pike, the absence of current stock status studies has contributed to differing perceptions on the status and trends of the pike population in the area. The local perception is that reduced catch rates, fewer large fish and a growing number of sport anglers indicate a stock at risk. Department biologists conclude that the northern pike stock is healthy based on the presence of exceptionally large fish, fish in old age classes and low harvest levels. The conflicting perceptions have contributed to a level of distrust for biologists and have exacerbated the communication challenges. These visits demonstrated to our staff the need for improved communication between the department and local communities and re-emphasized the need for better biological information about northern pike in the area.

A stock assessment project of northern pike inhabiting the Innoko River was started in the spring of 2002. This project is using radio telemetry to describe seasonal movements and the geographic area used by northern pike targeted by the recreational fishery during the summer and by the Holy Cross and Shagaluk subsistence fisheries throughout the year. The project is also providing information on the current age and size composition of pike in the area. In June 2002, 525 northern pike ranging in length from 12 to 50 inches (TL) were captured, tagged and released. In addition, 65 fish were fitted with radio transmitters. Tracking results from the radio tagged pike show that most of the fish have remained within the study area, but that there is large variability in the degree of movement and that some fish move long distances > 200 miles seasonally. The radio-tagged fish will be tracked periodically through summer 2004. A final report of this study is expected during winter 2004-2005.

A second related project began in 2002 that seeks to describe current subsistence use patterns of freshwater fish including the geographic distribution of winter-time northern pike subsistence fishing. The project also seeks to describe the age, sex, and length (ASL) of pike harvested in the subsistence ice fishery and to collect tag returns from tagging efforts in the summertime sport fishery. Aerial surveys were used to describe the geographical distribution of ice season harvest. Sampling of the subsistence harvest of northern pike for length, sex, and age was conducted in late March in concert with visits to local schools to train students in the collection of (ASL) data. A sample of 75 northern pike was collected. No tags were encountered in the sample. Lengths ranged from 21 to 41 inches (TL). All fish sampled were mature and in pre-spawning condition. Most (57%) of the pike, and all pike larger than 31 inches, were pre-spawning females. This project will continue through 2004. We plan to continue to involve school students in collecting ASL samples from the subsistence fishery.

Total catch of northern pike in the Nowitna River pike fishery appears to be increasing. Increased level of use indicated by recent estimates of effort, catch and harvest of northern pike in the Nowitna River suggest that change in sport fishery regulations for this fishery may be warranted to preserve the quality of the fishery. An assessment of the characteristics of the sport fishery and of the northern pike stock inhabiting the lower portion of the Nowitna River is recommended.

DALL RIVER NORTHERN PIKE

Fishery Description and Historical Perspective

Construction of the Dalton Highway in the mid 1970s provided improved access to the Dall River for anglers. Since that time, a summer season sport fishery has developed which targets mostly northern pike. Local people have expressed concern over encroachment by outside visitors and by what they perceive as a depletion of resources particularly northern pike.

In 1987, residents of Stevens Village proposed to the BOF that the northern pike sport fishery in the Dall River should be closed. The BOF responded to the proposal by restricting allowable harvest of northern pike in the Yukon River and its tributaries from the Tanana to the Hodzana River to five pike (one over 30 inches). In 1988 and 1989 ADF&G conducted a project designed to assess the population of northern pike residing in the Dall River (Arvey and DeCicco 1989; Arvey and Burkholder 1990). A reliable estimate of population abundance was not obtained because northern pike travel into and out of the Dall River during the open water season. The study found that northern pike caught in the Dall River travel within the Yukon River and its tributaries from as far downstream as Hess Creek and upstream of Stevens Village to at least Old Lost Creek. Data obtained in 1988 and 1989 on the size and age of pike using the Dall River during summer indicate that a substantial portion of these fish were of large size and old age. The maximum estimated harvest of northern pike from the Dall River occurred in 1984 and was 2,480 fish (1,752 sport, 730 subsistence). All harvest estimates since that time have been less (Mills 1978-1994, Howe et al. 1995, 1996, 2001a-d, Walker et al. 2003, Jennings et al. 2001-02 *In prep*). Based on these study findings, the department concluded that the level of harvest occurring in 1988 and 1989 on this pike population that inhabits a huge geographic area was within sustainable levels.

The Dall River lies within the boundaries of the traditional lands claimed by Stevens Village. Local people continue to express concern about the long-term impact of increased visitor use of the Dall River area. Stevens Village residents alleged that non-resident anglers damaged private property on the lower Dall River and acted without respect for the river environment and for the fisheries resource. Waste of fish and other game animals has been reported. Local people are concerned that mortality associated with catch and release fishing may be substantial.

Following the 1989 study, additional information concerning the Dall River northern pike fishery was limited to results of the SWHS. These results found that the average harvest between 1988 (bag limit reduced) and 1994 was 361 fish per year compared with an average of 835 fish prior to 1988. The restrictive bag and size limit appeared to be controlling harvest. Total catch was estimated beginning in 1990 and these data showed up to 87% of the northern pike caught were released. The number of fish harvested did not appear to be increasing. Estimated fishing effort on the river remained stable between 1988 and 1992 varying between 217 and 438 days of effort. Estimated fishing effort in 1993 increased to 845 days, the highest since 1984.

In 1995 and 1996 Stevens Village submitted proposals to the Federal Subsistence Board (FSB) seeking to close the Dall River to hunting and fishing by all but qualified rural residents. The FSB took no action on the proposals primarily because the navigable water in the Dall River was not federal public land and was therefore not within the jurisdiction of the FSB.

During 1995, a project was conducted to again assess the sport fishery for northern pike in the Dall River. This project represented a cooperative effort by Stevens Village Council, the Yukon Flats National Wildlife Refuge and ADF&G. The project was designed to obtain quantitative

information on the level and type of visitor use, fishing effort, and on the catch and harvest of northern pike from the Dall River. The study was also designed to provide a check on the use and harvest estimates provided by the SWHS.

The 1995 survey found that the use of the Dall River during the 1995 season was light (Burr and James 1996). The survey estimated that 330 people (92% non-local) visited the river in 107 boats and stayed for a total of 631 days. Local use was highest in June when 20% of visitors were from Stevens Village; local use dropped to a low level in July. Most (94%) of visitors came to fish for northern pike. Sport fishing effort was estimated to be 553 angler days by 300 anglers. Total catch was estimated at 1,325 northern pike of which 340 were kept and 985 were released. The ranges of lengths and ages sampled in 1995 were consistent with the ranges observed during the earlier studies. Estimates from the SWHS were consistent with estimates from the on site survey on the Dall River. The SWHS estimated that 494 anglers fished 1,018 days catching 2,463 northern pike and harvested 350 (Howe et al. 1996). Although the point estimates from the SWHS for each measure of the sport fishery were higher than the estimates from the 1995 on-site study, these differences were not functionally or statistically different (Burr and James 1996).

Recent Fisheries Performance

Recent estimates of fishing effort, harvest and total catch in the Dall River sport fishery indicate that this fishery is no longer growing and that at least harvests have decreased.

During the last five-year period (1997-2001) fishing effort at the Dall River was similar to the level estimated in 1995 during the on-site survey (Table 10). Estimated angler effort in 2002 (165 angler days) was lower than recent estimates.

Estimated harvests of northern pike from the Dall River until 2001 have been higher than other Yukon area locations. Between 1995 and 2000, this fishery provided an average of nearly 20% of all pike harvested from the Yukon subarea. Pike harvests have in general decreased in the Dall River and in the Yukon area as a whole since 1987; the estimate for 2002 (115 fish) is about one third of the recent five year average.

Catch of northern pike between 1990 and 1999 showed an increasing trend with the estimate for 1999 (3,320) exceeding all previous levels. Since that time catch levels have been less; in 2002 the estimated total catch was 1,356 fish.

Fishery Objectives and Management

The management of northern pike in the Yukon is outlined in the Fishery Management Plan for the Yukon River Northern Pike Fishery, 2001-2004 (Burr *In prep a*).

- The current objective for the Dall River northern pike fishery is to maintain the proportion of northern pike 30 inches and larger at 0.3 (30%) in the assessed population¹.

Daily bag and possession limits were restricted in 1987 to allow for only one pike over 30 inches with a total bag of five fish. Subsequent studies and results from the SWHS indicated that harvest levels have largely been controlled by the regulations. The department will continue to closely monitor SWHS results to detect major changes in the level of participation.

¹ The assessed population includes the portion of the population that is accessible to the sampling gear used in stock assessment. For the Dall River this includes fish larger than 19 inches TL (450 mm FL)

The department, together with the Stevens Village Natural Resource Office, and interested fish and game advisory committees jointly developed a Fisheries Management Plan (FMP) for the Dall River northern pike fishery. The goal of this planning process is to maintain a high quality northern pike stock for the benefit of local and non-local users. A summary of the current plan including the shared policies, objectives, and issues/action items is found in Appendix D.

Fisheries Outlook

New regulations for the Dall River fishery were adopted by the BOF during January 2001. As a result, the opportunity to harvest large northern pike in this fishery was greatly restricted. The current regulations provide for harvest of smaller pike and for catch-and-release fishing of large pike. The intended effect of this regulation is to increase the survival of large northern pike thereby increasing the size of fish available for catch-and-release. The outlook for fishing at the Dall River is good in terms of the number and size of fish expected to be available.

Recent Board of Fisheries Action

New sport fishing regulations for the Dall River fishery were adopted by the BOF during January 2001. The regulations established special bag, possession and size limits for northern pike in the Dall and Little Dall River drainages. The regulations are consistent with the recommendations of the Dall River Fisheries Management Plan.

Current regulations are: Season – May 20 –September 30. Daily bag and possession limit is 4 northern pike less than 30 inches and 1 pike larger than 48 inches. No harvest of pike 30 – 48 inches. No bait.

Current Issues

Most of the tension between non-local visitors to the Dall River area and local residents has been caused by local concern over natural resources including pike or by trespass on private land. Nearly all of the lands adjacent to the river were (as of 2003) conveyed to the regional corporation (Doyon), to the Village Corporation (Dinyee) or to individuals as native allotments. The Stevens Village Resource Office aggressively enforced trespass violations on private land (native allotments, corporation lands) during 1998. Representatives from the village talked with anglers about land status, discouraged them from fishing in the area and in a few isolated instances removed legal fishing gear from the water.

The joint development of the fisheries management plan and the subsequent adoption of new regulations for the fishery appears to have reduced tensions stemming from local concern over resource health and a perceived lack of control of non-local use of the resource. No instances of significant conflict between recreational users and local residents were reported in the 2003 season.

During 2003 the Stevens Village Council through the Natural Resource Office began providing improved access to certain private lands adjacent to the Dall River by constructing camping sites. Establishment of designated camping sites within the Dall River area should reduce unwitting trespass by visitors and provide a greater sense of control for local landowners.

Ongoing and Recommended Research and Management Activities

The Alaska BOF recently established new regulations for the Dall River area with the goal of providing additional protection for large sized northern pike. The project conducted in 1999 and 2000 (Chythlook and Burr 2002) provided evidence that regulations applied to the Dall River drainage would likely be effective at providing a catch and release fishery for large northern

pike. The study found that most northern pike captured within the Dall River in early summer remained within the drainage during the fishing season. The study also found that the proportion of fish larger than 30 inches (total length) has not decreased substantially from estimates from 1988 and that a substantial number of large (>30 in.) fish are still present. In order to assess the effectiveness of the new regulation, it will be necessary to sample the Dall River pike stock periodically with the goal of estimating the proportion of pike larger than 30 inches (the current maximum length limit).

YUKON RIVER ARCTIC GRAYLING

Fishery Description and Historical Perspective

Grayling are distributed throughout the entire drainage, from extreme headwaters in Canada to streams that originate in the Yukon Delta. Sport fishing effort is likewise widespread. Historic documentation of harvests (Mills 1977-1994; Howe et al. 1995, 1996, 2001a-d, Walker et al. 2003, Jennings et al. 2001-02 *In prep*) indicates that the heaviest sport utilization has occurred in the middle part of the Yukon drainage, between the mouth of the Porcupine River downstream to the Koyukuk River. Within this section, most of the catch and harvest comes from the Koyukuk River tributaries, including those that are crossed by the Dalton Highway. Improved road access has also recently been provided to Nome and Beaver creeks, another popular middle Yukon River site. In addition, an important component of the catch and harvest of grayling comes from the Anvik River in the lower Yukon River section. Most of this fishing effort is believed to come from a lodge located on the upper Anvik River. Virtually all other grayling harvests in the drainage are from streams that have no, or very limited, road access. Historic sport effort and harvests are estimated to be small relative to road accessible streams (Table 11).

Dalton Highway. The sport fishery for grayling from Koyukuk River tributaries accessed from the Dalton Highway account for about 25% of the harvest and 40% of the catch of grayling from the entire Koyukuk drainage (Table 11). Given the relatively small portion of the Koyukuk drainage that is accessible from the Dalton Highway, grayling stocks along this road are subjected to the highest level of use by anglers in the drainage.

The Jim River supports the largest regional stock, as well as the largest harvest by sport anglers (Fish 1997; Table 11). The Jim River is one of the most accessible of the streams crossed by the Dalton Highway because the roadbed parallels the stream for many miles. In contrast, most other streams generally flow perpendicular to the roadbed. Between 1995 and 1997 studies were conducted to obtain baseline abundance and composition data for stocks of Arctic grayling in rivers and streams crossed by the Dalton Highway. Studies concluded that catchability of fish in the Jim River is not affected by accessibility from the highway, and that fishing pressure at easily accessible locations along the river is probably not great enough to cause changes in catchability throughout the summer.

A study of the movement of grayling captured in the Jim River summer fishery was conducted in 1997 and 1998 using radio telemetry. The goals of the study were to locate spawning and overwintering habitats of grayling and to determine the fidelity of Arctic grayling to summer feeding grounds in the Jim River. The study (Fish 1998) found that most fish tagged in the Jim River remain in the Jim River through the winter. A smaller proportion (about 35%) wintered in other locations including the South Fork Koyukuk River, the Middle Fork Koyukuk River and Prospect Creek. During the spawning season, most grayling were located in the Jim River in

Table 11.-Sport harvest and catch of Arctic grayling in the Yukon River drainage (1992-2002).

