

Fishery Management Report No. 01-5

**Fishery Management Report for Sport Fisheries in the
Lower Tanana River Management Area for 1999 -
2000**

by

Mike Doxey

March 2001

Alaska Department of Fish and Game

Division of Sport Fish



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the *Système International d'Unités* (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)		General		Mathematics, statistics, fisheries
Centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis H_A
Deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm e
Gram	g	and	&	catch per unit effort CPUE
Hectare	ha	at	@	coefficient of variation CV
Kilogram	kg	Compass directions:		common test statistics F, t, χ^2 , etc.
Kilometer	km	east	E	confidence interval C.I.
Liter	L	north	N	correlation coefficient R (multiple)
Meter	m	south	S	correlation coefficient r (simple)
metric ton	mt	west	W	Covariance cov
Milliliter	ml	Copyright	©	degree (angular or temperature) °
Millimeter	mm	Corporate suffixes:		degrees of freedom df
		Company	Co.	divided by \div or $/$ (in equations)
Weights and measures (English)		Corporation	Corp.	Equals =
cubic feet per second	ft ³ /s	Incorporated	Inc.	expected value E
Foot	ft	Limited	Ltd.	fork length FL
Gallon	gal	et alii (and other people)	et al.	greater than >
Inch	in	et cetera (and so forth)	etc.	greater than or equal to \geq
Mile	mi	exempli gratia (for example)	e.g.,	harvest per unit effort HPUE
Ounce	oz	id est (that is)	i.e.,	less than <
Pound	lb	latitude or longitude	lat. or long.	less than or equal to \leq
Quart	qt	monetary symbols (U.S.)	\$, ¢	logarithm (natural) ln
Yard	yd	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (base 10) log
Spell out acre and ton.		number (before a number)	# (e.g., #10)	logarithm (specify base) \log_2 , etc.
		pounds (after a number)	# (e.g., 10#)	mid-eye-to-fork MEF
Time and temperature		registered trademark	®	minute (angular) '
Day	d	trademark	™	multiplied by x
degrees Celsius	°C	United States (adjective)	U.S.	not significant NS
degrees Fahrenheit	°F	United States of America (noun)	USA	null hypothesis H_0
hour (spell out for 24-hour clock)	h	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	Percent
Minute	min			Probability P
Second	s			probability of a type I error (rejection of the null hypothesis when true) α
Spell out year, month, and week.				probability of a type II error (acceptance of the null hypothesis when false) β
Physics and chemistry				second (angular) "
all atomic symbols				standard deviation SD
alternating current	AC			standard error SE
Ampere	A			standard length SL
Calorie	cal			total length TL
direct current	DC			Variance Var
Hertz	Hz			
Horsepower	hp			
hydrogen ion activity	pH			
parts per million	ppm			
parts per thousand	ppt, ‰			
Volts	V			
Watts	W			

FISHERY MANAGEMENT REPORT NO. 0-05

**FISHERY MANAGEMENT REPORT FOR SPORT FISHERIES IN THE
LOWER TANANA RIVER MANAGEMENT AREA FOR 1999-2000**

by
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Alaska Department of Fish and Game
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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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PREFACE

The Alaska Department of Fish and Game is the fish and wildlife management agency for the State of Alaska. The Department consists of six divisions (three management divisions and three with other purposes). Sport Fish Division is one of the management divisions. The goals of Sport Fish Division are to conserve wild stocks of sport fish, to provide a diversity of recreational fishing opportunities, and to optimize social and economic benefits from recreational fisheries. In order to implement these goals, the Division has instituted a fisheries management process.

This report is one of a series of Area Management Reports (AMRs) providing the 1999 - 2000 updates of fisheries management information about important sport fisheries within Sport Fish Division's Region III. Information is presented in this report for the Lower Tanana River Drainage Management Area (LTMA). The report is written to make 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. Also included are descriptions of the fisheries regulatory process, the geographic area covered, and administrative, regulatory, and assessment project boundaries germane to the LTMA. This report also describes funding sources for Sport Fish Division programs, and provides information about Fish Stocking programs and other Sport Fish Division management programs within the Lower Tanana River Drainage Management Area.

Fisheries stock assessment research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Biological information gathered during the course of these research projects is combined with effort information and input from user groups and is used to assess the need for and to develop fisheries management plans and propose regulatory strategies.

There is an annual Regional Area Review meeting in mid-winter during which the current status of important area fisheries is presented and research needs are identified. The area review is followed in a few weeks by a series of operational planning meetings to begin the final development and planning of the fisheries research projects that will be undertaken during the next year. Both ongoing and new research projects are considered during operational planning.

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 come 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.

INTRODUCTION AND BACKGROUND

REGION III DESCRIPTION

The Alaska Board of Fisheries (BOF) has divided the State of Alaska into ten regulatory areas for the purpose of organizing the sport fishing regulatory regime by drainages and fisheries. These areas (not to be confused with Regional management areas) are described in Title 5 of the Alaska Administrative Code (5 AAC). Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) divides the state into three administrative regions with boundaries roughly corresponding to groups of the BOF regulatory areas (Figure 1). Region I is Southeast Alaska, Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands. Region III includes two and most of a third of the BOF fishery regulatory areas. They are the Upper Copper and Upper Susitna regulatory area, the Arctic-Yukon-Kuskokwim regulatory area, and the Tanana River drainage.

Region III is the largest region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region encompasses about 526,000 mi² (1,357,080 km²) of Alaska, some of the state's 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 Sheldon Point in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is sparsely populated. The most densely populated center is located in the Tanana River valley with Fairbanks (population about 31,000) being the largest community. The Regional Headquarters office is located in the Creamer's Field Wildlife Refuge in Fairbanks.

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 Arctic - Yukon - Kuskokwim (AYK) Management Area (the North Slope drainages, the Yukon River drainage above Paimute except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- (3) The Lower Yukon/Lower Kuskokwim (LYLK) Management Area (the Yukon Drainage below Paimute and the Kuskokwim Drainage downstream from and including the Aniak River Drainage), which was created and added to Region III in 1999.
- (4) The Upper Copper/Upper Susitna (UCUS) Management Area (the Copper River drainage and the Susitna River drainage above the Oshetna River), which was added to Region III in 1997.
- (5) The Upper Tanana River (UTMA) Management Area (The Tanana River drainage upstream from Banner Creek and the Little Delta River).
- (6) The Lower Tanana River (LTMA) Management Area (The Tanana River drainage downstream from Banner Creek and the Little Delta River; Figure 2).

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

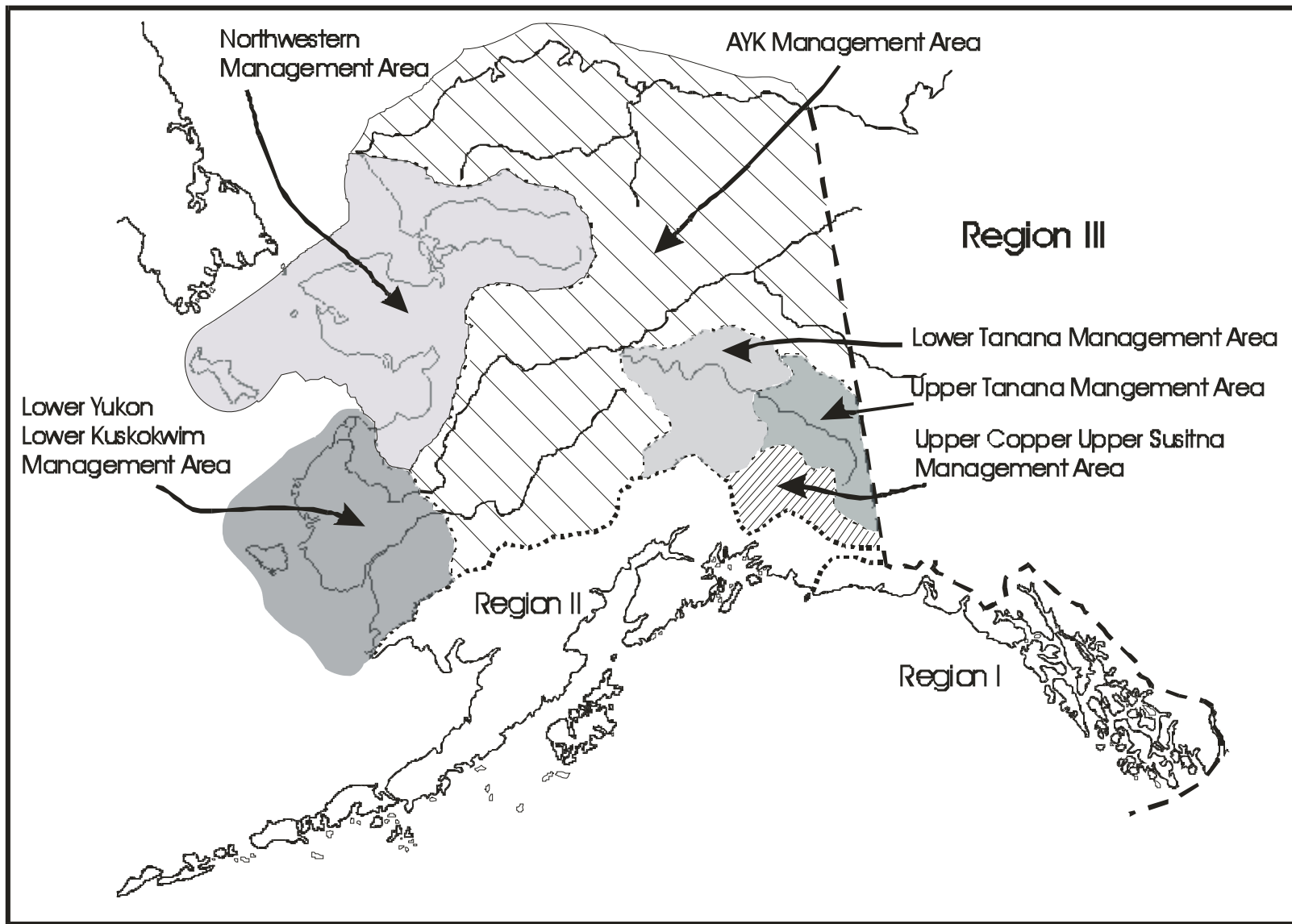


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

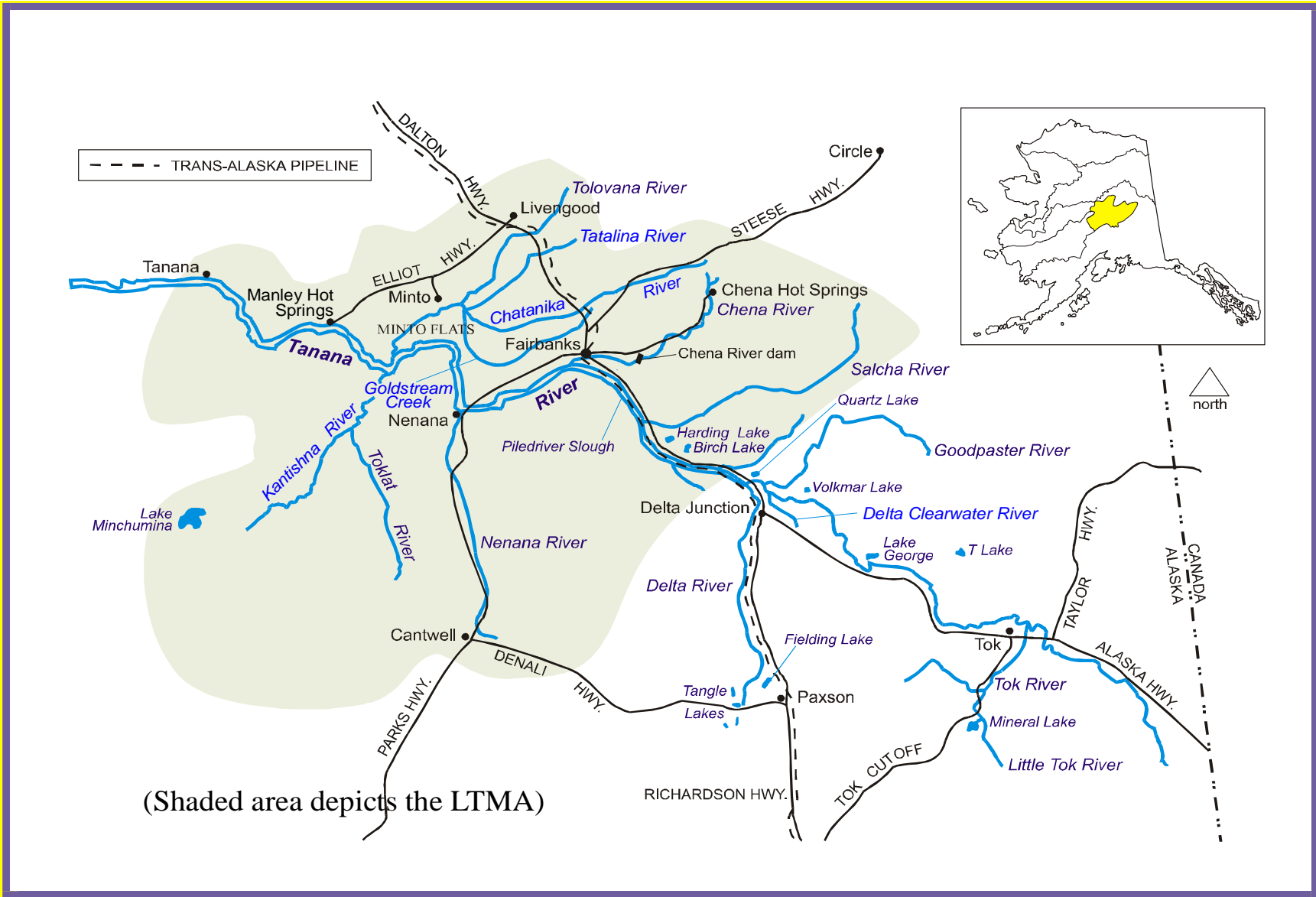


Figure 2.- Map of the Lower Tanana River Management Area (LTMA).