Harvest	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Canadian Border to Ft. Yukon)													
Sub Total	992	633	1,075	528	205	1,207	677	833	569	318	308	704	721
Fortymile River*	317	587	190	517	54	90	497	178	0	0	39	243	153
Charley River	383	54	416	18	49	489	149	289	20	65	61	193	202
Kandik River	278	0	449	0	0	0	0	34	239	172	0	117	89
Other	14	0	20	0	102	628	31	332	310	81	208	150	276
Yukon R. drainages (Ft. Yukon to Koyukuk R)													
Sub Total	2,544	2,031	2,790	2,087	3,140	1,883	2,398	2,085	2,078	2,006	1,483	2,304	2,090
Porcupine River*	180	221	255	237	309	99	270	83	0	601	251	226	211
Birch Creek	38	420	16	52	0	54	169	61	178	500	75	149	192
Beaver and Nome Cr	323	171	306	53	665	122	371	311	672	0	156	299	295
Haul Road Streams	0	0	0	217	235	143	230	497	88	249	75		241
Jim River	128	211	573	53	235	86	184	321	10	163	75	196	153
Koyukuk River	985	716	2,015	1,174	1,535	1,118	800	863	735	571	577	1,051	817
Other	1,018	503	198	571	631	490	788	767	493	334	424	579	574
Yukon R. drainages (downstream from Koyukuk R)													
Sub Total	325	558	147	334	594	252	837	77	307	677	1,041	411	430
Nulato River	68	0	0	35	146	98	48	0	0	0	492	44	37
Anvik River	143	71	10	52	217	0	422	27	174	67	154	118	138
Innoko River	0	0	0	0	158	41	0	0	42	112	0	44	65
Andreafsky River	38	299	98	62	61	27	84	0	11	463	365	127	146
Other	76	188	39	185	12	86	283	50	80	35	30	103	107
Total Yukon Harvest	4,171	3,330	4,574	3,421	4,000	3,456	3,912	3,164	3,279	3,193	2,832	3,650	3,401

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Table 11.-Page 2 of 2.

Catch	Year											Averages	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	1992-01	1997-01
Yukon R. drainages (Canadian Border to Ft. Yukon)													
Sub Total	2,197	2,356	2,186	765	1,426	3,826	1,335	2,883	2,428	1,869	2,026	2,127	2,468
Fortymile River*	835	760	279	522	449	280	510	490	0	0	103	413	256
Charley River	804	137	481	18	243	1,079	615	1,151	249	377	61	515	694
Kandik River	466	0	449	35	0	1,014	0	373	1,167	601	0	411	631
Other	92	1,459	977	190	734	1,453	210	869	1,012	891	1,862	789	887
Yukon R. drainages (Ft. Yukon to Koyukuk R)													
Sub Total	12,006	14,865	11,070	7,949	16,822	17,116	10,494	13,786	14,453	10,500	9,454	12,906	13,270
Porcupine River*	188	1,570	562	385	1,332	513	1,094	1,327	1,626	3,521	607	1,212	1,616
Birch Creek	60	775	49	78	850	874	254	331	1,089	1,455	1,163	582	801
Beaver and Nome Cr	1,300	274	2,417	957	4,030	4,065	1,747	1,427	2,405	1,517	1,971	2,014	2,232
Haul Road Streams	0	0	0	648	936	2,776	1,656	5,293	756	919	705		2,280
Jim River	1,210	877	2,450	157	924	2,749	1,229	5,075	517	566	666	1,575	2,027
Koyukuk River	1,946	5,348	1,889	4,610	8,354	7,061	4,630	4,630	7,964	1,761	3,920	4,819	5,209
Other	8,512	6,898	6,153	1,919	2,256	4,603	2,769	6,071	1,369	2,246	1,793	4,280	3,412
Yukon R. drainages (downstream from Koyukuk R)													
Sub Total	4,478	4,491	1,705	1,145	2,810	1,441	6,489	1,215	4,191	3,381	7,490	3,319	3,343
Nulato River	68	0	0	61	364	166	48	0	38	35	796	78	57
Anvik River	2,908	2,888	102	158	1,342	599	2,748	945	3,670	2,575	4,857	1,794	2,107
Innoko River	0	0	0	0	0	0	0	56	67	129	0	109	67
Andreafsky River	383	1,270	1,403	219	408	54	1,151	0	49	584	1,712	552	368
Other	1,119	333	200	707	696	622	2,542	214	367	58	125	686	761
Total Catch	17,300	21,420	15,951	11,454	21,417	23,318	18,318	18,432	23,024	16,000	19,194	18,663	19,818

either the fishery area or in the lower Jim River. Some fish (< 20%) were located during the spawning season in Fish Creek, Prospect Creek, and the South Fork Koyukuk River. The migration characteristics and patterns of habitat use are very similar to those of other stocks of grayling inhabiting other clear water rapid runoff rivers in Interior Alaska (Tanana Valley). This study suggests that Arctic grayling in the Jim River are probably a distinct stock of fish that may share overwintering and feeding habitat with other related Koyukuk River stocks.

In 2000 and 2001, a study was conducted to estimate maturity schedules for grayling in the Jim River (Gryska 2003). This study found that grayling in this system mature at larger size and at an older age than do grayling in the Chena River; 50% maturity was estimated at 7 years and at about 300 mm FL (13 inches TL) compared with 5 years and 270 mm (12 inches TL) for the Chena River stock.

Nome/Beaver Creek. Excellent access has been provided to Beaver Creek by way of the improved road to Nome Creek. Beginning in the early 1990s, BLM upgraded the roadbed and initiated construction of multiple campgrounds. In 1999, construction of the campgrounds and the expanded road system leading to Nome Creek and its confluence with Beaver Creek was completed. This road system is located near the Fairbanks population center and has resulted in increased visitor use and in increased catch of Arctic grayling in this area.

Baseline studies conducted by BLM during the late 1980s indicated a very small resident grayling population in Nome Creek. Concern over increased fishing effort and potentially high levels of exploitation of the grayling stock in this 3rd order tributary prompted the ADF&G to propose increasingly restrictive regulations for Nome Creek culminating in the current catch-and-release only regulation that was adopted in the winter 1994-95.

Recent Fishery Performance

The Yukon subarea has provided about 70% of the sport harvest and 60% of the catch of Arctic grayling in the AYKMA during the 1997-2001 period (Table 2; Appendix B1). Estimated average harvest in the most recent five-year period was 3,401 fish, which reflects little change over historic levels (3,650, 1992-2001). In 2002, an estimated 2,832 grayling were harvested from the Yukon area (Table 11). Catch estimates for the Yukon subarea have averaged about 19,000 annually since 1992; estimated catch in 2002 was approximately 19,194 grayling (Table 11). These data reflect a continued low but stable level of use of the species in the Yukon area as a whole.

Dalton Highway. Sport fisheries for Arctic grayling in the Yukon area along the Dalton Highway have harvested an average of 241 fish annually since 1997. During this period, most of the harvest (153 grayling) has come from the Jim River (Table 11). Total estimated catch from this area since 1997 has averaged 2,330 grayling of which nearly 2,027 came from the Jim River (Table 11). Estimates of catch and harvest were substantially lower in 2002 (harvest 75 fish, total catch 705 fish). The results from 2002 likely reflect the poor weather conditions the area experienced in July 2002.

Nome/Beaver Creek. The SWHS combines Beaver Creek and Nome Creek data into a single report. The estimated annual catch of Arctic grayling from Nome and Beaver creeks averaged approximately 2,200 fish for the most recent five-year period (Table 11). Estimated catch from 1997 (4,065 fish) was the highest on record for this fishery. The estimated catch of about 2,000 grayling for the 2002 season is consistent with recent estimates. Harvest of Arctic grayling from

Beaver Creek (Nome Creek is closed to harvest) was estimated for 2002 to be approximately 150 fish and is consistent with the recent five-year average during the period.

Fishery Objectives and Management

Management strategies for Arctic grayling stocks in the Yukon area are found in Fishery Management for the Yukon River Arctic Grayling Sport Fishery, 2001-2004 (Burr *In prep b*). A region-wide management plan for Arctic grayling will be reviewed by the BOF during the January 2004 meeting. Once this plan is completed Yukon area grayling management will fall under this umbrella plan. The goal of the department is to maintain naturally reproducing populations of Arctic grayling with characteristics that are sustainable and are desirable to the public. To date, fishery objectives are in place for two fisheries in the Yukon River area.

Dalton Highway. The fishery objective for the Dalton Highway grayling fishery is to maintain total harvest of Arctic grayling from the Jim River below 10% of the estimated abundance of fish larger than 250 mm FL in the assessed area. The most recent applicable estimate of abundance is 12,000 fish. The performance of the Jim River fishery will serve as a proxy for the grayling fishery in the Yukon drainage portion of the Dalton Highway grayling sport fishery.

Current regulations for the Dalton Highway Arctic grayling fishery are:

- Daily Bag and Possession Limit is 5 grayling, 12 inch minimum size.

The length limit in place for the fishery was instituted using knowledge of Tanana area stocks and is based on the assumption that grayling will have the opportunity to mature, spawn, and contribute to the population before being harvested as a 12-inch or larger fish. Recent information (Gryska 2003) suggests that Arctic grayling inhabiting streams within the road corridor grow more slowly, and mature at larger size and at older age than do fish in the Tanana area. The length limit would need to be increased to at least 13 inches in order to be effective at protecting pre-spawning fish. Current estimates of effort and harvest and stock status studies indicate that these stocks can sustain greater levels of harvest. If it becomes necessary to reduce fishing mortality on these stocks, a reduction in bag limit with no length limit is recommended.

Nome/Beaver Creek. The goal of management for Nome Creek is to minimize fishing mortality and thereby preserve historic size compositions of Arctic grayling within this small tributary of Beaver Creek with a catch-and-release fishery.

The fishery objective for Beaver Creek is to maintain total harvest of Arctic grayling below 10% of the estimated abundance of fish larger than 250 mm FL in the assessed area. The most recent estimate of abundance of grayling larger than 250 mm FL in the assessed area is 9,900 fish.

New sport fishing regulations were adopted by the Alaska BOF for Beaver Creek Arctic grayling fishery in January 2001. The current regulations for Nome Creek and Beaver Creek are:

- Only unbaited, single hook, artificial lures may be used April 1 – May 31;
- Nome Creek – catch-and-release only for the entire year;
- Beaver Creek (from its headwaters downstream to its confluence with O'Brien Creek, except for Nome Creek) – daily bag and possession limit is 5 grayling, no size limit; and,
- Beaver Creek (downstream from the confluence with O'Brien Creek, except for Nome Creek) – Daily Bag and Possession Limit is 10 grayling, no size limit.

Fishery Outlook

Dalton Highway. A change in the regulation for the Dalton Highway grayling sport fishery is anticipated for the 2004 season. A proposal before the Alaska BOF seeks to remove the minimum length limit that is currently in place for this fishery. If the proposal is adopted a modest increase in the harvest of grayling from area waters is expected.

Substantial increases in the levels of angler effort, catch, and harvest have been expected as a result of the large improvements in the road surface (most of the highway north of the Yukon River and south of Wiseman was paved in 2001). However, while modest increases in visitor use have been recorded at the visitor center in Coldfoot (BLM), there is little evidence of significant increases in the sport fishery. With better road access and with a somewhat less restrictive sport fishing regulation, the department anticipates that the participation in the roadside fishery for Arctic grayling will increase.

Nome Creek/Beaver Creek. With the adoption of new regulations in 2001, no changes in the fishery regulations for the Nome and Beaver creeks are anticipated. Only modest increases in visitor use and in angling effort are anticipated as the recreational destination becomes more popular.

Recent Board of Fisheries Action

Dalton Highway. In 1994, the BOF reduced the bag and possession limit for grayling within the Dalton Highway Corridor from 10 to 5 fish and added a minimum length limit of 12 inches total. This action was taken in response to increases in recreational use and harvest (Burr et al. 1998).

Nome Creek/Beaver Creek. During 1994, the BOF adopted a catch-and-release only regulation for grayling in Nome Creek in anticipation of continued increasing recreational use of this small tributary of Beaver Creek. In January 2001 the sport fishery bag limit regulation for Beaver Creek from its headwaters downstream to its confluence with O'Brien Creek, except for Nome Creek, was reduced from 10 to 5 per day.

Current Issues

Dalton Highway. Local roadside depletion of fish stocks near crossings of the Koyukuk River tributaries by the Dalton Highway has been a concern because such depletions would reduce angling opportunity for sport fishers traveling this route. Bag and possession limits were reduced and a minimum length limit was imposed to alleviate harvest pressure in the immediate road crossing areas. It is likely that fishing effort will increase in the next few seasons with the major improvements of the Dalton Highway. Changes in fishing effort catch and harvest will be closely monitored to ensure that management of the fishery will be modified if necessary to meet objectives for this fishery.

In addition to changes in the sport fishery, a new gill net subsistence fishery in these streams has been proposed (Proposal 164, Appendix A) and will be considered by the BOF during winter 2003/2004. If the proposal is adopted, this additional subsistence harvest will need to be factored into the estimated annual harvest. Adjustments will likely be needed in the regulation of the sport fishery to ensure that harvest levels remain sustainable.

Nome/Beaver Creek. Improved access to Beaver and Nome creeks has resulted in a rapidly growing sport fishery for Arctic grayling. However, it is unlikely that additional modifications in regulation of the fishery will be needed for several seasons. Current annual harvest levels

from Beaver Creek (less than 300 fish) have not yet approached the 9,900 fish threshold level established in the objective for this fishery.

Recommended Research and Management Activities

The minimum length limit currently in place in the Dalton Highway fishery was evaluated with results from recent studies. This 12 inch minimum limit is unlikely to be effective at protecting spawning fish in this area. Removal of the length limit regulation is recommended.

At present, there is little concern for over-harvest of grayling in streams crossed by the Dalton Highway. A conservative annual sustainable harvest level of 1,200 grayling from this fishery has been established. As fishing effort and harvests increase and begin to approach this level of use, a reassessment of the stock will be needed. In addition an on-site creel census will be recommended to better describe the sport fishery.