THE ALASKA BOARD OF FISHERIES

The Alaska Board of Fisheries (BOF) is the seven-member board that sets fishery regulations and harvest levels, allocates fishery resources, and approves or mandates many fishery conservation plans for the State of Alaska. Sport, Subsistence, Personal Use, and Commercial fisheries are regulated on State Waters by the BOF. Board members are appointed to 3-year terms by the Governor and must be confirmed by the legislature. There is a parallel Board of Game that deals with wildlife management issues, hunting, and trapping.

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 three-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, local advisory committees, special interest organizations, and the general 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. They serve for three years. Most active committees meet in the fall and winter on a monthly basis, usually prior to Board meetings. Advisory meetings allow opportunity for direct public interaction with department staff answer questions and providing 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 1999-2000, the Department had direct support responsibilities for 56 Advisory committees in the state. Jim Marcotte is the Interior Region coordinator, stationed in Fairbanks.

ADF&G EMERGENCY ORDER AUTHORITY

The ADF&G has emergency order (E.O.) authority (5 AAC 75.003) 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, E.O.s 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.

FEDERAL REGIONAL ADVISORY COUNCILS

Under ANILCA (the Alaska National Interest Lands Conservation Act) the Federal Government requires the State of Alaska to establish use of fish and game by rural residents as the top priority of possible uses, and establishes Federal rules to which the state priority must conform. This is unconstitutional under state law, which requires equal access to those resources for all citizens. Should the state not amend the constitution of the State of Alaska to implement the Federal law,

managers of Federal Lands in Alaska are obligated by ANILCA to implement that priority on Federal Lands. The Constitution of the State of Alaska has not been amended.

A Federal System has been created that establishes 10 federally funded Regional Advisory Councils (RACs) providing recommendations to ensure that the rural priority for fish and game use is implemented on federal lands statewide. The RACs make recommendations to a Federal Subsistence Board, which then codifies them into Federal law. As of 2000, implementation of this system to regulate Alaska's fisheries on federal land was proceeding, and RACs were meeting to consider fisheries proposals.

REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT STAFFING

The Region III Sport Fish Division staff biologists are organized into a research staff and a management staff. The management staff consists of a management supervisor, an area management biologist (AMB) for each of the six management areas, one or more assistant area management biologists (for all areas combined, not six assistant AMBs), 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, and may have one or more assistants. Interaction with the BOF, Advisory Committees, and the general public is an important part of their job. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries, and have one or more field assistants.

There is an Access Coordinator to administer the Regional fishing and boating access program, who is also the Assistant Area Biologist assigned to the Region III Headquarters Office in Fairbanks. The Access Coordinator has an assistant who manages the construction and mapping components of the Access program.

An information officer was added to the Region III Sport Fish Division staff in 2000, and charged with the responsibility of organizing and upgrading the sport fishery outreach and information programs.

The research staff consists of a research supervisor, eight research biologists (in 2000), and various field assistants. The research biologists plan and implement fisheries research projects in order to provide information needed by the management group to meet divisional goals. The duties of the management and research biologists overlap somewhat.

THE STATEWIDE HARVEST SURVEY

Recreational angling effort and catch and harvest of important sport fish species in Alaska has been estimated and reported annually by Sport Fish Division's Research and Technical Services Section (RTS) since 1977 (Mills 1979-1994; Howe et al. 1995-1999). The Statewide Harvest Survey (SWHS), a questionnaire mailed out to a random selection of sport fish license purchasers, is the instrument that provides the data which is analyzed to make these estimates. Estimates for a particular year usually become available in August and September of the following year, and the report is published sometime after that. 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. Effort tables are provided in this report where the estimated effort may be species-specific. Effort is estimated as number of anglers, number of trips, and most importantly, days fished. Utility of the estimates is strongly dependant on the number of responses for a site (Mills and Howe 1992). Estimates based on 12 or less responses are useful only to document that

fishing occurred. Twelve to 29 responses produce estimates useful for indicating relative order of magnitude and for assessing long-term trends, and estimates based on 30 or more responses are generally an accurate meter of harvested catch numbers.

ORGANIZATION OF THIS REPORT

This report for 2000 is organized into 18 major sections. Section I provides an overview of the Lower Tanana River Management Area. Included is a description of the management area, Board of Fisheries and other regulatory actions, management and research plans and activities within the area, issues, and access projects. Section II provides overall effort and harvest estimate data and economic information (if available) for the Management Area. Sections III - XVII are the fisheries descriptions, and Section XVIII is Appendices and References. Within the appendices are LTMA area sport fishing regulations and (for this year) the LTMA regulation change proposals submitted for the January 2001 Board of Fisheries meeting, along with staff comments. In several cases, there are separate sections describing fisheries upon different species occurring within the same waterbody (Chena River chinook and Chena River grayling, for instance). The general description of the waterbody will be found in the **Background and Historical Perspective** section of the first section dealing with a fishery within that waterbody. Thereafter, additional description of the waterbody will appear in subsequent sections only if pertinent to that particular section. Many of the background descriptions will be derived from the introductions of Fisheries Data Series reports. Some will be fairly complete; others will be improved in subsequent annual updates of this report.

All effort, catch, and harvest information in this report is derived from the SWHS estimates cited above unless otherwise specified. Generally the estimates for the most recent year will not have been published as this report is written, but final estimates will be available from RTS in draft form and will appear in this report.

Because this report is written for a diverse readership, most units of measure are given using the English system (miles, acres, river miles, etc.). Readers conversant with and preferring the metric system should have no trouble converting the measurements mentally.

SECTION I: LOWER TANANA RIVER DRAINAGE MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

LOWER TANANA RIVER DRAINAGE MANAGEMENT AREA

After the Koyukuk Drainage, the Tanana River drainage is the second largest tributary system of the Yukon River. The Tanana River basin (Figure 2) drains an area of approximately 45,155 mi² (116,500 km²). The mainstem Tanana River is a large glacial stream formed by the confluence of the Chisana and Nabesna rivers near Tok and the Alaska - Canada border which flows in a generally northwest direction for some 570 river miles (917-km) to the Yukon. The confluence of the Tanana and Yukon Rivers, near the village of Tanana, is 695 river miles from the mouth of the Yukon on the Bering Sea coast. Much of the human population in Region III is located within the Tanana River drainage along the Alaska, Richardson and Parks highways, and along the road system around Fairbanks. These highways and their secondary roads provide much of the access to sport fisheries.

The Tanana River drainage is divided by Sport Fish Division into two management areas - the Upper Tanana River Drainage Management Area (UTMA, commonly called the "Delta Management Area"), and the Lower Tanana River Drainage Management Area (LTMA, commonly called the "Fairbanks Management Area"). The LTMA consists of all waters of the Tanana River drainage downstream from the Banner Creek drainage flowing into the Tanana from the north and the nearby Little Delta River drainage on the south. Communities and municipalities located within the LTMA include Nenana, Anderson, Healy, Cantwell, Manley, Livengood, Minto, Fairbanks/Ft. Wainwright, North Pole, Eielson AFB, Salcha, Two Rivers, Chatanika, Fox, and Ester. The Fairbanks North Star Borough lies entirely within the LTMA, as does part of the Denali Borough.

Prior to 1998 this Annual Management Report (AMR) was a combined report for the entire Tanana River drainage, co-authored by the area biologists for the UTMA and the LTMA. After 1998, separate reports are being written for each Area.

During the first eight months of 1998 Jerry Hallberg was the Area Management Biologist for the LTMA. Jerry retired from the department in the fall of 1998 and Tim Viavant served as acting Area Manager until Mike Doxey was selected as the Area Management biologist in December 1998.

THE STATEWIDE HARVEST SURVEY APPLIED TO THE TANANA RIVER DRAINAGE

The Tanana River drainage in its entirety is included in Statistical Area U of the Statewide Harvest Survey. While most sites for which effort, catch, and harvest are estimated are clearly within one of the two management areas, a few such as the "Middle Tanana River", "Other Lakes", and "Other Streams", overlap both areas. An attempt has been made to segregate those estimates into components for each management area.

DIVERSITY OF ANGLING OPPORTUNITY WITHIN THE LTMA

Angling within the LTMA occurs at numerous lakes, ponds, and streams. Some are accessible directly from the road system. Most of these road-accessible waters have some sort of a boat launch accommodating watercraft appropriate to the size and characteristics of the waterbody. Access to off-road waters can be through a short walk, overland use of all terrain vehicles (ATVs), snowmachines, cross-country skis, or sled dogs (in which frozen rivers and lakes are added to the pathways), boats, and light aircraft suitable for landing on rough strips or gravel bars or equipped with floats or skis.

Fishing guides, outfitters, and transporters take anglers to areas of better quality fishing. Most such transport is by aircraft or boat. Some commercial operators provide cabins or some sort of shelter, and boats for angler use. There were no commercial enterprises characterizing themselves as fishing lodges in the LTMA in 1999 - 2000.

Indigenous (wild stocks) and introduced (produced in hatcheries and stocked) fish are available to anglers. There are 18 fish species indigenous to the Tanana River drainage. Ten of those are commonly targeted by sport anglers, and all occur within the LTMA. They include: chinook salmon *Oncorhynchus tshawytscha*, coho salmon *Oncorhynchus kisutch*, chum salmon *Oncorhynchus keta*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, lake trout *Salvelinus namaycush*, sheefish (inconnu) *Stenodus leucichthys*, least cisco *Coregonus sardinella*, humpback whitefish *Coregonus pidschian*, and northern pike *Esox lucius*. Dolly Varden char *Salvelinus malma*, round whitefish *Prosopium cylindraceum* and broad whitefish *Coregonus*

nasus are taken occasionally by anglers. Longnose suckers *Catostomus catostomus*, Alaska blackfish *Dallia pectoralis*, lake chub *Couesius plumbeus*, slimy sculpins *Cottus cognatus* and Arctic lamprey *Lampetra japonica* are present but not targeted by anglers. Suckers and lampreys are sometimes used for bait.

Rainbow trout *Oncorhynchus mykiss* are not native to the drainage, but have been stocked in many locations. Arctic char *Salvelinus alpinus*, coho salmon, chinook salmon, Arctic grayling, and lake trout are also stocked in selected waters of the Tanana River drainage.

Angling opportunity is available year-round. Fishing may occur in all waters where game fish are present during the summer. Winter effort focuses on stocked lakes, with some effort directed toward lake and river populations of burbot and northern pike.

REGULATIONS AND REGULATORY ACTIONS

Area Regulations (for the LTMA)

Regulations for the Tanana drainage sport fisheries are codified in Chapters 70 and 75 of Title 5 of the Alaska Administrative Code (5 AAC 70 & 5 AAC 75). Along with appropriate Statewide Regulations and other information they are summarized and simplified in a sport fishing regulation booklet for distribution to the angling public.

Appendix A contains a version of the general sport fishing regulations for the Tanana River drainage and the specific regulations that apply to the LTMA. Most statewide regulations are not included. **The version of the regulations appearing in this report have been edited to remove references to and regulations for the Upper Tanana River Drainage Management Area (UTMA) and are included in this report to provide reference to fisheries management actions and regulation changes in the LTMA in this and in future reports. Under no circumstances should they be copied from this report and used as a reference by anglers.**

1999-2000 REGULATORY ACTIONS AND ANTICIPATED FUTURE ACTIONS

In 1999-2000, Emergency Order 3-WF-03-96 remained in effect (Table 1). Issued on 8/30/96, it closed the Chatanika River to the retention of whitefish. Whitefish stocks in the Chatanika River had not recovered such that they could sustain a general spearfishery harvest. This E.O. may be rescinded in 2001, depending on BOF action in January 2001.

On May 1, 2000, Emergency Order 3-NP-01-00 was issued closing northern pike fishing in Harding Lake until further notice. This E.O. will be rescinded after the BOF takes action on a proposal that will indefinitely close northern pike fishing in Harding Lake by regulation. The BOF will take up those actions at their January 2001 meeting.

In July 2000, it became apparent that chinook and chum salmon returns to the Yukon River Drainage were very poor. In anticipation of the need to ensure maximum potential spawning escapement, personal use fishing in the Tanana River was closed, and sport fishing for all salmon in the Tanana River Drainage was closed by Emergency Order 3-KS-05-00 on July 17, 2000, which closed chinook (and chum) salmon fishing. Subsistence fishing for salmon was severely restricted.

On August 10, 2000, in response to a continuing crisis in the returns of Yukon drainage chum salmon, Emergency Order 3-CS-01-00 extended the closure on chum salmon fishing in the entire Yukon River Drainage through the remainder of the year.

Table 1.-Emergency orders issued for Lower Tanana River Management Area sport fisheries 1995 - 2000.

Year	E. O. Number	Explanation
1995	3-WF-03-95	Closure of Chatanika River to whitefish sport fishing.
1996	3-AG-01-96	Closes Piledriver Slough and 23 Mile Slough to the retention of Arctic grayling.
1996	3-WF-03-96	Closes the Chatanika River to whitefish sport fishing.
1998	3-S-03-98	Restricts Chena, Salcha, and Chatanika rivers to Catch and Release for Chinook and Chum Salmon.
1998	3-CS-04-98	Closes Chum Salmon sport fishing throughout Tanana Drainage
2000	3-NP-01-00	Closes Northern Pike Fishing in Harding Lake
2000	3-KS-05-00	Closes Salmon Fishing in the Tanana Drainage
2000	3-CS-01-00	Closes Fall Chum Salmon Fishing in the Yukon Drainage

STATE BOARD OF FISHERIES

The two most recent meetings of the Alaska Board of Fisheries to consider regulatory issues pertaining to the AYK regulatory area and the Tanana River drainage took place in Anchorage during November 8 - 18, 1994 and in Fairbanks during December 2-9, 1997. During the 1994 meeting the BOF took three actions specific to the LTMA. They adopted regulations designed to establish Little Harding Lake as a fishery for large rainbow trout; they standardized the opening date at June 1 for the LTMA grayling fisheries subject to spring catch and release restrictions; and they extended the 12 inch minimum harvest length limit for grayling to cover the entire Chatanika River drainage. During the 1997 meeting the BOF actions specific to the LTMA were: to adopt a Minto Flats Northern Pike Management Plan; to extend the season for northern pike fishing on certain remote lakes; and to align the area of the Chatanika River closed to chum salmon fishing with the area closed for chinook salmon fishing.

The next BOF meeting to address proposals regarding Tanana drainage sport fisheries is scheduled for January 2001, in Anchorage. Lower Tanana Drainage Management Area issues that will be addressed at that meeting include a refinement of the Minto Flats Northern Pike Management Plan, management of sport fisheries to ensure that chinook salmon escapement objectives are met in the Salcha and Chena Rivers, clarification of catch and release regulations for grayling, restructuring the Chatanika River whitefish fishery to allow some harvest, increased restriction on harvest of lake trout in Harding Lake, a reduced bag limit and a size limit for

rainbow trout in Dune Lake, and the closing of northern pike fishing in Harding Lake. The regulatory proposals and staff comments can be found in Appendix B.

FISH AND GAME ADVISORY COMMITTEES

A total of four Advisory Committees represent resource users in the LTMA: Fairbanks, Minto/Nenana, Middle Nenana River, and Lake Minchumina. During 1999 - 2000 Region III Sport Fish Division staff attended meetings of the Fairbanks and Minto/Nenana Advisory Committees. During 2000 the proposals described in Appendix B were discussed with those Advisory Committees. The Fairbanks Advisory Committee agreed with all of the proposals. The Minto/Nenana Advisory Committee considered three proposals. They agreed with the proposal to modify the Minto Flats Northern Pike Management Plan, took no action on the proposal to change the management strategy for Salcha and Chena River chinook salmon, and opposed the proposal to allow harvest of Chatanika River whitefish. The opposition was generated by the opinion of the members that insufficient stock assessment had been done by the Department recently.

FEDERAL SUBSISTENCE

The LTMA lies within the boundaries of the Eastern Interior Regional Advisory Council (EIRAC). There is a very small proportion of Federal Land outside of parklands within the LTMA that is within the jurisdiction of the EIRAC. So far no Federal fisheries issues have arisen within that area.

MANAGEMENT PLANS

The Region III management staff began drafting Fishery Management Plans in 1992 for important fisheries. The plans went through a public review and comment process and were finalized. With the exception of the Minto Flats Northern Pike Management Plan, none of these plans involved specific management strategies requiring new regulations or BOF action. Finalized plans are subject to revision. None of the plans have been formally reviewed and revised, although some in-house revisions of plans for stocked lakes have occurred and some management strategies have been changed by the division or BOF outside of the written management plan process. Managers use the plans as planning and evaluation tools, but the utility of the plans can decline as time passes without review and updating.

The title, year of publication, species and waterbody objectives, and review plans are as follows:

- I. Birch Lake Sport Fishery Enhancement, June 1992 (Amended periodically).
 - A. Objectives:
 1. Provide 15,000 annual angler days or more of sport fishing effort.
 2. Provide diverse sport angling opportunities through the annual or alternate year stocking of rainbow trout, coho salmon, Arctic char, and Arctic grayling.
 3. Maintain an annual mean catch rate in excess of two sport fish per angler-day while allowing anglers to keep the portion of the catch they so desire.
 - B. Review: Annually, as part of the review of the development of the Statewide Stocking Plan for Recreational Fisheries.

- II. Chena Lake Sport Fishery Enhancement, June 1992 (Amended periodically).
 - A. Objectives:
 - 1. Provide 10,000 annual angler days or more of sport fishing effort.
 - 2. Provide diverse sport angling opportunities through the annual or alternate year stocking of rainbow trout, coho salmon and /or chinook salmon, Arctic char, and Arctic grayling.
 - 3. Maintain an annual mean catch rate in excess of two sport fish per angler-day while allowing anglers to keep the portion of the catch they so desire.
 - B. Review: Annually, as part of the review of the development of the Statewide Stocking Plan for Recreational Fisheries.

- III. Piledriver Slough Sport Fishery Enhancement, June 1992 (Amended periodically).
 - A. Objectives:
 - 1. Ensure that incidental mortality of Arctic grayling and that harvest and incidental mortality of other naturally occurring species is sustainable. Fishing mortality on the Arctic grayling population should not exceed 20% annually.
 - 2. Provide 10,000 or more days of recreational fishing annually on a streamside rainbow trout fishery.
 - 3. Maintain an annual mean catch rate in excess of two sport fish per angler-day while allowing anglers to keep the portion of the catch of rainbow trout they so desire.
 - C. Review: Annually, as part of the review of the development of the Statewide Stocking Plan for Recreational Fisheries.

- IV. Fisheries Management Plan for Small Lakes in the Tanana Valley, June 1992 (Amended periodically).
 - A. Objectives:
 - 1. Manage important native populations of fish according to sustained yield principles.
 - 2. Provide a combined 20,000 days of sport fishing effort (angler days).
 - 3. Provide sport angling diversity through annual or alternate-year stocking of multiple species of sport fish.
 - 4. Publicize the fishing opportunities available to anglers.
 - 5. Improve public access where needed.
 - 6. Manage three small stocked lakes (Little Harding Lake, Craig Lake, and Coal Mine # 5) to provide catch and release and/or limited harvest opportunities for larger than average rainbow trout. *Coal Mine #5 Lake*

and Craig Lake are in the UTMA but are listed here to collectively describe the management program for larger rainbow trout.

- B. Review: Annually, as part of the review of the development of the Statewide Stocking Plan for Recreational Fisheries.

V. Chatanika River Sport Fishery Management Plan, November 1992.

A. Objectives:

1. To ensure that harvests and incidental mortality of Arctic grayling, whitefish, sheefish, northern pike, burbot, chinook salmon and chum salmon are sustainable.
2. To increase participation in the recreational fishery from current levels to 15,000 angler-days per year by 1995.
3. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.

- B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting, and a Minto Flats Northern Pike Management Plan was adopted by the BOF in 1997.

VI. East Twin Lake Sport Fishery Management Plan, April 1993.

A. Objectives:

1. To ensure that harvests and incidental mortality of northern pike by the recreational fishery are sustainable.
2. To allow the fishery to approximately double from the average 1988-1991 level.
3. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.

- B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting..

VII. Minto Flats Sport Fishery Management Plan, April 1993.

A. Objectives:

1. To ensure that harvests and incidental mortality of northern pike by the recreational fishery are sustainable.
2. To manage the fishery in a manner that allows the fishery to rebuild to the average level that occurred during the 1970's (about 3,000 angler days per year).
3. To maintain public access to Minto Flats for the benefit of recreational anglers.

4. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.
- B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting, and a Minto Flats Northern Pike Management Plan was adopted by the BOF in 1997 that set out more specific harvest and regulatory guidelines.
- VIII. Recreational Fishery Management Plan for Chinook Salmon in the Chena River, May 1993.
- A. Objectives:
1. To ensure that harvests and incidental mortality of chinook salmon in the Chena River fishery are sustainable. *Within the text of the plan escapement goals and the BOF mandated guideline harvest is described.*
 2. To maintain current levels of fishing opportunity in the Chena River chinook salmon fishery.
 3. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.
- B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting.
- IX. Recreational Fishery for Chinook Salmon in the Salcha River, May 1993.
- A. Objectives:
1. To ensure that harvests and incidental mortality of chinook salmon in the Salcha River fishery are sustainable. *Within the text of the plan escapement goals and the BOF mandated guideline harvest is described.*
 2. To maintain current levels of fishing opportunity in the Salcha River chinook salmon fishery.
 3. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.
- B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting..
- X. Recreational Fishery Management Plan for Arctic Grayling in the Salcha River, June 1993.
- A. Objectives:
1. To ensure that harvests of grayling and other fish species by anglers are sustainable.
 2. To manage the Salcha River grayling fishery in a manner that will provide an average of 7,500 angler-days of fishing effort per year.

3. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.
 - B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting..
- XI. Harding Lake Sport Fishery Management Plan, June 1993 (Amended periodically).
- A. Objectives:
 1. Manage indigenous stocks of northern pike and burbot at sustainable levels.
 2. Manage the non-indigenous, but reproducing stock of lake trout within sustainable levels, and begin stocking catchable lake trout.
 3. Provide increased diversity of recreational angling opportunity through the annual stocking of Arctic char.
 - B. Review: Annually, as part of the review of the development of the Statewide Stocking Plan for Recreational Fisheries.
- XII. Tanana River Burbot Sport Fishery Management Plan, June 1993 (*Includes both the UTMA and LTMA*).
- A. Objectives:
 1. To ensure that harvests and incidental mortality of burbot by the recreational fishery are sustainable.
 2. To manage the Tanana River fishery in a manner that allows the fishing effort to rebuild to an average level of approximately 10,000 angler days per year.
 3. To maintain public access to the Tanana River for the benefit of recreational anglers.
 4. To ensure that public benefits derived from this fishery outweigh the costs of fishery management.
 - B. Review: Formal review of the plan is unscheduled as of 1998, but the status of selected fisheries is reviewed annually during the Area Management Review meeting.
- XIII. Chena River Arctic Grayling Conservation and Rehabilitation Plan, December 1993.
- A. There is no specific list of "objectives" within this plan. Objectives can be derived from the text. In summary, the objective of the project was to increase grayling abundance to a level capable of sustaining a harvest of 10,000 fish in the Chena River by 1995.

- B. Review: The project was terminated. Review of the general status of Chena River Arctic grayling is conducted annually during the Area Management Review meeting.

XIV. Minto Flats Northern Pike Management Plan, December 1997.

- A. This plan was adopted by the BOF in 1997 to address conservation concerns. The objective is to ensure that the maximum exploitation rate of northern pike in Minto Flats for all users may not exceed 20% annually.
- B. Review: The plan may be reviewed during the Area Management Review meeting and during BOF meetings.