NORTH SLOPE DOLLY VARDEN/ARCTIC CHAR

Fishery Description and Historical Perspective

In the AYKMA, Arctic char occur in lakes in the Brooks Mountain Range and in some headwater lakes in the Kuskokwim River drainage. Dolly Varden, a closely related species, are common inhabitants of most large rivers on the North Slope in most drainages of the eastern coastal plain from the Canadian Border to the Colville River. The species is widely distributed throughout the Kuskokwim and Yukon drainages as well. The department groups Dolly Varden and Arctic char together for regulatory purposes. However, the two species have distinct life history traits. Distribution of Arctic char is very limited in the AYKMA and the vast majority of fisheries are directed toward Dolly Varden. For the purposes of the following discussion this species complex will be referred to as “char”

In most of the AYKMA char provide a minor contribution to the total catch and harvest in comparison to other species. In the upper Kuskokwim (upstream of the Aniak River) char have contributed only 6% of the harvest and 8% of the catch to the Kuskokwim drainage totals. In the Yukon drainage char contribute only about 4% of the catch and harvest to the total numbers in the drainage. In contrast, char are a major component of the catch and harvest in the North Slope area contributing more than 45% of the harvest and 33% of the catch (Table 12; Appendix B4). On the North Slope most sport fisheries for char target overwintering populations of Dolly Varden either in the fall as the fish return to freshwater from the sea, or in the spring as they move toward the sea to feed.

On the North Slope, char spawn and overwinter in spring water upwelling areas. The char become increasingly concentrated in the spring areas beneath and adjacent to the in-river glaciers (aufeis) that form during winter. Streams that are known to support significant populations of char include the Kongakut, Hulahula, Canning, Sagavanirktok, and Anaktuvuk rivers. Overwintering locations are in some cases different from spawning locations such that non-spawning fish from several neighboring tributaries may concentrate in a single drainage. The upper Ivishak River, a tributary of the Sagavanirktok River provides a large overwintering area used by fish in non-spawning years from nearby tributaries such as the Ribdon, Lupine and Echooka rivers.

The population of char using the Sagavanirktok River is considered particularly vulnerable because of potential habitat degradation resulting from oil and gas development that has occurred in Prudhoe Bay (Sagavanirktok River Delta). Access for anglers to the migratory route of this

Table 12.-Sport fishing effort, and harvest and catch of principal species in the North Slope subarea.

Year	Angler-Days		Lake Trout		Char		Arctic Grayling	
	Total	Haul Road	Total	Haul Road	Total	Haul Road	Total	Haul Road
Harvest								
1977	2,434		88		241		1,239	
1978	1,422		9		181		678	
1979	1,526		264		364		1,382	
1980	2,142		379		827		1,765	
1981	2,601		454		1,188		2,904	
1982	4,879		629		2,065		4,077	
1983	5,738	911	367	31	2,966	105	2,884	524
1984	8,344	1,620	481	416	1,507	351	2,441	1,247
1985	4,490	1,558	1,707	37	3,489	296	5,382	2,078
1986	4,779	842	415	-	983	322	4,099	907
1987	5,256	2,278	274	50	2,676	1,560	1,932	1,065
1988	2,541	1,265	73	73	1,018	327	983	528
1989	4,118	1,266	482	149	1,031	241	2,113	993
1990	3,764	2,502	168	118	489	219	791	554
1991	7,291	3,535	176	-	1,199	640	3,301	1,921
1992	4,940	2,211	379	293	836	336	1,145	324
1993	5,600	3,421	106	57	1,092	623	1,632	547
1994	5,407	2,926	73	73	589	451	807	371
1995	5,644	3,275	38	38	896	437	983	579
1996	4,487	2,700	19	-	1,108	547	1,194	619
1997	5,278	3,224	57	34	1,018	413	903	426
1998	3,653	2,121	221	129	1,454	1,071	1,182	604
1999	5,230	2,473	77	-	929	341	1,206	365
2000	4,739	2,325	18	18	1,178	267	934	370
2001	6,032	4,256	37	-	1,589	1,006	846	510
2002	6,032	2,224	217	-	773	266	2,215	590
Average ^a								
1987-01 (%)	4,932	2,652	147 (5)	69	1,140 (41)	565	1,330 (47)	652
1992-01 (%)	5,101 (100)	2,893 (57)	103 (4)	64 (63)	1,069 (43)	549 (51)	1,083 (43)	472 (44)
1997-01 (%)	4,986 (100)	2,880 (58)	82 (3)	36 (44)	1,234 (46)	620 (50)	1,014 (38)	455 (45)

-continued-

Table 12.-Page 2 of 2.

Year	Angler-Days		Lake Trout		Char		Arctic Grayling	
	Total	Haul Road	Total	Haul Road	Total	Haul Road	Total	Haul Road
Catch								
1990			1,728	1,225	3,744	1,141	5,842	3,240
1991			932	161	2,670	1,635	9,200	4,668
1992			887	556	3,850	1,769	6,608	2,135
1993			266	180	3,946	2,454	9,345	5,505
1994			327	316	3,178	2,371	8,552	5,165
1995			370	319	3,229	1,780	5,427	3,828
1996			298	159	8,06	6,933	7,456	4,708
1997			783	67	4,094	1,433	16,248	12,524
1998			1,292	269	7,716	4,166	7,529	4,862
1999			913	55	4,520	497	9,956	4,875
2000			457	457	7,579	2,561	12,523	8,244
2001			266	87	6,027	3,244	7,035	5,413
2002			410	54	2,195	433	9,374	4,767
Average ^a								
1992-01			586 (4)	247 (42)	5235 (34)	2,721 (52)	9,068 (59)	5,726(63)
1997-01			742 (4)	187 (25)	5,987 (34)	2,380 (40)	10,658 (60)	7,184 (67)

^a Percents are within parenthesis.

stock is provided by the Dalton Highway which parallels most of the main stem of the Sagavanirktok River. In 1994, the entire length of the Dalton highway was opened to public travel. Prior to this, the North Slope portion of the road was technically open only as far north as the Wiseman area in the upper Koyukuk drainage.

Aerial surveys of index areas in the Ivishak River were initiated in 1971 and attempted annually through 1984 as a means of monitoring changes in this stock. The number of char counted in the Ivishak index area ranged from about 8,000 to as many as 36,000 in the 12 years the survey was conducted (Appendix E). In 1989, 1993, and 1995 the aerial surveys were again conducted; counts were 12,650, 3,057, and 27,036 char. The low estimate from 1993 was conducted at least two weeks earlier than other counts and it is likely that many of the fish had not completed the upstream migration. In 2000 a study was initiated which is comparing estimates of abundance from mark recapture experiments with concurrent aerial surveys for char in the Ivishak River index area. A more complete description of this study along with preliminary results is given under the heading, "Ongoing and Recommended Research and Management Activities", at the end of this section.

In the Anaktuvuk River drainage, an index area was established in 1979 and annual counts were attempted through 1984 (Appendix E). Counts ranged from 15,717 to 5,462, declining each year. In 1989 anecdotal reports from local residents and long-time users of this stock indicated that the fish were not present in traditional areas including the overwintering/spawning area near Rooftop Ridge (index area). The primary users of char from this area are Barrow residents that fly into a nearby privately owned airstrip. ADF&G personnel planned to conduct an aerial survey of the Anaktuvuk River in 1989 but the survey was not conducted due to weather conditions. No survey of the Anaktuvuk River char stock was conducted since that time until 2002 when the overwintering aggregations were again counted in a helicopter survey. In 2002 the index count was 4,800 fish (Appendix E).

The Kongakut River is a popular destination for float trips in the eastern part of the Arctic National Wildlife Refuge (ANWR). Concern by refuge staff and members of the public over perceived declines in the number of char available during summer resulted in a joint project to assess this stock. In 1995, the project attempted to estimate abundance of char in a section of the river. However, too few fish were captured during the summer sampling period. The ADF&G conducted an aerial survey in September of 1995 to determine if there had been a substantial decrease in the number of spawning and overwintering fish that were using the river. The count in 1995 was 14,080, substantially greater than the other two estimates available (Appendix E).

Recent Fishery Performance

Estimates of catch and harvest of char from the North Slope subarea through 2001 show a stable level of use (Table 12); estimates of use in 2002 were lower. Harvest in 2002 was estimated to be 773 char of which 266 (34%) were taken from the Dalton Highway corridor. Catch in 2002 was estimated to 2,195 fish of which 433 came from lakes and streams within the road corridor.

A large increase in fishing effort and catch of char and the other two key sport species (Arctic grayling and lake trout) was anticipated with the opening of the entire length of the Dalton Highway to public travel in 1994 and again in 2001 and 2002 with the improvement of the roadway south of Atigun Pass. Estimates from the SWHS do not indicate that this has occurred (Table 12).

Fishery Objectives and Management

Fishery management for char reflect the different life history characteristics that these two closely related species exhibit. Dolly Varden (which inhabit streams and are often anadromous) can be exploited at much higher rates than can lake-dwelling Arctic char. The life history characteristics of lake-dwelling Arctic char are very similar to lake trout and these populations can support only low rates of exploitation.

In lakes (primarily Arctic char) char are managed to provide a conservative level of yield. In streams (primarily Dolly Varden) char are managed to encourage participation in the fishery while limiting harvest of spawning adults.

Fishery Outlook

Char will likely continue to provide a substantial portion of the sport fishery that occurs on the North Slope. The waters within the Dalton Highway corridor will continue to support a substantial portion of the total catch and harvest of char in the North Slope sub area. Increased numbers of visitors are reportedly floating streams (Kongakut, Hulahula, Caning rivers) in the Arctic National Wildlife Refuge (Wiswar, USFWS files). Modest increases in catch and harvest of char can be anticipated with the increased visitor use of the area.

A fishery proposal to align lake trout harvest regulations with lake dwelling arctic char will be considered by the BOF in January 2004 (Proposal 108, Appendix A). However, no changes in the regulation of the char fishery are expected prior to, or during the 2004 season.

Recent Board of Fisheries Action

In 1994, the BOF adopted new regulations for Dolly Varden and Arctic char for the entire AYK region. It is difficult for many anglers to distinguish between Dolly Varden and Arctic char in the field. However these two species have substantially different biological characteristics and cannot withstand the same exploitation rates. Dolly Varden (which inhabit streams and are often anadromous) can be exploited at much higher rates than can lake dwelling Arctic char.

The BOF adopted the following regulations: in flowing waters the bag and possession limit for these species is ten per day with only two over 20 inches in length; in all lakes the bag and possession limit is two per day with no size limit.

Current Issues

There is a concern among indigenous people of the North Slope that a growing sport fishery for char may conflict with local subsistence fisheries.

Oil and gas development adjacent to and within the migration routes of char in North Slope waters carries the potential for serious impacts through contamination of habitat. Char using the Sagavanirktok drainage pass through Prudhoe Bay, one of the most heavily industrialized areas in Alaska. Current plans for oil and gas leases in the foothill region of NPRA are of particular concern. These new lease areas include the critical overwintering/spawning habitat in the spring areas of the Anaktuvuk River drainage. Seismic surveys are planned for the portions of the Sagavanirktok, Anaktuvuk and Canning rivers that are the primary spawning and overwintering habitats for these char stocks. Department staff continues to assert that these critical habitats must be excluded from all surface development and that travel routes be redirected.

Ongoing and Recommended Research and Management Activities

A multi-year project funded by the federal OSM program began in 2000. One aspect of this project is an investigation of the validity of using aerial surveys as a char stock assessment tool.

The project is designed to estimate the precision of aerial surveys of overwintering aggregations, and determine the relationship between aerial survey index counts and traditional mark-recapture abundance estimates of the same overwintering aggregations. Another part of the project is using radio telemetry to better describe overwintering and spawning locations and to investigate the year-to-year variability in the location of these habitats.

In 2001, 2002 and 2003 the abundance of char in an index reach of the Ivishak River was estimated with mark recapture experiments and was indexed with aerial counts (Viavant 2002, 2003, *In prep*). The index reach is a 28 km stretch of the Ivishak river extending from the mouth of the Echooka upstream to the mouth of the Saviukviayak River. The reach is consistent with the aerial index section used between 1971 and 1995 and appears to include most overwintering fish.

The estimated abundances of char in the index area from the mark-recapture experiments in 2001 and 2002 were 49,523 fish (SE = 7,277) and 21,634 fish (SE = 3,075). The 2003 result is not yet available. The average aerial index count based on all surveys was 10,932 (SE = 314) in 2001 and 5,408 (SE = 363) for 2002 and 2,720 (SE = 133) for 2003 (Appendix E). These results indicate that the replicate aerial counts have relatively low variability and that these aerial counts appear to represent approximately 22% to 24% of the abundance in the same index area as measured by mark-recapture methods. The study also shows substantial variability in the annual number of char overwintering in the index area. Most significantly this study demonstrates that aerial surveys of overwintering aggregations of char in North Slope drainage can be used as an indicator of overwintering abundance.

The radio telemetry results show that the specific locations of critical spawning and overwintering habitat used by anadromous char in the Beaufort Sea drainages may change significantly between years within a relatively large area of a drainage (Viavant 2003). Protection of such habitat should not be based on locations determined only for one or a few seasons.

Re-establishment of annual aerial index counts of the Ivishak and Anaktuvuk river overwintering areas is recommended. Annual monitoring of these stocks is important particularly in light of the increased oil and gas development activity this area.

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APPENDIX A

Appendix A1.-Reference information specific to 2004 Board of Fisheries proposals.

Proposal(s)	Reference Text	Page	Tables	Page	Figures	Page
108			2, 12	17, 64	6	20
111, 112	Arctic grayling Sport Fisheries	57-63	11, 12	58-59, 64		
145, 174	King Salmon Sport Fisheries	24, 33	4, 7, 8 Appendix C1, Appendix C4	25, 35, 37, 90, 93		
159			9, 11,	48, 58-59		
164	Dalton Highway Fisheries Objectives	61	11	58		

Appendix A2.-List of regulatory proposals to be considered by the Alaska Board of Fisheries concerning AYKMA Sport Fisheries.

PROPOSAL 108, PAGE. 112, - 5 AAC 70.022(a-c) and (e). Waters; seasons; bag; possession, and size limits in the Arctic-Yukon-Kuskokwim Area. Amend this regulation as follows:

Lake trout and Arctic char/Dolly Varden in all lakes: the bag and possession limit is two fish in combination, with no size limit.