SECTION II: LOWER TANANA RIVER DRAINAGE MANAGEMENT AREA OVERALL EFFORT AND HARVEST DATA AND ECONOMIC INFORMATION

DATA MANAGEMENT

In preparation for the development of this report, SWHS estimates of effort, catch, and harvest for the entire Tanana River drainage were segregated into separate sets of estimates for the UTMA and LTMA. The beginning of timelines for estimates presented in this report vary depending on when it was possible to sensibly break out the LTMA information. Some begin with the first reported estimates in 1977. Many begin in 1983, when increasingly detailed estimates became available covering more individual waters. In 1990 both catch and harvest estimates were produced (for 1977 - 1989 only harvest was evaluated). Because of this and the relevance to the present status of the fisheries or more recent estimates, considerable emphasis is placed on estimates from 1990 to present. Some estimates may differ slightly from SWHS reported results because of computational modifications when the segregation was undertaken.

SPORT ANGLER EFFORT IN THE LTMA

Due to a computational problem (discovered in 1999), estimates of effort, catch, and harvest for 1995, 1996, 1997, and 1998 produced by RTS were incorrect. RTS has recomputed the estimates for 1996, 1997, and 1998, and all of the tables within this report detailing effort, catch, and harvest for those years have been corrected. The electronic file containing data for 1995 was lost and the data will never be corrected.

From 1988 through 1998, anglers in the LTMA have expended an average of 113,650 angler-days (about 5% of the total statewide effort; Table 2). The five-year (1994 - 1998) average effort for the LTMA (114,373 angler days) is about 49% of the five-year average for Region III. The heavy contribution of LTMA fisheries to Region III effort totals is a function of higher human

Table 2.-Number of angler days of sport fishing effort expended by recreational anglers fishing LTMA waters, 1983-1999.

Year	LTMA Effort	Statewide Effort	LTMA Percent of Statewide	Region III Effort	LTMA Percent of Region III
1983	103,153	1,732,528	6%	199,125	52%
1984	103,868	1,866,837	6%	199,041	52%
1985	91,338	1,943,068	5%	186,883	49%
1986	103,885	2,071,412	5%	194,713	53%
1987	106,654	2,152,866	5%	217,109	49%
1988	126,135	2,311,291	5%	233,559	54%
1989	139,223	2,264,079	6%	239,626	58%
1990	133,365	2,453,284	5%	245,629	54%
1991	106,959	2,456,328	4%	219,922	49%
1992	81,378	2,540,374	3%	181,852	45%
1993	103,713	2,559,408	4%	220,972	47%
1994	99,906	2,719,911	4%	239,626	42%
1995	141,231	2,787,670	5%	270,141	52%
1996	159,027	2,006,528	8%	201,166	70%
1997	89,911	2,079,514	4%	238,856	38%
1998	81,789	1,856,976	4%	227,841	36%
1999	114,592	2,499,152	5%	304,522	38%
Total - 1983-1999	1,876,678	38,301,226	4%	3,820,583	49%
Average 1983-1998	110,130	2,237,630	5%	224,740	49%
10 year Average 1989-1998	113,650	2,372,407	5%	228,563	50%
5 Year Average 1994-1998	114,373	2,290,120	5%	235,526	49%

population density in the Tanana River valley. In 1999 an estimated 40, 526 anglers fished in the LTMA, compared to the five-year average of 49,076 anglers. There are drainages within Region III where sport fish species are more abundant than within the LTMA.

The transfer of authority over the Upper Copper/Upper Susitna Management Area (UCUS) from Region II to Region III (RIII) in 1997 caused a decline in the proportion of total effort, catch, and harvest that the other management areas contributed to the overall Region III production. Overall effort in the LTMA appears to be consistent within a range (Figure 3).

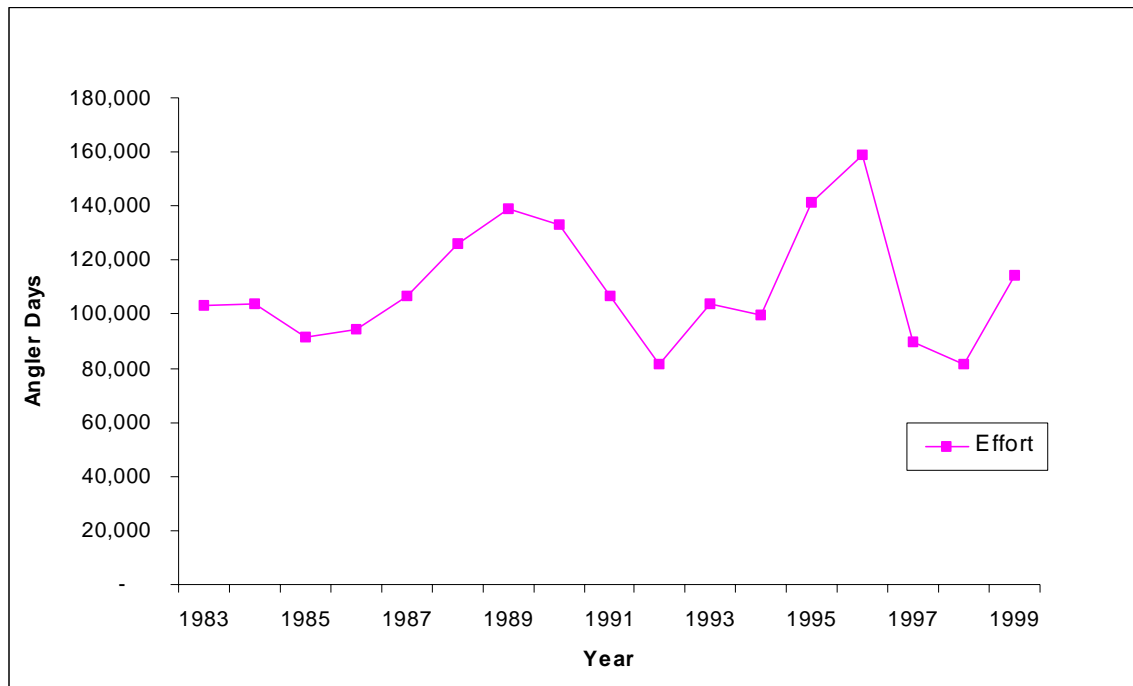


Figure 3.-Total angler effort in the LTMA, 1983 – 1999.

SPORT FISH CATCH AND HARVEST

From 1983 through 1999, anglers in the LTMA harvested an estimated 1,325,555 fish, accounting for of 2.5% of the estimated statewide recreational fish harvest for that period and about 40% of the total estimated Region III harvest for the same period (Table 3). Five-year (1994 - 1998) average harvest was less than the ten-year (1989-1998) and long - term (1983 - 1999) average harvest, and the 1999 harvest was below all averages.

The proportion of the LTMA harvest within the total Region III harvest declined due to the addition of the UCUS Area to Region III in 1997. An overall declining trend since 1990 seems to be appearing. Restrictive regulations are partially responsible for the declines in Tanana drainage harvests, but it must be remembered that those regulations are in place to conserve stocks that were observed to be declining. Had regulations not been implemented, harvest would have likely declined in any case with the probable continued decline in the stocks. Another possible reason for declines in harvest is the growing angler tendency to release their catch.

Arctic grayling and Rainbow trout dominated the catch and harvest from LTMA waters in 1999, with grayling providing about 60% (157,000 fish) of total catch of all species and rainbow trout

Table 3.-Total number of fish harvested by recreational anglers from LTMA waters, 1983-1999.

Year	LTMA Harvest	Statewide Harvest	LTMA % of Statewide	Region III Harvest	LTMA % of Region III
1983	109,547	3,086,280	3.55%	274,086	39.97%
1984	121,755	3,115,966	3.91%	245,083	49.68%
1985	105,453	3,096,044	3.41%	241,109	43.74%
1986	97,155	3,163,433	3.07%	216,826	44.81%
1987	90,174	3,207,138	2.81%	201,677	44.71%
1988	113,150	3,483,306	3.25%	264,371	42.80%
1989	119,605	3,213,867	3.72%	253,437	47.19%
1990	75,186	3,033,301	2.48%	174,175	43.17%
1991	83,237	3,311,513	2.51%	221,164	37.64%
1992	47,466	3,234,048	1.47%	131,486	36.10%
1993	63,490	2,989,720	2.12%	151,551	41.89%
1994	52,501	3,350,415	1.57%	152,676	34.39%
1995	59,741	2,909,979	2.05%	118,473	50.43%
1996	58,414	2,988,024	1.95%	156,333	37.37%
1997	45,676	2,873,020	1.59%	161,500	28.28%
1998	37,789	2,678,120	1.41%	165,771	22.80%
1999	45,216	3,093,608	1.46%	169,675	26.65%
Total – 1983-1999	1,325,555	52,827,782	2.51%	3,299,393	40.18%
Average 1983-1999	77,974	3,107,517	2.51%	194,082	40.18%
10 year Average 1989-1998	64,311	3,058,201	2.10%	168,657	38.13%
5 Year Average 1994-1997	50,824	2,959,912	1.72%	150,951	33.67%

providing about 60% (27,000 fish) of the harvest (Table 4). Coho salmon, chum salmon, and whitefish were the least important proportionately in 1999.

Some catch and harvest trends are visible in Table 5. Increases in the harvest of chinook salmon in the 1990's reflect increasing angler interest in the fisheries. Decreases in grayling harvest over time are a result of regulatory restrictions which are apparently working, since catch is stable. Declining catch and harvest of whitefish reflects the closure of the Chatanika River spearfishery and to a certain extent restrictions on the use of bait in grayling fisheries, particularly in the Chena River. Changes in catch and harvest of rainbow trout and landlocked salmon from one year to the next may reflect changes in angler satisfaction with the size of these stocked species, since number stocked and number of waters stocked is somewhat stable. Catch and harvest of Arctic char, a stocked species, is gradually increasing as densities of this long-lived species increase and anglers become more knowledgeable about fishing techniques for them.

PROPORTIONAL CONTRIBUTION OF SPECIES TO LTMA TOTALS

Whereas Tables 4 and 5 provide information on magnitude of catch harvest and trends within fisheries, Tables 6 and 7 provide a measure of relative importance between fisheries for species as they contribute to the overall catch and harvest within the LTMA. Assumptions based on these tables must carefully take into consideration the characteristics of the fisheries, however. Arctic grayling contribution to overall catch is about twice that of rainbow trout (Table 6), but grayling take in winter is insignificant. Stocked species are taken year-round, with liberal harvest limits, and the stocked rainbow trout, landlocked salmon, and Arctic char are the foundation of the ice fisheries. Wild stocks support very little winter fishing. Similarly, while catch of chinook salmon has never exceeded 3% of the total LTMA catch, the size of the fish and the overall fishing experience makes them highly desirable to anglers and economically important during the short time of availability.

Proportional contribution to total harvest (Table 7) shifts the proportions between species when compared to Table 6. Proportions of stocked species demonstrate not only the importance of year-round availability but of more liberal harvest regulations, giving anglers the opportunity to take something home to eat. About half of the harvest is from stocked species. However, this table simply provides numerical comparisons based on relative estimated numbers of harvested fish. As with Table 6, characteristics of fisheries for species demand some consideration. Sea-run salmon, northern pike, lake trout, burbot, and sheefish are large fish, and the enjoyment of catching them coupled with the relatively larger body size for consumption makes them more important than their low contribution to overall harvest implies.

HARVEST AS A PROPORTION OF CATCH (HARVEST RATE)

Total proportion of catch that is harvested is trending downward through the years (Table 8). Overall harvest rate of grayling is very low, due in large part to the major contribution of the Chena River grayling catch (see Section VI of this report) which is entirely a catch-and-release fishery. Other major grayling fisheries are regulated by restrictions beyond the background regulations (Appendix A). Harvest rate of burbot is quite high, reflecting their desirability for human consumption.

In addition to the influence of regulations, harvest rates are driven by the relative (for the species) size of the fish available, angler preferences to keep or to not keep fish of a particular species or stock, or an overall sentiment toward all fishing.

Table 4.-Angler catch and harvest from LTMA waters during 1999, percent harvested, and species contribution to LTMA total.

Species	Catch ^b	Harvest	Percent Harvested	Species Contribution to LTMA Total	
				Catch ^b	Harvest
Salmon:					
Chinook	3,435	1,006	29%	1.24%	2.23%
Coho	331	141	43%	0.12%	0.31%
Chum	1,654	388	23%	0.60%	0.86%
Resident and Stocked Species					
Rainbow Trout	79,297	27,067	34%	28.72%	59.86%
Landlocked Salmon	10,025	2,590	26%	3.63%	5.73%
Lake Trout	1,118	384	34%	0.40%	0.85%
Char ^a	7,516	2,507	33%	2.72%	5.54%
Arctic Grayling	157,762	6,729	4%	57.13%	14.88%
Northern Pike	10,641	2,013	19%	3.85%	4.45%
Whitefish	976	219	22%	0.35%	0.48%
Burbot	3,195	2,049	64%	1.16%	4.53%
Sheefish	173	121	70%	0.06%	0.27%
Total	276,123	45,216	16%		

^a Includes Arctic char

^b Catch = Total (number released + number harvested).

Table 5.-Number and species of fish caught and harvested by recreational anglers from LTMA waters, 1983 1999.

Year	Sea Run Salmon						Resident and Stocked Species					
	Chinook		Coho		Chum		Rainbow Trout		Landlocked Salmon		Lake Trout	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	992	N/A	84	N/A	582	N/A	18,009	Catch	10,048	N/A	31
1984	N/A	338	N/A	158	N/A	351	N/A	26,296	N/A	11,929	N/A	559
1985	N/A	1,356	N/A	25	N/A	1023	N/A	20,150	N/A	14,278	N/A	46
1986	N/A	788	N/A	281	N/A	496	N/A	15,967	N/A	7,165	N/A	45
1987	N/A	492	N/A	0	N/A	578	N/A	19,865	N/A	9,984	N/A	109
1988	N/A	399	N/A	461	N/A	236	N/A	43,398	N/A	11603	N/A	
1989	N/A	460	N/A	493	N/A	969	N/A	39,685	N/A	8,490	N/A	567
1990	1,310	420	688	269	301	50	90,248	35,377	16,951	6,566	715	226
1991	1,197	630	1,900	443	588	385	82,345	40,039	16,417	10,604	545	461
1992	204	118	760	198	1,199	373	57,907	20,164	15,424	6,836	1,935	380
1993	5,017	1,691	291	29	2,135	317	82,695	27,976	9,952	5,976	955	412
1994	2,609	1,832	946	539	1,131	244	53,518	17,014	10,242	3,645	461	117
1995	5,675	2,419	1,130	593	2,828	1,252	59,254	18,743	10,140	3,497	702	258
1996	8,676	3,095	1,961	348	8,246	1,731	115,218	34,382	13,682	5,094	1,262	271
1997	6,566	1,943	1,264	342	1,697	456	68,025	21,516	11,967	3,701	1,029	348
1998	1,480	441	550	125	1,039	64	63,327	19,200	18,005	4,867	443	51
1999	3,435	1,006	331	141	1,654	388	79,297	27,067	10,025	2,590	1,118	384
Total 1983-1999	N/A	18,421	N/A	4,529	N/A	9,495	N/A	444,849	N/A	126,873	N/A	4,544
Avg. 1983 - 1999	3,617	1,084	982	272	2,082	569	75,183	26,168	13,280	7,463	916	267
10-Year Avg. 1989-1998	3,637	1,305	1,054	367	2,129	601	74,726	27,410	13,642	5,928	894	309
5-Year Avg. 1994-1998	5,001	1,946	1,170	362	2,988	800	71,868	22,171	12,807	4,161	779	209
1999 % of 5-Year Avg.	69%	52%	28%	39%	55%	49%	110%	122%	78%	62%	143%	184%

-continued-

Table 5.- Page 2 of 2

Year	Resident and Stocked Species													
	<u>Char</u>		<u>Grayling</u>		<u>Northern Pike</u>		<u>Whitefish</u>		<u>Burbot</u>		<u>Sheefish</u>		<u>Total</u>	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	212	N/A	60,748	N/A	7,898	N/A	7,436	N/A	3,350	N/A	157	N/A	107,889
1984	N/A	13	N/A	61,560	N/A	6,357	N/A	10,742	N/A	3,131	N/A	320	N/A	120,907
1985	N/A	1,171	N/A	36,711	N/A	8,824	N/A	18,840	N/A	3,566	N/A	385	N/A	103,971
1986	N/A	37	N/A	30,398	N/A	8,112	N/A	26,995	N/A	6,618	N/A	53	N/A	95,390
1987	N/A	30	N/A	24,723	N/A	6,105	N/A	25,937	N/A	2,128	N/A	223	N/A	89,104
1988	N/A	418	N/A	36,489	N/A	7,599	N/A	9,123	N/A	1,922	N/A	770	N/A	111,601
1989	N/A	682	N/A	39,407	N/A	8,310	N/A	16,688	N/A	2,969	N/A	403	N/A	117,201
1990	1,873	557	122,342	17,732	23,964	5,414	8,014	6,299	2,701	2,207	255	68	269,361	343,236
1991	2,705	909	98,562	18,503	23,037	9,426	551	356	1,920	1,323	203	158	229,970	312,010
1992	5,151	1,597	78,820	8,275	24,477	4,200	3,140	2,810	2,964	2,368	612	148	192,594	239,857
1993	6,962	3,536	127,383	11,377	41,809	7,743	948	722	4,164	3,547	190	164	282,500	340,973
1994	2,923	1,129	171,968	11,826	76,372	13,200	1,677	242	3,154	2,551	267	163	325,269	375,161
1995	5,650	2,140	105,251	16,291	43,325	10,834	1187	578	4113	2,936	482	200	239,737	293,802
1996	6,139	1,963	123,971	5,073	34,867	4,890	660	149	1,935	1,378	219	40	316,837	366,575
1997	6,815	1,820	204,338	8,598	19,186	2,320	1,404	773	4,935	3,824	486	35	327,712	366,822
1998	5,898	2,528	179,855	5,914	12,964	2,003	1,115	490	2,832	2,088	79	17	287,586	323,895
1999	7,516	2,507	157,762	6,729	10,641	2,013	976	219	3,195	2,049	173	121	276,123	317,903
Total 1983-1999	N/A	21,249	N/A	400,354	N/A	115,248	N/A	128,399	N/A	47,956	N/A	3,425	N/A	4,026,298
Avg. 1983 - 1999	5,163	1,250	137,025	23,550	31,064	6,779	1,967	7,553	3,191	2,821	297	201	274,769	236,841
10-Year Avg. 1989-1998	4,902	1,686	134,721	14,300	33,334	6,834	2,077	2,911	3,191	2,519	310	140	274,618	307,953
5-Year Avg. 1994-1998	5,485	1,916	157,076	9,540	37,343	6,649	1,209	446	3,394	2,555	307	91	299,428	345,251
1999 % of 5-Year Avg.	137%	131%	100%	71%	28%	30%	81%	49%	94%	80%	56%	133%	92%	92%

^a Includes Arctic char and Dolly Varden.

Table 6.-Proportional contribution of species to total LTMA catch, 1990-1999.

Year	Sea Run Salmon			Resident and Stocked Species									Total
	Chinook	Coho	Chum	Rainbow Trout	Landlocked Salmon	Lake Trout	Char	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	
1990	0.49%	0.26%	0.11%	33.50%	6.29%	0.70%	0.27%	45.42%	8.90%	2.98%	1.00%	0.09%	269,361
1991	0.52%	0.83%	0.26%	35.81%	7.14%	1.18%	0.24%	42.86%	10.02%	0.24%	0.83%	0.09%	229,970
1992	0.11%	0.39%	0.62%	30.07%	8.01%	2.67%	1.00%	40.93%	12.71%	1.63%	1.54%	0.32%	192,594
1993	1.78%	0.10%	0.76%	29.27%	3.52%	2.46%	0.34%	45.09%	14.80%	0.34%	1.47%	0.07%	282,500
1994	0.80%	0.29%	0.35%	16.47%	3.06%	0.90%	0.14%	52.92%	23.50%	0.52%	0.97%	0.08%	324,979
1995	2.37%	0.47%	1.18%	24.72%	4.23%	2.36%	0.29%	43.90%	18.07%	0.50%	1.72%	0.20%	239,737
1996	2.74%	0.62%	2.60%	36.37%	4.32%	1.94%	0.40%	39.13%	11.00%	0.21%	0.61%	0.07%	316,837
1997	2.00%	0.39%	0.52%	20.76%	3.65%	2.08%	0.31%	62.35%	5.85%	0.43%	1.51%	0.15%	327,712
1998	0.51%	0.19%	0.36%	22.02%	6.26%	2.05%	0.15%	62.54%	4.51%	0.39%	0.98%	0.03%	287,586
1999	1.24%	0.12%	0.60%	28.72%	3.63%	2.72%	0.40%	57.13%	3.85%	0.35%	1.16%	0.06%	276,123
5-Yr Average 1994-1998	1.69%	0.39%	1.00%	24.07%	4.30%	1.86%	0.26%	52.17%	12.59%	0.41%	1.16%	0.11%	

Table 7.-Proportional contribution of species to total LTMA harvest, 1990-1999.

Year	Sea Run Salmon			Resident and Stocked Species									Total
	Chinook	Coho	Chum	Rainbow Trout	Landlocked Salmon	Lake Trout	Char	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	
1990	0.56%	0.36%	0.07%	47.05%	8.73%	0.74%	0.30%	23.58%	7.20%	8.38%	2.94%	0.09%	75,186
1991	0.76%	0.53%	0.46%	48.10%	12.74%	1.09%	0.55%	22.23%	11.32%	0.43%	1.59%	0.19%	83,237
1992	0.25%	0.42%	0.79%	42.48%	14.40%	3.36%	0.80%	17.43%	8.85%	5.92%	4.99%	0.31%	47,466
1993	2.66%	0.05%	0.50%	44.06%	9.41%	5.57%	0.65%	17.92%	12.20%	1.14%	5.59%	0.26%	63,490
1994	3.49%	1.03%	0.46%	32.41%	6.94%	2.15%	0.22%	22.52%	25.14%	0.46%	4.86%	0.31%	52,501
1995	4.05%	0.99%	2.10%	31.37%	5.85%	3.58%	0.43%	27.27%	18.14%	0.97%	4.91%	0.34%	59,741
1996	5.30%	0.60%	2.96%	58.86%	8.72%	3.36%	0.46%	8.68%	8.37%	0.26%	2.36%	0.07%	58,414
1997	4.25%	0.75%	1.00%	47.11%	8.10%	3.99%	0.76%	18.82%	5.08%	1.69%	8.37%	0.08%	45,676
1998	1.17%	0.33%	0.17%	50.81%	12.88%	6.69%	0.13%	15.65%	5.30%	1.30%	5.53%	0.04%	37,789
1999	2.23%	0.31%	0.86%	59.86%	5.73%	5.54%	0.85%	14.88%	4.45%	0.48%	4.53%	0.27%	45,216
5-Yr Average 1994-1998	3.65%	0.74%	1.34%	44.11%	8.50%	3.95%	0.40%	18.59%	12.41%	0.93%	5.21%	0.17%	

Table 8.-Percentage of fish caught that were harvested by anglers from LTMA waters, 1994-1999.

Species	Year						
	1994	1995	1996	1997	1998	5 Yr Avg	1999
<u>Salmon:</u>							
Chinook	70%	43%	36%	30%	30%	39%	29%
Coho	38%	59%	18%	27%	23%	33%	43%
Chum	22%	44%	21%	27%	6%	25%	23%
<u>Resident Species:</u>							
Landlocked Salmon	37%	34%	30%	32%	30%	32%	34%
Rainbow Trout	32%	32%	37%	31%	27%	33%	26%
Lake Trout	39%	38%	21%	34%	12%	32%	34%
Char ^a	25%	37%	32%	27%	43%	37%	33%
Arctic Grayling	7%	15%	4%	4%	3%	7%	4%
Northern Pike	17%	25%	14%	12%	15%	18%	19%
Whitefish	34%	49%	23%	55%	44%	42%	22%
Burbot	81%	71%	71%	77%	74%	78%	64%
Sheefish	61%	41%	18%	7%	21%	37%	70%
Annual Total	21%	25%	18%	14%	13%	17%	16%

^a Includes Arctic char and Dolly Varden char.

ECONOMIC VALUE OF SPORT FISHERIES

Sport fisheries in the LTMA provide year-round economic benefits. The fish-stocking program is a critical contributor, since without the availability of stocked salmonids in lakes, there would be very little winter fishing. Eight major department stores in the Fairbanks area and on the military bases sell fishing tackle. There are three shops that specialize in fishing gear, and many supermarkets and roadside businesses away from the urban area have small fishing tackle sections. Seven companies advertise fishing charters, and there are other, smaller charter operators in the area. Peripherally, economic benefits are produced by sales of products ranging from transportation equipment used partially or totally for fishing (boats, motors, ATVs, snowmachines, aircraft, and the associated service, repair and accessory industries) through such items as ice augers and ice chisels sold at hardware stores. Fuel and supplies used for fishing trips are also purchased locally.