WHAT WOULD THE PROPOSAL DO?

The proposal would reduce the background sport fishery bag and possession limit for lake trout from four to two and combine this limit with the existing two fish limit for lake resident Arctic char/Dolly Varden. This regulation would apply to lakes in the North Slope, Northwest Alaska, Kuskokwim and Yukon portions of AYK. This regulation would not apply to the Tanana portion of the Yukon drainage.

PROPOSAL 111, PAGE. 115, - 5 AAC 70.022(c)(10)(D)(iii). Waters; seasons; bag; possession, and size limits in the Arctic-Yukon-Kuskokwim Area. AMEND THIS REGULATION AS FOLLOWS:

In the Dalton Highway corridor (Trans-Alaska Pipeline corridor) within the Yukon River portion of the Arctic-Yukon-Kuskokwim Area...the bag and possession limit for Arctic grayling is five fish, no size limit

WHAT WOULD THE PROPOSAL DO?

The proposal would remove the 12 inch minimum size limit from the regulation for Arctic grayling in waters within the Dalton Highway corridor in the Yukon River drainage.

PROPOSAL 112, PAGE. 116, - 5 AAC 70.022(a)(14)(D) Waters; seasons; bag; possession, and size limits in the Arctic-Yukon-Kuskokwim Area. AMEND THIS REGULATION AS FOLLOWS:

In the Dalton Highway corridor (Trans-Alaska Pipeline corridor) within the North Slope portion of the Arctic-Yukon-Kuskokwim Area...the bag and possession limit for Arctic grayling is five fish, no size limit

WHAT WOULD THE PROPOSAL DO?

The proposal would remove the 12 inch minimum size limit from the regulation for Arctic grayling in waters within the Dalton Highway corridor on the North Slope.

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Proposal No. 145, Page 144, 5AAC 07.365 (e)(1). Kuskokwim River Salmon Rebuilding Management Plan. Amend this regulation to provide the following:

The sport fishery in the Kuskokwim drainage shall be managed in accordance with the subsistence salmon gillnet and fish wheel schedule described in 5AAC 07.365 (c) (1-3); if the commissioner further restricts the fishery by emergency order for conservation purposes, the restrictions will be based on the level of abundance.

WHAT WOULD THE PROPOSAL DO?

During the months of June and July the salmon sport fishery would be open only when the subsistence gillnet and fish wheel is open. The subsistence gillnet and fish wheel schedule is open for four (4) consecutive days per week in June and July as announced by emergency order. The rod and reel subsistence fishery would remain open continuously.

PROPOSAL 159, PAGE 160. 5 AAC 01.220. Lawful gear and gear specifications. Amend this regulation as follows:

Increase the mesh size regulation for Birch Creek

WHAT WOULD THE PROPOSAL DO?

The proposal if adopted would allow the use of gill nets with mesh size larger than three inches in the Birch Creek drainage.

PROPOSAL 164, PAGE 164. 5 AAC 01.220(f). Lawful gear and gear specifications. Amend this regulation as follows:

In the middle fork and south fork of the Koyukuk River, gillnet mesh size may not exceed 3 ½ inches.

Legal subsistence methods and means may be used year round except gill net fishing is closed July 1 – October 31 on the middle fork and south fork drainages to protect spawning salmon.

WHAT WOULD THE PROPOSAL DO?

The proposal if adopted would allow the use of gillnets with mesh size 3 ½ inches or less in the portions of Koyukuk River tributaries within the Dalton Highway corridor except when salmon are traditionally present (July 1 – October 31).

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PROPOSAL 165, PAGE 164. 5 AAC 01.225. Waters closed to subsistence fishing; 5 AAC 05.350. Closed waters; and 5 AAC 70.022. Waters; seasons; bag, possession and size limits in the Arctic-Yukon-Kuskokwim Area. Amend this regulation as follows:

All spawning streams will be closed to any fishing ½ mile downstream from the mouth and ¼ mile upstream. No fishing until the department by emergency order opens when they have reached the escapement goal and the department makes sure they monitor these spawning streams.

WHAT WOULD THE PROPOSAL DO?

The proposal, if adopted, would close all fishing in the Yukon River and its tributaries ½ mile down stream of tributary confluence and the lower ¼ mile of each tributary. All Yukon River tributaries would also be closed near their confluence with higher order tributaries that provide salmon spawning habitat.

PROPOSAL 174, PAGE 171. 5AAC 05.360 (f). Yukon River King Salmon Management Plan. Amend this regulation as follows:

The sport fishery in the Yukon River drainage will be managed in accordance with the subsistence salmon net and fish wheel openings and closure set forth in 5 AAC 05.360(d)(1)-(5). Sport fishing restrictions necessary for conservation proposes will correspond to the level of abundance of king salmon.

WHAT WOULD THE PROPOSAL DO?

The proposal, if adopted, would align the opening and closing of the sport fishery with the gill net and fish wheel subsistence fisheries. The rod and reel subsistence fishery would remain open continuously.

APPENDIX B

Appendix B1.-Sport harvest and catch from the Yukon subarea (SWHS Area Y), 1977-2002.

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Grayling	Whitefish	Sheefish	Northern Pike	Burbot	Other Fish
Harvest														
1977	4,168	56	31	0	6	16	308	88	2,486	55	180	899	43	0
1978	9,814	360	163	0	93	293	262	823	3,976	511	388	2,583	362	0
1979	10,993	39	25	0	16	109	173	531	8,273	92	271	1,446	18	0
1980	13,291	15	0	0	19	0	293	506	9,640	9	251	2,498	60	0
1981	10,173	6	0	0	11	17	302	197	6,176	18	509	2,718	219	0
1982	13,580	22	139	0	41	82	720	470	7,171	568	372	3,551	444	0
1983	13,225	0	52	0	0	349	305	856	8,014	52	259	3,318	10	10
1984	10,531	13	0	0	78	0	143	143	6,856	182	104	2,960	52	0
1985	7,985	12	12	0	0	12	485	382	4,180	315	245	2,132	210	0
1986	10,775	15	161	0	98	202	508	91	5,566	328	214	3,470	122	0
1987	12,740	0	61	0	0	226	0	541	9,054	206	128	2,492	32	0
1988	12,363	91	183	0	0	546	0	618	6,115	610	656	3,526	18	0
1989	14,720	100	215	0	0	997	272	726	7,491	245	757	3,516	367	34
1990	9,948	105	228	0	0	417	220	391	4,961	322	323	2,474	507	0
1991	14,258	143	430	180	0	449	434	675	5,570	422	1,341	4,454	160	0
1992	11,416	313	551	58	27	618	193	672	4,171	248	553	3,590	422	0
1993	8,128	122	619	0	0	193	101	528	3,330	173	436	2,347	279	0
1994	9,445	410	728	0	0	90	59	488	4,574	89	391	1,968	145	503
1995	7,311	37	162	0	0	189	66	122	3,421	82	476	1,937	216	603
1996	9,036	128	432	0	30	66	9	881	4,000	160	606	2,502	203	19
1997	7,328	221	179	0	0	206	0	344	3,456	398	231	1,870	415	8
1998	6,969	207	154	64	85	351	27	205	3,912	121	258	1,452	133	0
1999	7,434	22	158	11	0	81	545	203	3,164	511	133	2,418	168	0
2000	6,103	99	244	0	0	64	55	373	3,279	222	372	1,277	118	0
2001	7308	12	126	0	0	53	56	368	3193	928	492	1772	50	258
2002	9655	8	551	3	0	77	147	551	2832	497	538	3291	1160	0
Averages ^a														
1987-01	9,800	134	298	21	9	303	136	476	4,646	316	477	2,056	216	95
		(1.4)	(3.0)	(0.2)	(0.1)	(3.1)	(1.4)	(4.9)	(47.4)	(3.2)	(4.9)	(25.6)	(2.2)	(1.0)
1992-01	8,048	157	335	13	14	191	111	418	3,650	293	395	2,113	215	139
		(2.0)	(4.2)	(0.2)	(0.2)	(2.4)	(1.4)	(5.2)	(45.4)	(3.6)	(4.9)	(26.3)	(2.7)	(1.7)
1997-01	7,028	112	172	15	17	151	137	299	3,401	436	297	1,758	177	53
		(1.6)	(2.5)	(0.2)	(0.2)	(2.1)	(1.9)	(4.2)	(48.4)	(6.2)	(4.2)	(25.0)	(2.5)	(0.8)

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Appendix B1.-Page 2 of 2.

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Grayling	Whitefish	Sheefish	Northern Pike	Burbot	Other Fish
Catch														
1990	62,327	199	533	0	0	2,149	914	2,842	34,299	914	2,251	17,717	509	0
1991	48,722	316	859	205	77	1,839	757	5,202	23,458	459	1,495	13,895	160	0
1992	43,322	1,242	1,329	107	155	1,960	741	3,744	17,300	349	1,569	14,801	25	0
1993	45,034	640	1,023	9	0	1,224	196	4,249	21,420	302	2,127	13,502	342	0
1994	36,015	510	1,109	9	0	351	177	1,779	15,951	301	1,121	11,694	152	2,861
1995	32,282	177	542	0	0	734	155	751	11,454	109	1,335	15,828	288	909
1996	57,857	2,785	813	0	964	792	60	1,938	21,417	434	2,915	25,502	212	25
1997	41,491	673	386	30	28	516	70	1,448	23,318	430	453	13,367	687	85
1998	40,070	456	385	1,019	802	3,544	74	1,991	18,318	415	568	12,349	149	0
1999	45,136	56	804	343	0	300	1,330	2,104	18,432	554	812	20,213	168	0
2000	41,907	562	684	0	39	366	166	1,678	23,024	524	1,144	13,589	130	0
2001	41,269	315	822	0	0	697	56	1,619	16,000	1,037	1,531	18,788	57	347
2002	63,955	18	1,064	3	38	363	1,596	2,142	19,194	862	1,483	35,975	1,217	0
Averages^a														
1992-01	45,438	742	790	152	199	1,048	303	2,130	18,663	446	1,358	15,963	221	423
		(1.7)	(1.7)	(0.4)	(0.5)	(2.5)	(0.7)	(5.0)	(44.0)	(1.0)	(3.2)	(37.6)	(0.5)	(1.0)
1997-01	43,367	412	616	278	174	1,085	339	1,768	19,818	592	902	15,661	238	86
		(1.0)	(1.5)	(0.7)	(0.4)	(2.6)	(0.8)	(4.2)	(47.2)	(1.4)	(2.1)	(37.3)	(0.6)	(0.2)

^a Percentage of all fish from Yukon subarea are within parenthesis.

Appendix B2.-Sport harvest and catch from the upper Kuskokwim subarea, 1984-2002.

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern Pike	Burbot
Harvest														
1983	7,142	231	483	41	-	514	315	775	52	3,137	273	556	765	-
1984	2,235	104	585	-	-	26	-	52	78	974	-	195	169	-
1985	1,615	49	112	60	-	50	17	399	-	503	-	140	295	-
1986	1,294	-	293	98	-	-	-	293	-	391	147	48	-	24
1987	3,934	63	671	147	-	168	-	739	-	1413	42	308	348	35
1988	3,893	18	273	127	-	-	145	200	54	1330	382	127	1,237	-
1989	2,529	100	100	-	112	-	13	504	-	606	30	270	794	-
1990	725	-	36	12	-	216	36	18	-	301	-	53	53	-
1991	3,151	-	481	-	-	119	43	303	15	569	-	141	1,480	-
1992	1,411	55	275	49	18	129	224	73	24	107	28	173	256	-
1993	1,578	85	55	112	-	225	*	79	-	218	-	45	142	-
1994	1,404	108	244	43	17	-	-	183	-	292	-	130	314	10
1995	1,378	169	179	-	-	-	25	78	-	357	-	189	381	-
1996	1,459	288	327	9	104	121	25	85	13	309	-	47	131	-
1997	2,191	279	872	32	22	-	-	143	29	209	-	310	295	-
1998	2,789	174	95	-	-	167	-	67	-	1,858	107	43	278	-
1999	1,688	36	1,028	33	-	-	63	112	-	142	-	130	144	-
2000	1,550	55	730	23	-	13	106	71	-	179	95	92	186	-
2001	2,003	219	408	152	-	41	-	253	-	458	-	142	330	-
2002	1,747	108	959	16	-	19	-	147	-	266	13	30	189	-
Averages^a														
1987-01	2,112	110	385	49	18	80	46	194	9	557	46	147	425	3
		(5.2)	(18.2)	(2.3)	(0.9)	(3.8)	(2.2)	(9.2)	(0.4)	(26.3)	(2.2)	(6.9)	(20.1)	(0.1)
1992-01	1,745	147	421	45	16	70	45	114	7	413	23	130	246	1
		(8.4)	(24.1)	(2.6)	(0.9)	(4.0)	(2.6)	(6.6)	(0.4)	(23.7)	(1.3)	(7.5)	(14.1)	(0.1)
1997-01	2,044	153	627	48	4	44	34	129	6	569	40	143	247	-
		(7.5)	(30.7)	(2.3)	(0.2)	(2.2)	(1.7)	(6.3)	(0.3)	(27.8)	(2.0)	(7.0)	(12.1)	(0.0)

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Appendix B2.-Page 2 of 2.