An estimated 40,526 anglers fished in the LTMA in 1999, and the five-year average (1994 - 1998) is 49,076 anglers. On a statewide basis in 1998 about 41% of the anglers were residents (Howe et al. 1999). The proportion is likely higher in the LTMA. cursory examination of creel census reports written in the late 1980s and early 1990s indicate that over 90% of the anglers in

some popular fisheries were residents. Resident fishing licenses cost \$15, and the cheapest non-resident license is \$10. At a 41% residency rate and a \$10 minimum for non-residents, the 40,526 anglers fishing in the LTMA in 1999 generated a minimum of \$488,335 in license fees, less whatever proportion had the free license for residents over 60 years of age and in addition to whatever proportion purchased the \$10 King Salmon Stamp.

Inferences concerning the economic value of LTMA fisheries can be derived from an as-yet unpublished FDS report entitled Region III Angler Survey: Use and Valuation Estimates for 1996, with a Focus on Arctic Grayling Fisheries produced by, Duffield, Neher and Merritt (1999). Willingness to pay per trip (WTP) estimates were developed for selected fisheries and components of fisheries within Region III. While all expanded results ([WTP] x [number of trips to that fishery in 1995 and 1996]) are provisional, and the 1995 results cannot ever be corrected due to the lost data file, the reported expanded results are likely representative of the true values (P. Merritt, Alaska Dept. of Fish and Game, Fairbanks, personal communication). WTP by residents for all species combined for the segment of Region III dominated by Tanana Valley anglers was about \$122. Number of trips (provisional) within the LTMA in 1996 was about 117,000. Expanded potential net economic value was about \$14,274,000.

SECTION III: CHENA RIVER CHINOOK SALMON FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chena River is a rapid-runoff tributary to the Tanana River originating in the Tanana Uplands 90 miles east of Fairbanks. The river flows approximately 160 river miles from the uppermost reach in the East (Middle) Fork to the confluence with the Tanana River at Fairbanks. The watershed is about 2,000 mi², and includes five major tributaries: North Fork, West Fork, South Fork, East (Middle) Fork, and the Little Chena River. Collectively, these major tributaries and the mainstem are over 290 miles in length. Water color is transparent green at low river stages, but becomes stained with tannins during mild runoff events and becomes darker with silt and organic material during rising stages.

The Chena River is road-accessible along a long section of the upper river paralleled by the Chena Hot Springs Road (CHSR) beginning at mile 25 CHSR (river mile 71). Urban development is extensive along the lower 25 river miles and road access is plentiful along the lower reaches flowing through the Badger Road area, Ft. Wainwright, and the City of Fairbanks. A section between the Badger Road area and river mile 71 has limited road access. Powerboats can navigate throughout the mainstem downriver from the confluence of the North Fork Chena River and the East (middle) Fork, and can travel a short distance up the East Fork Chena and South Fork Chena rivers. Reaches of the Chena River upriver of areas accessible by powerboat or by roads and trails are utilized by floaters in canoes and inflatable boats. All areas downstream of the farthest upstream road accessible spot are also very popular with the floaters.

There is a flood control project (the Chena River Lakes Flood Control Project) at river mile 45 consisting of a dam, long dikes, and a floodway upstream from the dam constructed south to the Tanana River near Moose Creek. The dam allows the water to flow freely at normal velocities through three floodgates except when the river is high and there is flood danger to property downstream. Fish passage is unimpeded until the flow exceeds 8,000 cfs and the floodgates are partially closed to maintain that flow. Water is diverted along the floodway to the Tanana River. The floodgates have seldom been lowered while adult chinook salmon were passing through the

structure, and then only for short periods of time. A fishway built into the side of the structure is designed to allow fish passage if a large volume of water is backed up behind the dam. Because the water rarely gets high enough to flow down the fishway, its potential to pass migrating salmon is essentially untested.

The Chena River supports populations of: Arctic grayling *Thymallus arcticus*, chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Arctic lamprey *Lampetra japonica*, and a few sheefish *Stenodus leucichthys*. Grayling, salmon, whitefish, pike, burbot, and sheefish are taken in the sport fishery.

Adult chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear in the lower Chena River (920 miles from the Bering Sea) between late June and the second week of July. They move up the Chena River to spawning areas which are primarily upriver from the dam. The run ends in late July or early August.

There has been a chinook salmon sport fishery at the Chena River since before statehood. It remained relatively small throughout the 1980s. Estimated harvests between 1977 and 1992 ranged from 0 to 375 fish, then increased dramatically in the mid - 1990s (Table 9). The 5-year average catch (1994-1998) is 1,991 and harvest was 851. While run strength and river conditions can override effort in determining catch and harvest, the harvest potential of this fishery is likely increasing due to a combination of increased public awareness of its availability and improvements in the gear and fishing techniques used to target chinook salmon. Chinook fisheries in the LTMA occur almost entirely during the month of July. The fishery on the Chena River is closed above the Chena River Flood Control Project (the dam) at river mile 45. Most of the spawning occurs above the dam.

The chinook salmon fishery on the Chena River is road-accessible in numerous places through the communities of Fairbanks, Ft. Wainwright, and North Pole, and at the dam. There are several public and many private boat launches along the road accessible areas of the river, including one at the dam. Anglers targeting chinook salmon from boats tend to focus on the confluence of the Chena and Tanana rivers and some pools in the lower river through Fairbanks, and at the confluence of the Chena and Little Chena rivers. Those fishing from shore are scattered along the road accessible areas, with concentrations at Ft. Wainwright and at public use areas at the Nordale Road bridge and the dam.

Chinook salmon escapement to the Chena River was estimated by aerial survey by Commercial Fisheries Division from 1974 through 1998, and by either mark-recapture experiments or counting tower operations or both by Sport Fish Division since 1986 (Table 9). The Chena River Dam is used as a "counting tower" by ADF&G personnel.

Regulations for chinook salmon in the Tanana River drainage have remained unchanged since the early 1960s, at one per day, one in possession. The salmon fishery in the Chena was closed by emergency order in 1987 and 1992. Because of large returns, the bag limit was increased to two fish by emergency order in 1993 and 1994.

Table 9.-Catch, harvest, and abundance of chinook salmon from the Chena, Salcha, and Chatanika rivers, 1977 to 2000.

Year	Chena River			Salcha River			Chatanika River		
	Catch	Harvest	Abundance	Catch	Harvest	Abundance	Catch	Harvest	Abundance
1977	N/A a	29	NA	NA	62	NA	NA	9	NA
1978	NA	23	NA	NA	105	NA	NA	35	NA
1979	NA	10	NA	NA	476	NA	NA	29	NA
1980	NA	0	NA	NA	904	NA	NA	37	NA
1981	NA	39	NA	NA	719	NA	NA	5	NA
1982	NA	31	NA	NA	817	NA	NA	136	NA
1983	NA	31	NA	NA	808	NA	NA	147	NA
1984	NA	0	NA	NA	260	NA	NA	78	NA
1985	NA	37	NA	NA	871	NA	NA	373	NA
1986	NA	212	9,065	NA	525	NA	NA	0	NA
1987	NA	195	6,404	NA	244	4,771	NA	21	NA
1988	NA	73	3,346	NA	236	4,562	NA	345	NA
1989	NA	375	2,666	NA	231	3,294	NA	231	NA
1990	406	64	5,603	680	291	10,728	164	37	NA
1991	258	110	3,025	515	373	5,608	181	82	NA
1992	71	39	12,241	86	47	7,862	31	16	NA
1993	2,545	733	11,877	1,788	601	10,007	625	192	NA
1994	1,308	993	9,680	971	714	18,399	278	105	NA
1995	1,095	662	7,153	4,091	1,448	13,643	134	58	NA
1996	3,663	1,270	10,811	3,298	1,136	7,570	1,331	348	NA
1997	3,151	1,029	13,390	2,639	719	18,514	336	155	NA
1998	779	299	4,745	549	121	5,027	30	6	864
1999	2,004	442	6,845	1,237	445	9,198	63	63	966
2000	NA	NA	4,462	NA	NA	3,140b	NA	NA	398
Averages									
1977-99	NA	291	NA	NA	528	NA	NA	109	NA
1990-98	1,475	578	8,725	1,624	606	10,818	346	111	NA
1994-98	1,999	851	9,156	2,310	828	12,631	422	134	NA

a NA = not available.

b Minimum number due to incomplete tower count data due to periods of high water.

Estimated chinook salmon escapement abundance (as opposed to aerial survey counts) between 1987 and 1998 ranged from less than 2,700 to over 13,000 for the Chena River (Table 9). The 5-year average (1994 - 1998) was 9,156 fish.

Estimates of escapement abundance and length, age, and sex composition of chinook salmon were conducted on the Chena River during July and August of 1998. Poor run strength indicators for chinook for the entire Yukon drainage and poor escapement estimates for the Chena River through July 14th precipitated an Emergency Order restricting fishing for chinook salmon to catch-and-release only, on that date. Estimated catch for 1998 was 779 and harvest was 299 fish.

The final escapement estimate for the 1998 Chena River chinook return was below the escapement goal set in the current management plans for these fisheries. The estimated escapement was 4,745 (SE = 503), about 25% below the escapement goal of 6,300 fish (Stuby and Evenson 1999) and 45% below the 5-year average.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Escapement and Fishery

Indications of a weak Yukon River chinook salmon return created concerns among staff biologists and users, and the escapement counts into the Chena River were scrutinized intensively throughout the run. The possibility of restrictions on the sport fishery loomed, but the final escapement estimate for the 1999 Chena River chinook return was above the escapement goal (6,300) set in the current management plans for these fisheries (Table 9). The estimated escapement for 1999 was 6,845, about 75% of the 5-year average of 9,156. Estimated catch in the sport fishery was 2,004, and harvest was 442.

2000 Escapement and Fishery

By the time that chinook salmon entered the Tanana River in 2000, it was apparent that the Yukon River chinook salmon (and summer chum salmon) run was extremely poor, as were those in the Kuskokwim, and chum salmon returns were similarly dismal. Sonar counts and test fisheries in the Yukon confirmed this, and escapement objectives into spawning streams downriver from the Tanana River were not being met. Alaska's Governor was characterizing the western Alaska salmon runs as a disaster, and governmental agencies were preparing to assist individuals and communities along the rivers dependant on salmon for human and dog food and cash income. Commercial fisheries downriver were closed, and subsistence fisheries were being severely restricted. In anticipation of the need to ensure maximum potential spawning escapement, personal use fishing in the Tanana River downstream from the Chena River was closed, and sport fishing for all salmon in the Tanana River Drainage was closed by Emergency Order on July 17, 2000, which closed chinook (and chum) salmon fishing in the Chena River. Subsistence fishing for salmon was severely restricted.

The salmon counting tower project was interrupted by a high water event from July 11 to July 16. Salmon were passing and the run was building and may have peaked while counts were interrupted. An estimated total of 1,903 chinook salmon passed the dam before the run ended on August 1. The six-day interruption in counts was too large to allow an interpolated estimate of passage during the hiatus, so the tower counts were a very minimal estimate. A mark-recapture abundance estimate was accomplished after the majority of the chinook salmon had passed the

dam. Estimated abundance was 4,463 (L. Stuby, Alaska Department of Fish and Game, Fairbanks, personal communication). This is the number that appears in Table 9, and is about 71% of the escapement goal of 6,300 fish.

The same high water event that interrupted the tower counts made the river unfishable for sport fishing for salmon during what would have been the early stage of the sport fishery. As the river stage dropped and the turbidity cleared, allowing angling to resume, the fishery was closed by the E.O. Catch was probably less than 100 chinook salmon, and harvest was probably about 30 - 40% of that total.

FISHERY MANAGEMENT OBJECTIVES

The Chena River chinook salmon sport fishery is managed under a management plan with an escapement goal and a guideline harvest allocation for the sport fishery. (5AAC 70.060) An escapement goal based on aerial surveys was set by Commercial Fisheries Division in 1992 at 1,700 fish for the Chena River. Sport Fish Division in 1993 expanded this aerial survey escapement goal into an actual escapement abundance goal of 6,300 fish. The guideline sport harvest objective set by the BOF is 300 - 600 chinook salmon. In-season management for the guideline harvest objectives is next to impossible because there is no mechanism for day-to-day enumeration of the harvest. A creel survey providing that information would be difficult and expensive to implement.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The emergency order restricting the fishery to catch and release in 1998 cut off harvest at 299 fish. Had those fish not been harvested, the escapement would have still been about 1,300 fish below the 6,300 fish escapement objective. The harvest (prior to closure) estimate for 2000 will not be available from the SWHS until late in 2001.

The Department has reviewed the policy on salmon escapement goals. A biological escapement goal (BEG) committee has been formed to evaluate and calculate BEGs for Chena and Salcha River chinook salmon and for some Yukon drainage chum salmon stocks. These BEGs are calculated using all available escapement and brood year return data for the stocks in question. As of November, 2000, the committee has proposed BEG ranges of 2,800 - 5,700 chinook salmon for the Chena River and 3,300 - 6,500 for the Salcha River. The BEG ranges are lower than the 6,300 and 7,100 chinook salmon "point" escapement objectives for those rivers, and reflect the results of analysis of return and brood year data which indicates that down to a certain point smaller escapements can produce greater returns than larger escapements. The point objectives were calculated in the early 1990's based on averages of escapement data available at that time. It is interesting to note that all of the documented escapements for the Chena River have fallen within or in excess of the new BEG range, even during runs which were considered to be very poor in the Yukon River generally.

Sport Fish Division is forwarding a proposal to the BOF to develop a strategy of managing the sport fishery for escapement numbers within the BEG range. That proposal would create a system allowing for management of the sport fishery but to ensure proper escapement. Because the chinook salmon sport fishery in the Chena River is the last potential harvest of those fish before they arrive at their spawning area, there can be a direct and controllable relationship between sport harvest and escapement to spawn, unconfounded by other fisheries (as happens downriver). The proposed in-season strategy is to use escapement and passage data accumulated over the years to develop target cumulative passage numbers or rates for points early in the run

(for example, "x" number of fish passing per day or cumulative passage by day six of the run). These thresholds would be used to gauge the likelihood of the total escapement falling within or out of the BEG range. Emergency Order actions to restrict or liberalize the sport fishing regulations would be implemented as needed as directed by 5 AAC 765.003. The escapements in the Chena and Salcha Rivers mirror each other sufficiently so that inferences regarding attainment of BEGs for both rivers can be made even if good data is available from only one of the rivers. If high water disrupts the counts in one of the rivers, but not the other, the escapement projections and estimates for the river in which an accurate estimate can still be made will be considered an index of the chinook escapement in the other river, and will be used as a measure of run strength versus the BEG. Existing guideline harvest ranges will be assessed in light of the new strategy.

BOF ACTIONS

The Board of Fisheries will consider Proposal 183 regulating the Chena River chinook salmon fishery and establishing a BEG range during the January, 2001 meeting. Complete text of the proposal and staff comments are in Appendix B.

FISHERY OUTLOOK

The proportion of the run that is harvested has been impacted by Emergency Orders restricting or liberalizing harvest during 5 years of the period 1990 - 2000. The remaining data points are insufficient to establish trend indices, but harvest has ranged from 64 fish in 1990 to 1,270 fish in 1996 (Table 9.). Angler interest and effectiveness in the Chena River chinook salmon fishery seems to be increasing and is likely to continue increasing, which may raise the profile of the fishery as a component of the total allocation of chinook salmon for harvest in the Tanana drainage and in the Yukon River downriver from the confluence of the Yukon and Tanana rivers. Poor returns in 1998 and 1999, followed by what has been characterized as a disaster in 2000, may be the precursors of a general downturn in Yukon River chinook salmon abundance. The poor returns are from what were considered to be adequate or good parent stock spawning escapements, and inriver harvest of returning adults during the poor runs has not been a significant factor in the declines. The situation is generating considerable anxiety, speculation, and discussion among user groups and management organizations. Cause of the decline is unknown at this time, but high-seas survival is in question.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chinook salmon escapements (abundance) have been estimated annually by counting salmon using the Chena River dam as a counting tower and by mark-recapture estimates, or both, since 1986 (Table 9). In addition to estimating escapements with tower counts, carcass sampling has been done annually to estimate size and age distributions and sex ratios. Catch and harvest continue to be estimated by RTS.

SECTION IV: SALCHA RIVER CHINOOK SALMON FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Salcha River flows from headwaters in the Tanana hills about 120 miles northeast of its mouth to enter the Tanana River near Harding Lake. It is a rapid-runoff stream, and the water is transparent or slightly stained with tannin except during periods of heavy runoff. The Richardson Highway bridge crosses the Salcha about three river miles upstream from its

confluence with the Tanana, and there is a campground and boat launch at the bridge. There are many cabins along the lower 70 miles of river. Access to the river is limited to boat and aircraft upstream from the bridge, and snowmachine in the winter.

The Salcha River supports populations of: Arctic grayling *Thymallus arcticus*, chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, and Arctic lamprey *Lampetra japonica*. Grayling, the salmon, the whitefish, pike, and burbot are taken in the sport fishery.

Adult chinook salmon enter the Yukon River during or shortly after breakup, and migrate into the Tanana River to appear at the mouth of the Salcha River (965 miles from the Bering Sea) between late June and the second week of July. They move up the Salcha River to spawning areas. The run ends in late July or early August.

There has been a chinook salmon sport fishery at the Salcha River since before statehood. The salmon fishery is accessible from the Richardson Highway at the bridge and nearby campground and down a trail near the Munson Slough parking area. Boaters launch at the campground and travel downstream to fish at the confluence of the Tanana and Salcha rivers.

The salmon fishery on the Salcha River is closed above a marker located about 2 1/2 miles upriver from the Richardson Highway bridge (about 5 miles upstream from the confluence of the Salcha and Tanana rivers). Most of the spawning occurs upstream of this area.

Harvests exceeded those of the Chena until 1989, and the Salcha River fishery had the higher profile of the Tanana River drainage chinook salmon fisheries. Estimated harvests between 1977 and 1992 ranged from 47 to 904 (Table 9). Catch and harvest did not increase as dramatically in the Salcha as in the Chena, but harvests exceeded 1,000 fish in 1995 and 1996. The 5-year average catch (1994-1998) was 2,310 and average harvest was 828 fish. The harvest potential of this fishery could be increasing due to improvements in the gear and fishing techniques used to target chinook salmon.

Chinook salmon escapement to the Salcha River has been estimated by aerial survey by Commercial Fisheries Division annually beginning in 1974, and by Sport Fish Division since 1987 using either mark-recapture experiments or counting tower operations or both. Estimated chinook salmon escapement abundance (as opposed to aerial survey counts) between 1987 and 1998 ranged from about 3,300 to over 18,400 for the Salcha River (Table 9). The 5-year average (1994 - 1998) is 12,631 fish. The fishery in the Salcha was closed by emergency order in 1987 and 1992. Because of large returns, the bag limit was increased to two fish by emergency order in 1993 and 1994.

During 1998, poor run strength indicators for chinook for the entire Yukon River drainage and poor escapement estimates for the Salcha River through July 14th precipitated an emergency order restricting fishing for chinook salmon to catch-and-release only on that date. Estimated catch for 1998 was 600 and harvest was 121 fish.

The final escapement estimate for the 1998 Salcha River chinook run was below the escapement goal set in the current management plans for these fisheries. The estimated escapement was 5,027 (SE = 331), about 29% below the escapement goal of 7,100 fish (Stuby 1998) and 37% of the 5-year average.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Escapement and Fishery

The salmon counting operation on the Salcha River was funded and undertaken by the Yukon River Drainage Fisheries Association (YRDFA) beginning in 1999. YRDFA closely follows the project design and methodology established by Sport Fish Division for this project, and in Sport Fish Division provides some logistical support. Indications of a weak Yukon River chinook salmon return created the same concerns and possibilities of restrictions on the sport fishery as described for the Chena River. The final escapement estimate for the 1999 Salcha River chinook return was above the escapement goal (7,100) set in the current management plans for these fisheries (Table 9). The estimated escapement for 1999 was 9,198, about 73% of the 5-year average of 12,631. Estimated catch in the sport fishery was 1,237, and harvest was 445.

2000 Escapement and Fishery

The situation described in the Chena River Chinook section for the Yukon, Tanana and Chena River salmon returns applied also to the Salcha River, and sport fishing for salmon was closed by E.O. on July 17, 2000.

The salmon counting tower project was interrupted by a high water event from July 12 to July 16. Salmon were passing and the run was building and may have peaked while counts were interrupted. An estimated total of 3,108 chinook salmon passed the tower before the run ended on August 1. The five day interruption in counts was too large to allow an interpolated estimate of passage during the hiatus, so the tower counts were a very minimal estimate.

The same high water event that interrupted the tower counts made the river unfishable for sport fishing for salmon during what would have been the early stage of the sport fishery. As the river stage dropped and the turbidity cleared, allowing angling to resume, the fishery was closed by the E.O. Catch was probably less than 100 chinook salmon, and harvest was probably about 30 - 40% of that total.

FISHERY MANAGEMENT OBJECTIVES

The Salcha River chinook salmon sport fishery is managed under a management plan with an escapement goal and a guideline harvest allocation for the sport fisheries. An escapement goal based on aerial surveys was set by Commercial Fisheries Division in 1992 at 2,500 fish for the Salcha River. Sport Fish Division in 1993 expanded this aerial survey escapement goal into an actual escapement goal of 7,100 fish. The guideline sport harvest objective set by the BOF is 300 - 700 chinook salmon.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The emergency order restricting the fishery to catch and release in 1998 cut off harvest at 121 fish. Had those fish not been harvested, the escapement would have still been about 2,000 fish below the 7,100 fish escapement objective. The harvest (prior to closure) estimate for 2000 will not be available from the SWHS until late in 2001.

The escapement goal evaluation process as discussed in Section III (Chena River chinook salmon fishery), included the Salcha River, and the Department has proposed a BEG range of 3,300 - 6,500 chinook salmon for the Salcha River. The BEG range is lower than the 7,100 chinook salmon "point" escapement objective for the Salcha River, and reflects the results of

analysis of return and brood year data which indicates that down to a certain point smaller escapements can produce greater returns than larger escapements. All of the documented escapements for the Salcha River have fallen within or in excess of the new BEG range, even during runs which were considered to be very poor in the Yukon River generally (Table 9.).

The Salcha River is included in the Sport Fish Division proposal to the BOF which would implement a strategy of management for escapement numbers within the BEG range. This proposal and sport fishery management strategy is discussed in Section III.

BOF ACTIONS

The Board of Fisheries will consider Proposal 183 regulating the Chena River chinook salmon fishery and establishing a BEG range during the January, 2001 meeting. Complete text of the proposal and staff comments are in Appendix B.

FISHERY OUTLOOK

No obvious trends are apparent in the Salcha River chinook salmon fishery. Proportion of escapement that is harvested has been impacted by emergency orders restricting or liberalizing harvest during four years of the period 1990 - 1998. The remaining data points are insufficient to establish trend indices, but harvests have ranged from 291 to 715 fish, which is within the harvest range of the previous ten years (1980 - 1989). Poor returns in 1998 and 1999, followed by what has been characterized as a disaster in 2000, may be the precursors of a general downturn in Yukon River chinook salmon abundance. The poor returns are from what were considered to be adequate or good parent stock spawning escapements, and inriver harvest of returning adults during the poor runs has not been a significant factor in the declines. The situation is generating considerable anxiety, speculation, and discussion among user groups and management organizations. Cause of the decline is unknown at this time, but high-seas survival is in question.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chinook salmon escapements (abundance) have been estimated annually by counting salmon using the Salcha River bridge as a counting tower and by mark-recapture estimates, or both, since 1987 (Table 9). In addition to estimating escapements with tower counts, carcass sampling has been done annually to estimate size and age distributions and sex ratios. Catch and harvest continue to be estimated by RTS.

SECTION V: OTHER ANADROMOUS SALMON SPORT FISHERIES AND COMMERCIAL, PERSONAL USE, AND SUBSISTENCE HARVESTS OF TANANA RIVER STOCKS

BACKGROUND AND HISTORICAL PERSPECTIVE

SPORT FISHERIES

A sport fishery for chinook salmon occurs on the Chatanika River downstream from a marker located 1 mile upstream from the Elliot Highway bridge. Salmon fishing is closed above that marker to protect spawning fish. The run is small and attracts little effort. A counting tower project just below the Elliott Highway Bridge began producing escapement estimates in 1998, with an estimated escapement of 864 chinook salmon. Timing is similar to that of the Salcha and Chena rivers chinook salmon fisheries, with the run and fishery occurring in July. The 5-year

(1994 - 1998) average catch is 422 and harvest is 134 fish (Table 9). Chinook salmon fishing in the Chatanika River was restricted to catch-and-release in 1998. Estimated catch was 30 fish and estimated harvest (prior to the closure) was 6 fish.

Minor sport fisheries for summer chum salmon and coho salmon occur in the LTMA (Tables 5, 6, and 7). Chum salmon are primarily available in July and August during and just after the chinook salmon fisheries (summer chums), and are targeted as a secondary species. There is a run of fall chums that appears in the Tanana Drainage in September, but they are not generally targeted by anglers. While summer chums are generally more abundant than chinook salmon, are subject to a more liberal daily bag and possession limit (3 fish, or 2 fish if an angler already has a chinook), and are readily taken on certain types of spinning gear; average total harvest (Table 5) and retention rate (Table 8) is lower than that for chinook. The poor quality of summer chum salmon flesh for human consumption is likely a contributing factor. The 5-year (1994 - 1998) average chum salmon harvest in the LTMA was 800 fish. This harvest rate is driven down by the E.O. closing chum salmon fishing (Table 1) in 1998. Due to the collapse of the chum salmon runs in the Yukon and Tanana rivers, chum salmon sport fishing in the Yukon River drainage was closed from August 15 to October 1, 1998. The chum harvest in the LTMA during 1998 was 64 fish (Table 5).