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern Pike	Burbot
Catch														
1990	4,734	27	207	24	-	448	53	387	-	2,761	-	193	634	-
1991	11,360	-	717	76	-	199	100	3,485	106	4,083	-	398	2,197	-
1992	6,575	288	558	189	92	578	355	647	309	1,775	46	508	1,230	-
1993	11,180	725	242	980	17	1,063	9	2,204	347	2,103	-	1,317	1,565	-
1994	6,772	207	480	60	83	247	184	662	108	2,564	19	208	1,877	10
1995	8,193	401	481	-	-	414	97	1,062	-	2,036	-	622	3,080	-
1996	8,183	747	1,279	164	207	406	62	644	66	2,241	-	512	1,855	-
1997	16,020	2,423	3,784	457	22	116	40	1,892	166	3,881	-	1,394	1,845	-
1998	16,367	1,121	294	84	-	278	-	364	-	11,015	337	771	2,094	9
1999	11,567	1,332	3,460	75	-	474	274	589	-	1,636	-	813	2,914	-
2000	11,542	216	3,742	242	-	61	633	313	80	2,149	488	2,735	-	-
2001	26,173	3,497	5,037	1,765	34	1,013	-	2,974	431	7,255	197	501	3,469	-
2002	13,073	707	4,021	24	16	762	128	1,922	542	2,428	13	307	2,203	-
Averages^a														
1992-01	12,257	1,096	1,936	402	46	465	165	1,135	151	3,666	109	753	2,266	2
		(9)	(16)	(3)	(0.4)	(4)	(1)	(9)	(1)	(30)	(1)	(6)	(18)	(0.0)
1997-01	16,334	1,718	3,263	525	11	388	189	1,226	135	5,187	204	872	2,611	2
		(11)	(20)	(3)	(0.1)	(2)	(1)	(8)	(0.8)	(32)	(1)	(5)	(16)	(0.0)

^a Percentage of all fish from Yukon subarea are within parenthesis.

Appendix B3.-Sport harvest and catch from the Kuskokwim Bay (SWHS Area V), 1977-2002.

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern Pike	Burbot
Harvest														
1977	7,232	130	412	69	95	225	124	1,615	220	2461	166	253	962	183
1978	8,783	269	403	85	836	741	172	1,121	362	2912	261	163	554	-
1979	10,881	361	512	110	-	373	218	1,451	318	5256	327	283	1,581	73
1980	14,889	863	2,014	112	93	603	267	973	664	5489	275	351	2,556	586
1981	12,720	1,014	583	117	6	1,107	117	1,579	982	4362	349	374	1,698	432
1982	28,007	1,099	52	420	347	2,035	464	3,124	755	6149	826	560	3,220	1,358
1983	31,793	1,962	1,910	261	420	1,195	419	4,562	1,678	7365	3178	828	3,231	462
1984	14,287	1,221	3,623	299	273	896	662	1,883	1,442	2195	26	468	1,247	-
1985	10,693	1,080	1,156	149	-	423	34	2,168	659	1787	175	175	1,040	35
1986	10,751	987	3,232	420	72	973	1,110	1,849	504	1117	147	72	122	146
1987	12,872	981	4,819	419	18	656	28	2,090	592	2019	91	398	606	119
1988	21,201	2,456	4,492	746	892	836	191	3,764	1,599	2440	473	637	2,346	91
1989	21,122	2,147	4,282	291	191	2,213	1,086	3,545	757	2622	571	296	1,785	12
1990	95,612	897	1,358	620	347	749	72	1,797	475	1340	88	107	231	1,125
1991	13,108	786	2,087	514	36	647	272	2,924	774	2603	158	154	2,018	40
1992	9,200	1,046	2,033	189	219	927	356	802	404	545	286	292	752	169
1993	13,647	1,674	2,056	715	27	731	218	1,499	486	739	253	54	995	214
1994	14,065	2,148	2,978	894	126	1,626	40	1,398	229	850	183	390	828	20
1995	9,197	1,328	2,771	277	16	455	215	1,260	429	845	-	272	655	-
1996	15,615	2,542	4,756	687	486	761	135	1,965	529	977	-	107	344	-
1997	18,480	3,345	5,430	1,181	75	384	404	3,337	1,336	1,292	614	589	408	-
1998	22,026	3,401	4,023	1,627	122	596	131	1,581	523	3,469	1,220	119	1,430	136
1999	12,134	1,440	3,974	1,154	-	520	128	2,038	510	1,290	9	268	548	228
2000	9,601	1,181	3,294	822	10	359	152	1,612	106	361	-	250	531	588
2001	9,720	1,384	4,474	422	11	176	63	1,698	17	807	20	124	474	50
2002	10,963	1,397	4,265	267	143	598	134	2,026	76	1,464	54	81	443	15
Averages ^a														
1987-01	14,103	1,784	3,522	704	172	776	232	2,087	584	1,480	279	279	930	186
		(12.6)	(25.0)	(5.0)	(1.2)	(5.5)	(1.6)	(14.8)	(4.1)	(10.5)	(2.0)	(1.9)	(6.6)	(1.3)
1992-01	13,369	1,949	3,579	797	109	654	184	1,719	457	1,118	280	247	697	141
		(14.6)	(26.8)	(6.0)	(0.8)	(4.9)	(1.4)	(12.9)	(3.4)	(8.4)	(2.1)	(1.8)	(5.2)	(1.1)
1997-01	14,392	2,150	4,239	1,041	44	407	176	2,053	498	1,444	415	270	678	200
		(14.9)	(29.5)	(7.2)	(0.3)	(2.8)	(1.2)	(14.3)	(3.5)	(10.0)	(2.9)	(1.9)	(4.7)	(1.4)

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Appendix B3.-Page 2 of 2.

85

Year	All Fish Total	Salmon					Non-Salmon							
		Chinook	Coho	Sockeye	Pink	Chum	Lake Trout	Char	Rainbow Trout	Grayling	Whitefish	Sheefish	Northern Pike	Burbot
Catch														
1990	78,131	3,230	6,184	3,644	7,332	5,853	1,091	18,789	12,436	13,790	493	316	3,449	1,125
1991	70,256	2,621	6,538	3,528	741	3,491	1,019	30,155	11,546	14,983	329	539	4,621	50
1992	65,036	4,752	2,785	1,791	9,262	7,525	1,426	16,229	5,540	9,539	322	638	3,878	169
1993	110,259	9,684	8,390	3,637	1,132	10,741	1,314	35,825	12,646	16,596	395	1,952	3,721	214
1994	77,517	3,370	5,564	4,898	4,516	11,848	1,861	18,320	8,258	10,930	500	628	4,383	20
1995	73,467	7,271	8,990	1,364	310	9,693	540	17,503	10,532	9,598	63	1,416	5,430	-
1996	173,968	21,217	34,170	9,326	8,101	23,217	1,094	33,449	16,823	16,403	100	675	6,928	0
1997	281,255	32,990	29,726	5,824	2,766	15,498	1,167	89,299	61,566	34,586	732	2,172	4,413	180
1998	248,127	20,980	35,162	8,186	13,826	20,023	951	65,720	30,450	38,856	2,087	1,708	5,704	307
1999	203,768	12,859	40,902	7,360	1,209	27,261	1,089	54,597	26,254	23,975	109	1,381	5,643	228
2000	158,981	8,788	37,635	7,365	4,528	20,876	1,076	34,927	17,671	19,215	994	1,048	3,857	588
2001	159,518	18,480	42,689	5,102	1,031	12,430	242	36,550	14,494	22,813	814	742	4,081	50
2002	188,553	9,116	33,454	506	7,080	20,019	1,629	48,913	28,170	34,740	284	440	3,915	20
Averages^a														
1992-01	155,190	14,039	24,601	5,485	4,668	15,911	1,076	40,242	20,423	20,251	612	1,236	4,804	176
		(9.0)	(15.9)	(3.5)	(3.0)	(10.3)	(0.7)	(25.9)	(13.2)	(13.0)	(0.4)	(0.8)	(3.1)	(0.1)
1997-01	210,330	18,819	37,223	6,767	4,672	19,218	905	56,219	30,087	27,889	947	1,410	4,740	271
		(8.9)	(17.7)	(3.2)	(2.2)	(9.1)	(0.4)	(26.7)	(14.3)	(13.3)	(0.5)	(0.7)	(2.3)	(0.1)

^a Percentage of all fish from Yukon subarea are within parenthesis.

Appendix B4.-Sport harvest and catch from the North Slope subarea (SWHS Area Z), 1977-2002.

Year	All Fish Total	Salmon		Non-Salmon						
		Pink	Chum	Lake Trout	Char	Grayling	Whitefish	Northern Pike	Burbot	Other Fish
Harvest										
1977	1,568	0	0	88	241	1,239	0	0	0	0
1978	868	0	0	9	181	678	0	0	0	0
1979	2,010	0	0	264	364	1,382	0	0	0	0
1980	2,971	0	0	379	827	1,765	0	0	0	0
1981	4,546	0	0	454	1,188	2,904	0	0	0	0
1982	6,771	0	0	629	2,065	4,077	0	0	0	0
1983	6,708	283	0	367	1,966	2,884	125	0	83	0
1984	5,896	0	0	481	1,507	2,441	13	0	0	1,454
1985	10,615	0	0	1,707	3,489	5,382	0	37	0	0
1986	9,386	0	0	415	983	4,099	3,776	19	94	0
1987	4,957	0	0	274	2,676	1,932	75	0	0	0
1988	2,147	55	0	73	1,018	983	18	0	0	0
1989	3,883	0	0	482	1,031	2,113	109	0	148	0
1990	1,482	0	0	168	489	791	17	0	17	0
1991	4,676	0	15	176	1,199	3,301	0	0	0	0
1992	2,436	18	17	379	836	1,145	18	0	25	0
1993	2,926	0	0	106	1,092	1,632	0	58	21	0
1994	1,880	0	0	73	589	807	58	0	353	0
1995	2,004	0	0	38	896	983	18	0	69	0
1996	2,409	0	11	19	1,108	1,194	36	0	41	0
1997	1,978	0	0	57	1,018	903	0	0	0	0
1998	2,895	13	0	221	1,454	1,182	0	0	25	0
1999	2,280	0	0	77	929	1,206	68	0	0	0
2000	3,612	648	763	18	1,178	934	71	0	0	0
2001	2,516	0	0	37	1,589	846	26	0	18	0
2002	3,346	66	5	217	773	2,215	19	51	0	0
Averages^a										
1992-01	2,805	49(1.7)	54(1.9)	147(5.2)	1,140(40.6)	1,330(47.4)	34(1.2)	4(0.1)	48(1.7)	0(0.0)
1992-01	2,494	68(2.7)	81(3.2)	103(4.1)	1,069(42.9)	1,083(43.4)	30(1.2)	6(0.2)	55(2.2)	0(0.0)
1997-01	2,656	132(5.0)	153(5.7)	82(3.1)	1,234(46.4)	1,014(38.2)	33(1.2)	0(0.0)	9(0.3)	0(0.0)

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Appendix B4.-Page 2 of 2.

Year	All Fish Total	Salmon		Non-Salmon						
		Pink	Chum	Lake Trout	Char	Grayling	Whitefish	Northern Pike	Burbot	Other Fish
Catch										
1990	11,935	0	0	1,728	3,744	5,482	302	17	17	285
1991	12,852	0	0	932	2,670	9,200	50	0	0	0
1992	11,656	82	76	887	3,850	6,608	120	0	33	0
1993	13,932	10	17	266	3,946	9,345	192	135	21	0
1994	12,857	16	10	327	3,178	8,552	107	54	613	0
1995	9,113	0	0	370	3,229	5,427	18	0	69	0
1996	16,153	27	11	298	8,206	7,456	90	0	65	0
1997	21,323	9	0	783	4,094	16,248	163	0	26	0
1998	16,634	13	0	1,292	7,716	7,529	16	0	42	26
1999	15,477	0	0	913	4,520	9,956	68	0	0	20
2000	22,331	658	763	457	7,579	12,523	298	0	13	0
2001	13,477	0	0	266	6,027	7,035	117	0	32	0
2002	12,480	71	21	410	2,195	9,374	126	283	0	0
Averages ^a										
1992-01	15,295	82(0.5)	88(0.6)	586(3.8)	5,235(34.2)	9,068(59.3)	119(0.8)	19(0.1)	91(0.6)	5(0.0)
1997-01	17,848	136(0.8)	153(0.9)	742(4.2)	5,987(33.5)	10,658(59.7)	132(0.7)	0(0.0)	23(0.1)	9(0.1)

^a Percentage of all fish from Yukon subarea are within parenthesis.

APPENDIX C

Appendix C1.-Commercial, subsistence and sport harvest of chinook salmon in the Yukon River drainage.

Year	Tanana River			Yukon River without Tanana			All Yukon River		
	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport
1977	1,008	nd	104	95,749	nd	52	96,757	17,581	156
1978	635	1,231	263	98,533	29,066	260	99,168	30,297	523
1979	772	1,333	515	126,901	29,672	39	127,673	31,005	554
1980	1,947	1,826	941	152,038	40,898	15	153,985	42,724	956
1981	987	2,085	763	157,031	27,605	6	158,018	29,690	769
1982	981	2,443	984	122,663	25,715	22	123,644	28,158	1,006
1983	911	2,706	1,048	146,999	46,772	0	147,910	49,478	1,048
1984	867	3,599	338	119,037	38,829	13	119,904	42,428	351
1985	1,142	7,375	1,356	145,046	32,396	12	146,188	39,771	1,368
1986	950	3,701	781	99,020	41,537	15	99,970	45,238	796
1987	3,338	4,096	502	131,422	49,028	0	134,760	53,124	502
1988	762	5,507	853	99,602	40,525	91	100,364	46,032	944
1989	1,741	2,999	963	102,457	48,063	100	104,198	51,062	1,063
1990	2,156	3,069	439	93,504	48,112	105	95,660	51,181	544
1991	1,072	2,515	630	105,344	44,258	143	106,416	46,773	773
1992	753	2,438	118	120,419	43,188	313	121,172	45,626	431
1993	1,445	2,098	1,573	92,665	60,814	122	94,110	62,912	1,695
1994	2,606	2,370	1,871	111,234	50,707	410	113,840	53,077	2,281
1995	2,747	2,178	2,488	121,305	46,756	37	124,052	48,934	2,525
1996	447	1,392	3,102	89,745	42,435	128	90,192	43,827	3,230
1997	2,728	3,025	1,953	110,882	53,266	221	113,610	56,291	2,174
1998	963	2,276	447	42,736	51,814	207	43,699	54,090	654
1999	690	1,955	1,001	68,873	50,570	22	69,563	52,525	1,023
2000	0	1,058	178	8,518	34,858	99	8,518	35,916	277
2001	0	2,449	667	0	53,492	12	0	55,941	679
2002	836	1,193	478	23,820	42,675	8	24,656	43,868	486
2003	1,813	0		39,304	0		41,117	0	0
				Average					
1977-02	1,249	2,677	937	99,444	42,922	94	100,693	44,521	1,031
1993-02	1,246	1,999	1,376	66,978	48,739	127	68,224	50,738	1,502
1998-02	498	1,786	554	28,789	46,682	70	29,287	48,468	624

Appendix C2.-Commercial, subsistence, and sport harvest of summer and fall chum salmon in the Yukon River.

Year	Tanana River			Yukon River without Tanana			All Yukon River		
	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport
1977	22,990	nd	300	769,871	nd	16	792,861	242,273	316
1978	59,996	30,404	158	1,265,002	225,218	293	1,324,998	255,622	451
1979	63,737	46,908	219	1,134,208	323,943	109	1,197,945	370,851	328
1980	58,657	56,686	483	1,307,508	278,656	0	1,366,165	335,342	483
1981	63,472	32,573	595	1,693,965	262,296	17	1,757,437	294,869	612
1982	30,530	25,910	698	911,475	223,595	82	942,005	249,505	780
1983	61,517	52,769	649	1,241,614	284,275	349	1,303,131	337,044	998
1984	77,204	45,776	585	1,019,396	293,349	0	1,096,600	339,125	585
1985	110,805	60,041	1,255	1,093,477	301,650	12	1,204,282	361,691	1,267
1986	54,703	39,869	693	1,274,166	305,934	202	1,328,869	345,803	895
1987	11,060	153,056	620	611,481	383,547	226	622,541	536,603	846
1988	65,425	48,639	491	1,687,804	305,652	546	1,753,229	354,291	1,037
1989	103,429	69,507	1,135	1,630,266	315,768	997	1,733,695	385,275	2,132
1990	65,808	51,176	55	585,547	239,336	417	651,355	290,512	472
1991	68,340	45,538	588	843,980	218,526	449	912,320	264,064	1,037
1992	26,250	35,217	690	536,349	197,882	618	562,599	233,099	1,308
1993	3,705	17,320	371	136,411	165,055	193	140,116	182,375	564
1994	35,803	40,623	260	230,937	192,499	90	266,740	233,122	350
1995	111,545	62,472	985	989,926	188,400	189	1,101,471	250,872	1,174
1996	64,464	45,223	1,880	703,399	187,407	66	767,863	232,630	1,946
1997	25,287	24,049	456	261,152	168,876	206	286,439	192,925	662
1998	570	20,460	70	28,228	128,497	351	28,798	148,957	421
1999	148	18,769	474	49,636	141,933	81	49,784	160,702	555
2000	0	1,452	97	6,624	82,780	64	6,624	84,232	161
2001	0	4,094	29	0	103,920	53	0	108,014	82
2002	3,198	3,892	307	10,578	103,016	77	13,776	106,908	384
2003	8,556			13,244			21,800		0
					Average				
1977-02	45717	41297	544	770115	224880	219	815832	265258	763
1993-02	24472	23835	493	241689	146238	137	266161	170074	630
1998-02	783	9733	195	19013	112029	125	19796	121763	321

Appendix C3.-Commercial, subsistence and sport harvest of coho salmon in the Yukon River drainage.

Year	Tanana River			Yukon River without Tanana			All Yukon River		
	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport	Commercial	Subsistence	Sport
1977	1,284	nd	94	37,579	nd	31	38,863	16,333	125
1978	3,066	4,709	139	23,086	3,078	163	26,152	7,787	302
1979	2,791	4,612	25	14,374	5,182	25	17,165	9,794	50
1980	1,226	5,163	67	7,519	14,995	0	8,745	20,158	67
1981	2,284	9,261	45	21,396	11,967	0	23,680	21,228	45
1982	7,780	7,418	52	29,396	28,476	139	37,176	35,894	191
1983	6,168	6,932	147	7,152	16,973	52	13,320	23,905	199
1984	7,688	14,785	831	74,252	34,235	0	81,940	49,020	831
1985	11,762	11,761	796	45,910	20,503	12	57,672	32,264	808
1986	441	13,321	1,374	46,814	21,147	161	47,255	34,468	1,535
1987	0	55,471	1,231	0	29,423	61	0	46,213	1,292
1988	13,972	31,348	2,237	85,935	37,732	183	99,907	69,679	2,420
1989	16,084	19,572	1,596	69,409	22,011	215	85,493	40,924	1,811
1990	14,804	18,768	1,719	29,483	25,873	228	46,937	43,460	1,947
1991	9,775	21,561	2,345	96,839	15,827	430	109,657	37,388	2,775
1992	7,979	17,554	1,115	0	34,367	551	9,608	51,980	1,666
1993	0	4,304	278	0	11,418	619	0	15,812	897
1994	4,451	26,489	1,165	0	15,205	728	4,451	41,775	1,893
1995	6,900	19,219	1,116	40,113	9,423	162	47,013	28,642	1,278
1996	7,142	15,091	1,354	48,840	15,419	432	55,982	30,510	1,786
1997	0	11,945	1,229	35,320	12,350	179	35,320	24,295	1,408
1998	0	7,481	604	1	10,300	154	1	17,781	758
1999	0	9,547	451	1,601	11,423	158	1,601	20,970	609
2000	0	5,150	310	0	9,567	244	0	14,717	554
2001	0	9,000	1,122	0	13,156	126	0	22,156	1,248
2002	0	9,519	541	0	5,990	551	0	15,509	1,092
2003	15,119	0		10,124	0		25,243	0	0
				Average					
1977-02	4,831	14,399	846	27,501	17,442	216	32,613	29,718	1,061
1993-02	1,849	11,775	817	12,588	11,425	335	14,437	23,217	1,152
1998-02	0	8,139	606	320	10,087	247	320	18,227	852

Appendix C4.-Commercial, subsistence and sport harvest of chinook salmon in the Kuskokwim River and Kuskokwim Bay.

Year	Kuskokwim Area				
	Commercial	Subsistence	Sport	Total	% Sport
1977	58,256	58,158	130	116,544	0.1%
1978	63,194	38,145	269	101,608	0.3%
1979	53,314	57,053	361	110,728	0.3%
1980	48,599	62,047	863	111,509	0.8%
1981	79,377	64,274	1,014	144,665	0.7%
1982	79,816	61,141	1,099	142,056	0.8%
1983	93,676	51,020	1,962	146,658	1.3%
1984	74,016	60,668	1,221	135,905	0.9%
1985	74,083	45,720	1,080	120,883	0.9%
1986	44,972	54,256	987	100,215	1.0%
1987	65,558	71,804	981	138,343	0.7%
1988	74,563	57,107	2,456	134,126	1.8%
1989	66,914	85,322	2,147	154,383	1.4%
1990	84,451	92,678	897	178,026	0.5%
1991	48,170	90,224	786	139,180	0.6%
1992	67,597	68,665	1,046	137,308	0.8%
1993	26,636	91,721	1,674	120,031	1.4%
1994	27,345	98,378	2,148	127,871	1.7%
1995	72,352	100,159	1,328	173,839	0.8%
1996	22,959	81,598	2,542	107,099	2.4%
1997	47,990	85,506	3,345	136,841	2.4%
1998	44,402	86,115	3,401	133,918	2.5%
1999	25,019	77,659	1,440	104,118	1.4%
2000	26,115	68,841	1,181	96,137	1.2%
2001	176	73,610	290	74,076	0.4%
2002	360	74,778	319	75,457	0.4%
2003	559	78,941	500	80,000	0.6%
			Average		
1977-02	31,293	68,464	499	100,256	0.5%
1993-02	20,061	82,762	777	103,600	0.8%
1998-02	14,616	82,107	977	97,700	1.0%

Appendix C5.-Commercial, subsistence and sport harvest of chum salmon in the Kuskokwim River and Kuskokwim Bay.

Year	Kuskokwim Area				
	Commercial	Subsistence	Sport	Total	% Sport
1977	298,959	nd	225	299,184	0.1%
1978	282,044	nd	741	282,785	0.3%
1979	297,167	nd	373	297,540	0.1%
1980	561,483	nd	603	562,086	0.1%
1981	485,635	nd	1,107	486,742	0.2%
1982	326,481	nd	2,035	328,516	0.6%
1983	306,554	nd	1,195	307,749	0.4%
1984	488,482	nd	896	489,378	0.2%
1985	224,680	95,999	423	321,102	0.1%
1986	349,268	0	973	350,241	0.3%
1987	603,274	70,709	656	674,639	0.1%
1988	1,443,953	153,980	836	1,598,769	0.1%
1989	801,355	145,106	2,213	948,674	0.2%
1990	521,023	131,469	749	653,241	0.1%
1991	502,187	96,308	647	599,142	0.1%
1992	436,506	99,576	927	537,009	0.2%
1993	94,937	61,726	731	157,394	0.5%
1994	360,893	76,951	1,626	439,470	0.4%
1995	707,212	68,942	455	776,609	0.1%
1996	301,975	90,238	761	392,974	0.2%
1997	67,200	40,976	384	108,560	0.4%
1998	268,199	67,665	596	336,460	0.2%
1999	72,659	47,612	520	120,791	0.4%
2000	49,574	55,371	359	105,304	0.3%
2001	3,015	49,874	112	53,001	0.2%
2002	3,856	76,842	53	80,751	0.1%
2003	4,473	75,377	100	79,950	0.1%
Average					
1977-02	329,629	108,046	484	438,159	0.1%
1993-02	143,885	61,377	289	205,551	0.2%
1998-02	50,399	57,110	132	107,642	0.1%

Appendix C6.-Commercial, subsistence and sport harvest of coho salmon in the Kuskokwim River and Kuskokwim Bay.

Year	Kuskokwim Area				
	Commercial	Subsistence	Sport	Total	% Sport
1977	263,727	nd	412	264,139	0.2%
1978	247,271	nd	403	247,674	0.2%
1979	308,683	nd	512	309,195	0.2%
1980	327,908	nd	2,014	329,922	0.6%
1981	278,541	nd	583	279,124	0.2%
1982	567,452	nd	52	567,504	0.0%
1983	248,389	nd	1,910	250,299	0.8%
1984	826,774	nd	3,623	830,397	0.4%
1985	382,096	nd	1,156	383,252	0.3%
1986	736,910	nd	3,232	740,142	0.4%
1987	478,594	nd	4,819	483,413	1.0%
1988	623,733	43,866	4,492	672,091	0.7%
1989	554,411	57,847	4,282	616,540	0.7%
1990	443,783	50,713	1,358	495,854	0.3%
1991	556,818	55,581	2,087	614,486	0.3%
1992	772,449	44,496	2,033	818,978	0.2%
1993	686,570	35,295	2,056	723,921	0.3%
1994	856,100	36,504	2,978	895,582	0.3%
1995	555,539	39,165	2,771	597,475	0.5%
1996	1,099,865	34,698	4,756	1,139,319	0.4%
1997	166,648	30,714	5,430	202,792	2.7%
1998	312,517	27,240	4,023	343,780	1.2%
1999	32,251	27,284	3,974	63,509	6.3%
2000	307,439	35,670	3,294	346,403	1.0%
2001	192,998	29,430	1,204	223,632	0.5%
2002	83,463	34,304	2,030	119,797	1.7%
2003	284,064			284,064	0.0%
			Average		
1977-02	384,519	33,716	1,342	409,203	0.6%
1993-02	364,691	30,913	2,029	397,633	1.1%
1998-02	154,383	29,301	1,868	185,552	1.6%

Appendix C7.-Guideline harvest ranges and mid-points for commercial harvest of chinook, summer chum and fall chum salmon, Yukon area, Alaska, 2003.

Chinook Salmon						
District or Subdistrict	Guideline Harvest Range ^a					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	0 to 60,000	89.1	90,000	91.6	120,000	92.9
3	0 to 1,800	2.7	2,000	2.0	2,200	1.7
4	0 to 2,250	3.3	2,550	2.6	2,850	2.2
5B and C	0 to 2,400	3.6	2,600	2.6	2,800	2.2
5D	0 to 300	0.4	400	0.4	500	0.4
6	0 to 600	0.9	700	0.7	800	0.6
Total	67,350	100.0	98,250	100.0	129,150	100.0

Summer Chum Salmon						
District or Subdistrict	Guideline Harvest Range ^b					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	0 to 251,000	62.8	503,000	62.9	755,000	62.9
3	0 to 6,000	1.5	12,500	1.6	19,000	1.6
4A	0 to 113,000	28.3	225,500	28.2	338,000	28.2
4B, C	0 to 16,000	4.0	31,500	3.9	47,000	3.9
5B, C, D	0 to 1,000	0.3	2,000	0.3	3,000	0.3
6	0 to 13,000	3.3	25,500	3.2	38,000	3.2
Total	400,000	100.0	800,000	100.0	1,200,000	100.0

^d Anvik River Management Area roe cap of 100,000 pounds.

Fall Chum Salmon						
District or Subdistrict	Guideline Harvest Range ^e					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1, 2 and 3	60,000	82.5	140,000	71.2	220,000	68.6
4B, C	5,000	6.9	22,500	11.4	40,000	12.5
5B, C	4,000	5.5	20,000	10.2	36,000	11.2
5D	1,000	1.4	2,500	1.3	4,000	1.2
6	2,750	3.8	11,625	5.9	20,500	6.4
Total	72,750	100.0	196,625	100.0	320,500	100.0

^f Subdistrict 5A range of 0 to 4,000 pounds of roe.

^a The chinook salmon guideline harvest ranges have been in effect since 1981.

^b Summer chum salmon guideline harvest ranges were established in February 1990 based on the average harvest shares from 1975-1989.

^c Or the equivalent roe poundage of 61,000 to 183,000 pounds or some combination of fish and pounds of roe.

^d The current Anvik River Management Area roe cap was established in March 1996.

^e The current fall chum salmon guideline harvest ranges were established in 1990

^f Subdistrict 5A was removed from the guideline harvest ranges for chinook and summer chum and a separate guideline harvest range of 0-4,000 pounds of fall chum salmon roe was established in November 1998.

Appendix C8.-The Yukon River Drainage Fall Chum Salmon Management Plan, 2003.

Run Size Estimate ^b (Point Estimate)	Recommended Management Action Fall Salmon Directed Fisheries ^a				Targeted Drainagewide Escapement
	Commercial	Personal Use	Sport	Subsistence	
350,000 or Less	Closure	Closure	Closure	Closure ^c	350,000
350,001 to 450,000	Closure	Closure	Closure	Restrictions ^d	350,000
450,001 to 550,000	Closure	Closure	Closure	Restrictions ^d	375,000
550,001 to 600,000	Closure	Closure	Closure ^e	Restrictions ^d	400,000
600,001 to 675,000	Closure	Normal Fishing Schedules	Retention Allowed	Normal Fishing Schedules	400,000 or More
Greater Than 675,000	Commercial Fishing Considered ^f	Normal Fishing Schedules	Retention Allowed	Normal Fishing Schedules	400,000 or More

-continued-

- a* Considerations for the Toklat River and Canadian Mainstem rebuilding plans may require more restrictive management actions.
- b* The department will use the best available data including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects to assess the run size.
- c* The department may, by emergency order, allow subsistence chum salmon directed fisheries in areas that indicator(s) suggest that the escapement goal(s) in that area will be achieved.
- d* The department may, by emergency order, allow a less restrictive or a normal subsistence fishing schedule in areas that indicator(s) suggest that the escapement goal(s) in that area will be achieved.
- e* The department may, by emergency order, allow personal use and sport fishing in areas that have normal subsistence fishing schedules and indicator(s) that suggest the escapement goal(s) in that area will be achieved.
- f* When the projected run size is more than 675,000 chum salmon, the department may allow for a drainage-wide commercial fishery with the targeted harvest of the surplus above 625,000 chum salmon distributed by district or subdistrict proportional to the guideline established in harvest range 5 AAC 05.365. The department shall distribute the harvest at levels below the low end of the guideline harvest range by district or subdistrict proportional to the mid-point of the guideline harvest range.

5 AAC 05.365. (4) manage the commercial fishery during the fall chum salmon season for a guideline harvest range of 72,750 to 320,500 chum salmon, distributed as follows:

- (A) Districts 1, 2 and 3: 60,000 to 220,000 chum salmon;
 - (B) Subdistricts 4-B and 4-C: 5,000 to 40,000 chum salmon;
 - (C) Subdistricts 5-A, 5-B, and 5-C: 4,000 to 36,000 chum salmon;
 - (D) Subdistrict 5-D: 1,000 to 4,000 chum salmon;
 - (E) District 6: 2,750 to 20,500 chum salmon.
-

Appendix C9.-Yukon River Summer Chum Salmon Management Plan overview, 2003.

Projected Run Size ^a	Required Management Actions Summer Chum Salmon Directed Fisheries			
	Commercial	Personal Use	Sport	Subsistence
600,000 or less	Closure	Closure	Closure	Closure ^b
600,000 to 700,000	Closure	Closure	Closure	Possible Restrictions ^c
700,001 to 1,000,000	Restrictions ^d	Restrictions ^e	Restrictions ^e	Normal Fishing Schedules
Greater than 1,000,000	Open ^f	Open	Open	Normal Fishing Schedules

^a The department will use the best available data including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects to assess the run size.

^b The department may, by emergency order, open subsistence chum salmon directed fisheries where indicators show that the escapement goal(s) in that area will be achieved.

^c The department shall manage the fishery to achieve drainage wide escapement of no less than 600,000 summer chum salmon, except that the department may, by emergency order, open a less restrictive directed subsistence summer chum fishery in areas that indicator(s) show that the escapement goal(s) in that area will be achieved.

^d The department may, by emergency order, open commercial fishing in areas that show the escapement goal(s) in that area will be achieved.

^e The department may, by emergency order, open personal use and sport fishing in areas that indicator(s) show the escapement goal(s) in that area will be achieved.

^f The department may open a drainage-wide commercial fishery with the harvestable surplus distributed by district or subdistrict in proportion to the guideline harvest levels established in 5 AAC 05.362. (f) and (g).

Appendix C10.-Yukon River salmon fisheries preseason information sheet, 2002.



INFORMATION SHEET: Yukon River Salmon Fisheries Summary



State and Federal fishery managers will be coordinating management of the 2003 Yukon River subsistence salmon fishery. This information sheet reviews the 2002 season and describes the anticipated management of the 2003 season.

2003

RUN OUTLOOK

- Poor to below average salmon runs are projected for 2003.
- Trend of poor salmon production since 1998 is anticipated to continue in 2003.
- The 2003 chinook salmon run is anticipated to be similar to the 2002 run.
- Although the chum salmon runs are difficult to project pre-season, the 2003 summer and fall chum salmon runs are expected to be poor to below average.
- The preseason projected run size for fall chum salmon ranges from 240,000 to 600,000 with an anticipated run size of 450,000. Initially the fall chum salmon run will be managed using the performance of the summer chum salmon run.

HARVEST OUTLOOK

- Given the uncertainties associated with declines in productivity since 1998, salmon fisheries will be managed conservatively.
- It is anticipated that enough chinook and summer chum salmon will be available to meet escapement goals and provide for subsistence harvests.
- A small commercial chinook and summer chum salmon harvest may be possible.
- Subsistence harvests for fall chum salmon may be less than normal.

MANAGEMENT STRATEGIES

- Manage for escapement and to spread out subsistence harvest opportunity along the entire Yukon River.
- Continue the regulatory subsistence salmon fishing schedule.
- A preseason emergency order to reduce the daily harvest limit for the sport fishery to one chinook or one chum salmon in the Yukon drainage is planned. If commercial harvest occurs, the normal daily bag limit will be reinstated.
- Based on the evaluation of inseason indicators of run strength:
 - If necessary, reduce the subsistence salmon fishing schedule sometime after the quarter point of each salmon run. Close all other uses unless an escapement goal of a tributary is projected to be met. Consider a Federal rural subsistence priority on Federal waters if reduction occurs.
 - Be prepared to allow a small commercial chinook and summer chum salmon harvest near the midpoint of the run or later.
- Present run assessment information and discuss management strategies during weekly YRDFA sponsored teleconferences.

For additional information:

ADF&G: Tracy Lingnau: Anchorage (907) 267-2121; Fred Bue: Fairbanks (907) 459-7274; Emmonak (907) 949-1320
Subsistence Fishing Schedule: 1-866-479-7387 (toll free outside Fairbanks, in Fairbanks 459-7387)
USFWS: Russ Holder: Fairbanks (907) 455-1849 or 1-800-801-5108; Emmonak (907) 949-1798

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LOOKING BACK: 2002 Yukon River Salmon Fisheries



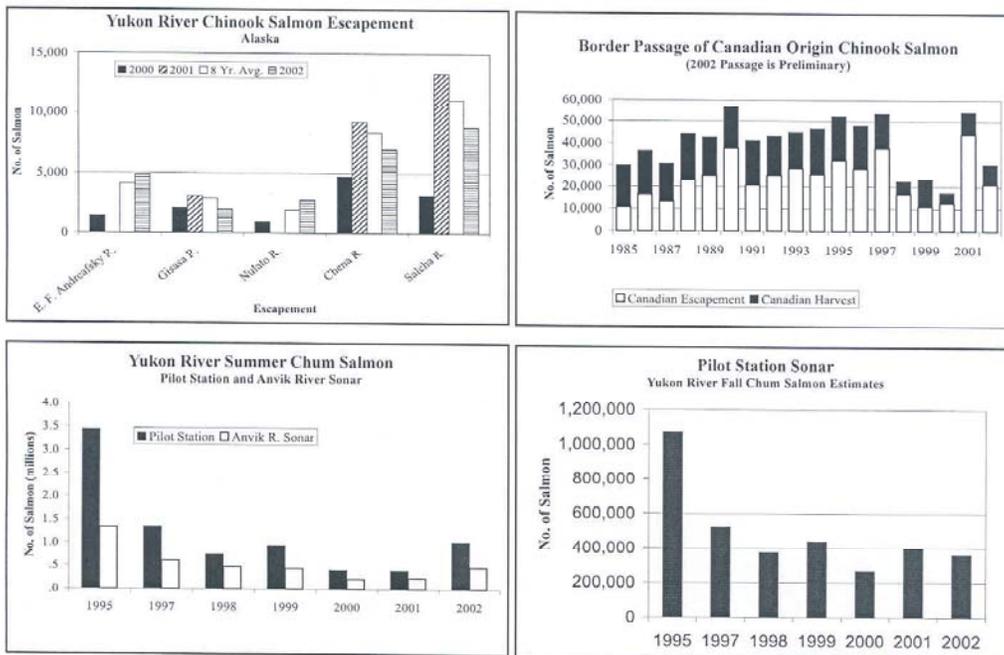
The 2002 chinook and summer chum salmon runs were below average, about as expected. However, the summer chum run was twice the strength of the 2000 and 2001 runs. The estimated size of the fall chum salmon run was approximately 413,000, also an improvement over the 2001 run of approximately 385,000.

Chinook Salmon Harvest		Summer Chum Salmon Harvest		Fall Chum Salmon Harvest	
24,400 Commercial (recent 10-year average = 90,000)	43,900 Subsistence (13% below recent 10-year average of 52,000)	13,600 Commercial (incidental to the chinook salmon harvest)	87,200 Subsistence (6% below recent 10-year average)	No Commercial (recent 10-year average = 103,000)	19,700 Subsistence (restricted and/or closed)
68,300 – Total Harvest (51% below recent 10-year average)		100,800 – Total Harvest (72% below recent 10-year average)		19,700 – Total Harvest (86% below recent 10-year average)	

- The 2002 subsistence salmon harvest information is preliminary.
- No Alaska commercial fall chum salmon fishing was allowed in 2002.
- The Aboriginal catch of 7,028 chinook salmon in Canada was 2% above the recent 10-year average.
- The commercial catch of 708 chinook salmon in Canada was 89% below the recent 10-year average.
- There was a limited commercial catch of 3,100 fall chum salmon in Canada.

2002 YUKON RIVER ESCAPEMENT SUMMARY

The Yukon River chinook salmon run in 2002 was approximately twice the size of the 2000 run, but still well below average, based on harvest data and escapement estimates from selected tributaries.



-continued-



OUTLOOK: 2003 Yukon River Salmon Fisheries



Chinook Salmon Harvest
Small commercial fishing may be possible.
Trend of poor production since 1998 anticipated to continue in 2003.
2003 Chinook salmon run is anticipated to be similar to 2002 run.
Anticipate enough fish available to provide for subsistence.

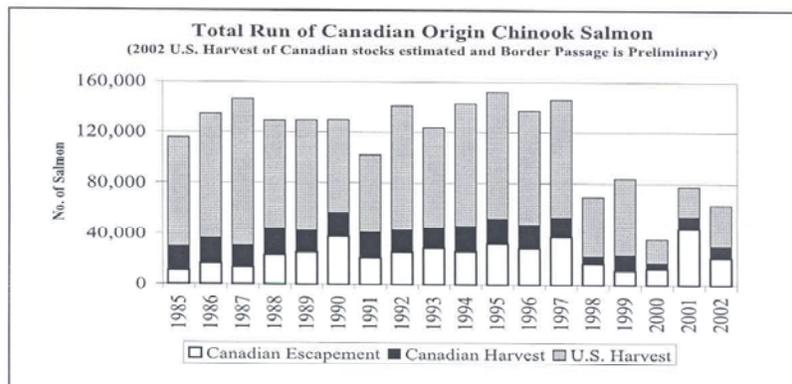
Summer Chum Salmon Harvest
Small commercial fishing may be possible.
Trend of poor production since 1998 anticipated to continue in 2003
Recent return per spawner falling below one.
Anticipate enough fish available to provide for subsistence.

Fall Chum Salmon Harvest
No commercial fishing expected.
Trend of poor production since 1998 anticipated to continue in 2003
Recent return per spawner falling below one.
Subsistence harvests may need to be reduced.

CANADIAN ORIGIN ESCAPEMENT TARGETS

Escapement Targets	Chinook Salmon	Escapement Targets	Fall Chum Salmon
33,000--43,000	Canadian Mainstem spawning escapement goal of 33,000 to 43,000 fish suspended for 2003.	65,000	Canadian Mainstem spawning escapement goal of 65,000 fish.
25,000	Spawning escapement goal of 25,000 if no commercial fishing.	15,000	Fishing Branch spawning escapement goal of 15,000 fish.
28,000	If commercial fishing occurs, spawning escapement goal is 28,000.		

Yukon River chinook salmon returning to spawn in Canada contribute about 50% of the harvest by Alaska fishermen. The 2002 run of 63,000 (preliminary) Canadian origin chinook salmon was poor, indicating unusually low production from parent year escapements that were well above average.



If the 2003 chinook salmon run is similar to the 2001 and 2002 runs, a harvestable surplus for commercial fishers may be between 0 and 20,000.

-continued-



2003

SUBSISTENCE FISHING SCHEDULE Yukon River Salmon Fisheries



The Alaska Board of Fisheries adopted a subsistence salmon fishing schedule in January 2001. The intent of the schedule is to reduce harvest impacts on any particular component of the run and spread subsistence fishing opportunity among users during years of low salmon runs. The schedule is based on current or past fishing schedules and should provide reasonable opportunity for subsistence users to meet their needs during years of normal to below average runs. The goal of the schedule is to provide windows of time during which salmon fishing is closed.

Please note this schedule is subject to change depending on run strength.

Area	Regulatory subsistence fishing periods	Schedule to Begin	Days of the week
District 1	Two 36-hour periods/week	May 29, 2003	Mon. 8 pm to Wed. 8 am /Thu. 8 pm to Sat. 8 am
District 2	Two 36-hour periods/week	June 1, 2003	Sun. 8 pm to Tue. 8 am /Wed. 8 pm to Fri. 8 am
District 3	Two 36-hour periods/week	June 4, 2003	Sun. 8 pm to Tue. 8 am /Wed. 8 pm to Fri. 8 am
District 4	Two 48-hour periods/week	June 11, 2003	Sun. 6 pm to Tue. 6 pm /Wed. 6 pm to Fri. 6 pm
Subdistricts 5-B, C	Two 48-hour periods/week	June 20, 2003	Tue. 6 pm to Thu. 6 pm /Fri. 6 pm to Sun. 6 pm
Subdistrict 5-A	Two 42-hour periods/week	June 20, 2003	Tue. 6 pm to Thu. Noon /Fri. 6 pm to Sun. Noon
District 6	Two 42-hour periods/week	By Regulation	Mon. 6 pm to Wed. Noon /Fri. 6 pm to Sun. Noon
Old Minto Area	5 days/week	By Regulation	Friday 6pm to Wednesday 6pm
Coastal District	7 days/week	By Regulation	M/T/W/T/H/F/SA/SU – 24 hours
Koyukuk River	7 days/week	By Regulation	M/T/W/T/H/F/SA/SU – 24 hours
Subdistrict 5D	7 days/week	By Regulation	M/T/W/T/H/F/SA/SU – 24 hours

All subsistence salmon fishing with gillnets and fish wheels must be stopped during subsistence salmon fishing closures (See above table).

The 2003 chinook run is anticipated to be similar to 2002. The summer and fall chum salmon runs will be managed using the regulatory management plans. If it is determined that salmon runs are insufficient to provide for escapement, then subsistence fishing time may be reduced from the regulatory subsistence salmon fishing schedule and/or gear restrictions may be implemented. Subsistence salmon fishing opportunity on waters applicable to ANILCA TITLE VIII may be further restricted to “Federally qualified users”. Once enacted, this restriction could be rescinded if the salmon run size is determined to be sufficient to provide for escapement and subsistence needs.

Chum Salmon Actions Based on Projected Run Sizes

SUMMER		FALL	
Projected Run Size	Actions	Projected Run Size	Actions
Below 600,000	THEN NO directed fishing by any user.	Below 350,000	THEN NO directed fishing by any user.
600,000-700,000	THEN limited subsistence fishing. NO directed commercial, sport or personal use fishing.	350,000-600,000	THEN limited subsistence fishing. NO directed commercial, sport or personal use fishing.
700,000-1 million	THEN Board of Fisheries subsistence schedule NO river-wide directed commercial, sport or personal use fishing. May allow fishing if specific district or area is projected to meet escapement goal. (e.g. Anvik River)	Greater than 600,000	THEN allow personal use fishing and sport fishing retention allowed.
Greater than 1 million	THEN directed summer chum fishing for all users.	Greater than 675,000	THEN commercial fishing considered.

Appendix C11.-Yukon River Coho Salmon Management Plan.

5 AAC 05.369. YUKON RIVER COHO SALMON MANAGEMENT PLAN.

(a) The goal of this plan is to provide for the management of directed commercial coho salmon fishing in the Yukon River. The majority of Yukon River coho salmon spawn in tributaries that flow into the Yukon River from the mouth of the Yukon river up to and including the Tanana River drainage. The management of directed coho salmon fishing during the fall season is complicated by an overlapping run of more abundant fall chum salmon stocks.

(b) For the purpose of (c) of this section, the department shall use the best available information to assess coho salmon abundance including mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and estimates from escapement monitoring projects.

(c) The department may allow a directed coho salmon fishery under this section in years when

(1) the return of coho salmon measured under (b) of this section is above the average of previous years;

(2) the fall chum salmon return is assessed by the department to be more than 625,000 fish; and,

(3) no directed fall chum salmon commercial fishing has occurred or the department determines that it is not expected to occur.

(d) Fall chum salmon harvested during a directed commercial coho salmon fishery under this section will be considered incidental any may only occur on the harvestable surplus of fall chum salmon above 625,000 fish.

(e) In a year when a directed commercial coho salmon fishery is opened under this section in

(1) Districts 1, 2, and 3, the commissioner shall close, by emergency order, the coho salmon fall season no later than September 5;

(2) Subdistricts 4-B, 4-C, and 5-A, and District 6, the commissioner shall close, by emergency order, the coho salmon fall season no later than October 5;

(3) Subdistrict 4-A, the commissioner may open, by emergency order, the directed commercial coho salmon fishery on or after August 20, and shall close the fishery no later than September 15.

(f) In Subdistrict 5-B, 5-C, and 5-D there will be no directed commercial coho salmon fishery unless the department determines that there will be a harvestable surplus of coho salmon.

(g) The department shall distribute, to the extent practicable, the harvest opportunity in the directed coho salmon fishery between districts and subdistricts as follows:

-continued-

- (1) 24 hours of combined fishing time in Districts 1, 2, and 3 will be considered equal to 32 hours of fishing time in:
 - (A) Subdistrict 4-A;
 - (B) Subdistricts 4-B and 4-C combined;
 - (C) Subdistrict 5-A; and,
 - (D) District 6;
 - (2) to ensure an orderly and conservative fishery, coho salmon fishing will be managed as follows:
 - (A) in Districts 1, 2, and 3 combined, fishing time shall not exceed 24 hours in a seven-day period;
 - (B) in District 4-A, fishing time shall not exceed 32 hours in a seven-day period;
 - (C) in Subdistricts 4-B and 4-C combined, fishing time shall not exceed 32 hours in a seven-day period;
 - (D) in Subdistrict 5-A, fishing time shall not exceed 32 hours in a seven day period;
 - (E) in District 6, fishing time shall not exceed 32 hours in a seven-day period;
- (h) The provisions of this section do not apply after January 1, 2001.
-

Appendix C12.-Estimated passage through the Kogruluk River weir, Holitna River drainage.

Year	Chinook Salmon	Sockeye Salmon	Chum Salmon	Coho Salmon
1976	5,579	2,326	8,117	
1977	1,385	1,637	19,443	
1978	13,667	1,670	48,125	
1979	11,338	2,628	18,599	
1980	6,572	3,200	41,777	
1981	16,655	18,066	57,365	11,455
1982	10,993	17,297	64,077	37,796
1983	3,009	1,176	9,407	8,538
1984	4,928	4,133	41,484	27,595
1985	4,619	4,359	15,005	16,441
1986	5,038	4,244	14,693	22,506
1987	4,063	973	17,422	22,821
1988	8,505	4,397	39,540	13,512
1989	11,940	5,811	39,549	1,272
1990	10,218	8,406	26,765	6,132
1991	7,850	16,455	24,188	9,964
1992	6,755	7,540	34,105	26,057
1993	12,332	29,358	31,899	20,517
1994	15,227	14,192	46,635	34,695
1995	20,630	10,996	31,265	27,861
1996	14,199	15,385	48,495	50,555
1997	13,286	13,078	7,958a	12,237
1998	12,107	16,773	36,441	24,348
1999	5,570	5,864	13,820a	12,609
2000	3,310 ^a	2,867	11,491a	33,135 ^b
2001	9,298 ^{a,c}	8,776	30,569 ^{a,c}	19,387
2002	10,104 ^c	4,050	51,570 ^c	14,516
2003	11,771 ^c	9,138	23,411 ^c	74,754
Passage Goal	10,000	no goal	30,000	25,000

^a Sport fishery closed by emergency order.

^b Sport fishery bag limit reduction by emergency order.

^c Sport fishery bag limit reduction by pre-season emergency order.

Appendix C13.-Estimated passage for George, Tatlawiksuk, and Takotna rivers.

Year	Chinook Salmon	Sockeye Salmon	Chum Salmon	Coho Salmon
George River Weir				
1996	7,716	98	21,670	173
1997	7,823	445	5,941	9,210
1998	2,505	9	6,391	52
1999	3,548	39	11,552 ^a	8,914
2000	2,959 ^a	22	3,492 ^a	11,256 ^b
2001	3,283 ^{a, c}	24	11,601 ^{a, c}	14,387
2002	2,444	17	6,543	6,759
2003		11	25,005	31,925
Passage Goal	no goal	no goal	no goal	no goal
Tatlawiksuk River Weir				
1998	970	0	5,726	0
1999	1,490	6	9,656 ^a	3,455
2000	817 ^a	0	7,044 ^a	5,756 ^b
2001	2,010 ^{a, c}	3	23,718 ^{a, c}	10,379
2002	2,237	1	24,542	11,345
2003	Not Operational			
Passage Goal	no goal	no goal	no goal	no goal
Takotna River				
Counting Tower				
1995	nd	0	1,685	nd
1996	401	0	2,794	nd
1997	1,176	0	1,794	nd
1998	Not Operational	nd	nd	nd
Weir				
2000	345 ^a	4	1,254 ^a	3,957 ^b
2001	723 ^{a, c}	1	5,479 ^{a, c}	2,606
2002	316	1	4,366	3,984
2003	378	3	3,020	7,171
Passage Goal	no goal	no goal	no goal	no goal

^a Sport fishery closed by emergency order.

^b Sport fishery bag limit reduction by emergency order.

^c Sport fishery bag limit reduction by pre-season emergency order.

Appendix C14.-Changes in sport fishing regulations for the upper Kuskokwim River, Alaska BOF 1997.

Holitna River					
Species	1997		1998		Season
	Daily Bag and Possession Limits		Daily Bag and Possession Limits		
King salmon	3	(only 2 over 28 inches)	3	(only 2 over 28 inches)	May-July 25
Other salmon	5	no size limit	5	no size limit	entire year
AD/DV	10	(only 2 over 20 inches)	3	no size limit	entire year
Lake Trout	4	no size limit	4	no size limit	entire year
Rainbow trout	2	catch & release	2	(only 1 over 20 inches)	entire year
Arctic grayling	10	no size limit	2	no size limit	entire year
Sheefish	10	No size limit	2	no size limit	entire year
Northern pike	10	No size limit	5	(only 1 over 30 inches)	entire year

APPENDIX D

DALL RIVER FISHERIES MANAGEMENT PLAN

Purpose of Plan

- To provide the public, state and federal agencies, the Stevens Village Natural Resource agency and the Alaska BOF with a clear understanding of the underlying principles by which northern pike inhabiting the Dall River Area will be managed and provide guidance in developing future regulations.

Philosophy of Plan

- Conservative Wild Stock Management
- Protect biological integrity of the wild stock while maximizing the benefits to various users of the stock consistent with the subsistence priority

Goal

- Ensure the long term quality of the northern pike fishery in Dall River Area

Principles/Policies

- Native pike population(s) to be managed for maintenance of historic age and size composition (avoid enhancement or supplementing the wild stocks)
- Maintain opportunities for traditional (subsistence) and recreational use of the northern pike stock

Objective

- Proportion of northern pike 30 inches and longer to be greater than 0.30 in the assessed population.

Issues / Action Items

- Establish a special management area for the protection of large size northern pike
- Evaluate the effective size of the special management area
- Control fishing mortality within special management area; minimize fishing mortality for northern pike > 30 inches
- Evaluate and establish sport fishing regulations that will promote survival of large size northern pike
- Encourage local efforts to minimize mortality of large size northern pike in the subsistence fishery
- Educate prospective anglers concerning proper fish handling techniques
- Educate prospective anglers concerning proper fishing gear
- Reduce friction between local traditional users and non-local recreational users
- Educate non-locals on the extent of private/public land
- Incorporate local knowledge with scientific information to a greater degree in management decisions
- Encourage greater local acceptance of non-local recreational angling as a legitimate use of the Dall River pike resource
- Encourage local economic opportunities associated with recreational use

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Definitions

Dall River Area The Dall River Area includes the Dall and Little Dall River drainages.

Benefits The concept of benefit varies with users. Traditional subsistence users seek fish resources for traditional purposes including human food. Village residents have recognized the potential for economic opportunities in providing services to recreational users of the fish and land resources. Urban anglers seek continued opportunity to participate in the fishery; both consumptive and non-consumptive uses are desired.

Quality All groups stress the importance of a quality fishery. In the present context quality is defined as a stock with historic size and age composition. The presence of fish in large size and old age categories is recognized by all groups as an appropriate indicator of stock health.

Assessed Population The assessed population includes the portion of the population that is accessible to the sampling gear used in stock assessment efforts. For northern pike in the Dall River area, this includes fish larger than 450 mm FL (19 inches Total Length).

APPENDIX E

Appendix E.-Aerial estimates of Arctic char from the Ivishak, Anaktuvuk, and Kongahut rivers of the North Slope.

Year	Date	Ivishak River	Anaktuvuk River	Kongahut River	Survey Method	Survey Rating	Data Source
1971	22-Sept	24,470	-	-	H	Good	Yoshihara 1973
1972	24-Sept	11,937	-	-	H	Good	Yoshihara 1972
1973	11-Sept	8,992	-	-	H	Excellent	Furniss 1975
1974	10-Sept	11,000	-	-	H	Not Rated	Furniss 1975
1975	22-Sept	8,306	-	-	H	Not Rated	Bendock ADF&G files
1976	22-Sept	8,570	-	-	H	Fair	Bendock ADF&G files
1977	NS	-	-	-	-	-	-
1978	NS	-	-	-	-	-	-
1979	22-Sept	24,403	15,717	-	S	Excellent	Bendock 1980
1980	NS	-	-	-	-	-	-
1981	22-Sept	24,873	10,536	-	S	Excellent	Bendock 1982
1982	22-Sept	36,432	6,222	-	S	Excellent	Bendock 1983
1983	22-Sept	27,820	8,743	-	S	Excellent	Bendock and Burr 1984
1984	22-Sept	24,818	5,462	-	S	Excellent	Bendock and Burr 1985
1985	NS	-	-	-	-	-	-
1986	NS	-	-	8,900	?	?	Millard USFWS files
1987	NS	-	-	-	-	-	-
1988	NS	-	-	-	-	-	-
1989	22-Sept	12,650	-	6,355	H	Good	DeCicco ADF&G files
1990	NS	-	-	-	-	-	-
1991	NS	-	-	-	-	-	-
1992	NS	-	-	-	-	-	-
1993	3-Sept	3,057	-	-	H	Good	Millard USFWS files
1994	NS	-	-	-	-	-	-
1995	27-Sept	27,036	-	14,080	H	Good	Burr ADF&G files
2000	22-Sept	4,530 ^a	-	-	H	Excellent	Viavant 2001
2001	22-Sept	10,932 ^b	-	-	H	Excellent	Viavant 2002
2002	22-Sept	5,408 ^b	4,800	-	H	Excellent	Viavant 2003
2003	22-Sept	2,720 ^b	-	-	H	Good	Viavant <i>In prep</i>

NS = no survey, H = helicopter, S = fixed wing aircraft (Supercub)

^a 6 km reach based on multiple aerial surveys.

^b Complete 28 km index area, based on multiple aerial surveys Sept 18-22.