Coho salmon become available in the Tanana River drainage fisheries during September. They spawn in groundwater-fed stream systems (commonly known as "clearwaters"). There is a major coho salmon fishery in the Upper Tanana River Management Area (UTMA) within the Delta Clearwater River. Annual area management reports for the UTMA describe run status and escapement to the Delta Clearwater. In the LTMA coho salmon are harvested in tributaries of the Nenana River system near the community of Anderson, and in a few "other streams". These are small-scale fisheries (Table 10). The 5-year (1994 - 1998) average coho salmon harvest in the LTMA was 362 fish. Coho harvest in 1998 was 125.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

In 1999, the estimated Chatanika River chinook salmon escapement was 966 fish, and estimated catch and harvest was 63 fish (Table 9).

Chum salmon catch within the LTMA in 1999 was 1,654, about 55% of the five year average catch of 2,988 fish. Harvest was 388 fish, about half of the five-year average harvest of 800 fish.

Coho catch in 1999 was 331, about 12% of the 1994 - 1998 5-year average catch of 1,170. Harvest was 141, or about 39% of the 5-year average of 362.

Salmon sport fishing was closed throughout the Tanana Drainage from July 17, 2000 to August 20, 2000 in response to very poor chinook and summer chum salmon returns throughout the Yukon River drainage. Commercial and personal use salmon fishing were also closed and subsistence salmon fishing was severely restricted. The emergency order was extended to keep chum salmon sport fishing closed through 12/31/2000 on August 10. Coho salmon fishing was unaffected.

Table 10.-Sport harvest and catch for LTMA coho stocks, 1983 - 1999.

Year	Nenana River Drainage		Other Streams		Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	N/A	N/A	0	N/A	84
1984	N/A	N/A	N/A	33	N/A	158
1985	N/A	N/A	N/A	25	N/A	25
1986	N/A	N/A	N/A	460	N/A	281
1987	N/A	0	N/A	0	N/A	0
1988	N/A	255	N/A	206	N/A	461
1989	N/A	192	N/A	288	N/A	493
1990	664	261	24	8	688	269
1991	1,679	222	221	221	1,900	443
1992	583	89	177	109	760	198
1993	0	0	291	29	272	29
1994	720	440	226	99	946	539
1995	114	77	1,016	516	1,130	593
1996	775	149	1186	199	1961	348
1997	767	179	497	163	1,264	342
1998	422	119	128	6	550	125
1999	142	33	189	108	331	141
Averages						
1990-98	636	171	418	150	418	150
1994-98	560	193	611	197	611	197

^a NA = data not available.

FISHERY MANAGEMENT OBJECTIVES

Management objectives for the Chatanika River chinook salmon fishery and LTMA coho and chum salmon fisheries are to maintain currently available fishing opportunities whenever run strength indicators such as the Commercial Fish Division test fisheries downstream from the sport fisheries and counting tower projects indicate adequate run strength.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The emergency order closing chinook and chum salmon fishing described in the 2000 summary prevented further sport catch and harvest of these fish.

BOF ACTIONS

The Board of Fisheries did not take any new actions regulating the LTMA chum salmon, coho salmon, or Chatanika River and other small chinook salmon fisheries during 1999 - 2000. There are no proposals pending before the BOF dealing with sport harvest of these stocks in the LTMA.

FISHERY OUTLOOK

Low levels of catch and harvest will continue whenever fishing is not closed by emergency order.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Chum salmon are counted incidentally to chinook salmon as they pass the counting tower projects at the Salcha, Chatanika, and Chena rivers. These counts can provide run strength information to be combined with information collected by others as the chums approach their final destinations.

COMMERCIAL, SUBSISTENCE, AND PERSONAL USE FISHERIES

The spawning stocks of chinook salmon within the LTMA are the most abundant Yukon drainage chinook spawning stocks between the Anvik River and the Canadian Border, and are very important to commercial, subsistence, and personal use fishermen in the middle Yukon and Tanana rivers.

Tanana River stocks of chinook, chum, and coho salmon provide commercial fisheries in the Tanana River District. Commercial fishing is regulated by emergency order in three statistical areas (6a, 6b, 6c), from the mouth of the Tanana River to the mouth of the Chena River. Commercial fishing above the mouth of the Chena River is prohibited. Commercial harvests target summer chum and chinook salmon, with some incidental catch of coho salmon. From 1995 to 1997, 4.6%, 6.9% and 11.1% of the total Alaskan Yukon River commercial summer chum salmon harvest were caught in Tanana drainage (Table 11). This proportion dropped drastically with the failure of summer chum runs in 1998, 1999, and 2000. From 0% to 2.4% of the Alaskan Yukon River chinook commercial harvest has occurred during these six years in the Tanana River drainage, all in the LTMA. For all salmon species, commercial harvest in the Tanana drainage declined from 9.5% of the total Alaskan Yukon harvest in 1995, to zero in 2000. The fall chum salmon harvest in the Tanana River drainage has constituted a higher proportion of the total Alaskan Yukon harvest than the summer chum harvest, since lower river fisheries close early enough to allow more escapements. In 1997, the Yukon River drainage fall chum salmon Management Plan was implemented directing that commercial fisheries only be allowed when run strengths are projected to be greater than 600,000 fall chum salmon. Based on in-season indicators, the Tanana River component of the fall chum salmon return was weaker than anticipated and was closed to commercial fishing in 1997, 1998, 1999, and 2000. As a consequence there was no commercial coho salmon fishery in the LTMA during these years.

SUBSISTENCE AND PERSONAL USE HARVESTS

Subsistence and Personal use salmon fisheries occur in the Tanana River within the LTMA. The Tanana River from its confluence with the Yukon upstream to the Wood River is open to subsistence salmon fishing with a permit requirement and periods and other restrictions set by the BOF and the potential for additional regulation by emergency order. Personal-use fishing for

Table 11.-Commercial salmon harvest in the Tanana River drainage and percent of the Yukon River drainage harvest from 1995 - 2000.

Species	1995			1996			1997		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	2,747	124,052	2.2	447	90,192	0.5	2,728	113,610	2.4
Summer chum	37,428	818,414	4.6	46,890	682,233	6.9	25,287	228,252	11.1
Fall chum	74,117	283,057	26.2	17,574	105,630	16.6	0	58,187	0.0
Coho	6,900	47,013	9.5	7,142	55,982	12.8	0	35,320	0.0
Total	121,192	1,272,536	9.5	72,053	934,037	7.7	28,015	435,369	6.4

Table 11.-Continued

Species	1998			1999			2000		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	963	43,699	2.2	690	69,563	0.99%	0	8,518	0
Summer chum	570	28,798	1.2	148	29,413	0.50%	0	6,624	0
Fall chum	0.0	0.0	0.0	0	20,371	0.00%	0	0	0
Coho	0.0	1	0.0	0	1601	0.00%	0	0	0
Total	1,533	72,497	2.1	838	120,948	0.69%	0	0	0

salmon is allowed in the Tanana between the Wood River and the Salcha River, and is regulated similar to subsistence fishing.

The Division of Commercial Fisheries Management and Development (CFMD) is charged with management of the subsistence and personal-use fishing in the LTMA, and documentation of the harvest.

From 1995 through 1999, salmon harvested for subsistence and personal use in the Tanana drainage declined from 25.5% to 12.9% of the total Yukon River subsistence and personal-use harvests (Table 12). Harvest also declined from about 84,000 in 1995 to about 30,000 in 1999. Personal use harvest was totally closed in 2000. Subsistence harvest estimates are not yet available, but are expected to be very low.

SECTION VI: CHENA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chena River grayling fishery has been popular since before statehood, and has increased in stature as the Chena Valley has been developed and access has improved. The grayling fishery is almost entirely an open water fishery, occurring from April through October. The Section on Chena River Chinook Salmon describes the river and angler access. Anglers target grayling throughout the road and boat accessible sections of the river and its tributaries, and some are transported to the headwaters by aircraft to begin float trips during which they fish for grayling. Badger Slough is an important component of the Chena River grayling fishery, and an important spawning and rearing area for lower river grayling.

The SWHS divides the Chena into the "upper river" and "lower river" at river mile 71, and provides estimates of effort, catch, and harvest of all species for each section. Species distributions and the regulations restricting salmon fishing and the use of bait above the dam at river mile 45 (described in Section III) dictates that almost all of the effort in the SWHS-designated upper river is directed toward grayling. The lower river supports a multi-species fishery, including the chinook salmon fishery which appears to be growing. So while the majority of the effort in the Chena River is probably directed toward grayling, effort has not yet been apportioned between species and the multi-species fishery confounds attempts to describe the total effort targeting grayling within the Chena River fisheries.

From 1977 through the mid-1980s, the Arctic grayling fishery on the Chena River was the largest grayling fishery in the state of Alaska. Annual fishing effort for the period 1979 - 1986 (for all species) averaged about 33,000 angler-days (Table 13). A series of restrictive regulation changes in response to conservation concerns from 1987 through 1992 likely reduced overall effort targeting grayling during that period, although poor weather in 1992 also impacted effort. The regulatory regime has been stable (open to grayling fishing but restricted to catch and release all year) since 1993. Estimates of total effort for the Chena River between 1994 and 1998 averaged about 33,400 days fished, which was 30% of all effort in the LTMA. The increase in effort reported in the upper Chena River during this period is almost entirely directed toward Arctic grayling. Effort declined slightly in 1998 to 27,910 days fished and estimated catch declined to 89,000.

As a result of a population decline of Arctic grayling in the upper Chena River beginning in the mid-1980s, harvest decreased 76% from 1984 to 1985, although effort declined only 39% during

Table 12.-Subsistence and personal use salmon harvest in the Tanana River drainage and percent of Yukon River drainage harvest from 1995 to 1999.

Species	1995			1996			1997		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	2,178	48,934	4.50	1,392	45,886	3.00	3,025	57,430	5.3
Summer chum	12,441	119,503	10.40	8,391	125,843	6.70	4,215	113,211	3.7
Fall chum	50,031	131,369	38.10	36,832	129,614	28.40	19,834	95,425	20.8
Coho	19,219	28,642	67.10	15,091	30,802	49.00	11,945	24,295	49.2
Total	83,869	328,448	25.50	61,697	332,145	18.60	39,019	290,361	13.4%

Table 12.-continued

Species	1998			1999			2000		
	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana	Tanana Total	Yukon Total	% Tanana
Chinook	1,919	56,043	3.4	1,955	52,525	3.72%	N/A	N/A	N/A
Summer chum	6,004	87,366	6.9	3,036	70,705	4.29%	N/A	N/A	N/A
Fall chum	14,370	62,901	22.8	15,732	89,998	17.48%	N/A	N/A	N/A
Coho	7,472	18,121	41.2	9,541	20,970	45.50%	N/A	N/A	N/A
Total	29,765	224,431	13.3	30,264	234,198	12.92%	N/A	N/A	N/A

Table 13.-Estimated angler effort (number of angler-days) and Arctic grayling harvest and catch from the Chena River, 1977-1999.

Year	Upper Chena Effort ^a	Lower Chena Effort ^a	Total Effort ^a	Effort as % of LTMA Effort	Grayling Harvest	Harvest as % of LTMA Grayling Harvest	Grayling Catch	Grayling Catch as % of LTMA Grayling Catch
1977	N/A ^g	NA	30,002	N/A	21,723	N/A	N/A	N/A
1978	N/A	NA	38,341	N/A	33,330	N/A	N/A	N/A
1979	8,016	14,122	22,138	N/A	27,977	N/A	N/A	N/A
1980	10,734	19,920	30,654	N/A	41,825	N/A	N/A	N/A
1981	10,740	16,013	26,753	N/A	27,548	N/A	N/A	N/A
1982	15,166	25,369	40,535	N/A	29,318	N/A	N/A	N/A
1983	16,725	24,177	40,902	40%	21,866	36%	N/A	N/A
1984	11,741	28,482	40,223	39%	30,400	49%	N/A	N/A
1985	8,568	18,565	27,133	30%	8,038	21%	N/A	N/A
1986	10,688	24,342	35,030	34%	9,209	30%	N/A	N/A
1987 ^b	10,667	14,398	25,065	24%	3,090	12%	N/A	N/A
1988 ^{b,c}	9,677	22,174	31,851	25%	5,328	15%	N/A	N/A
1989 ^{b,c}	10,014	27,548	37,562	27%	13,737	35%	N/A	N/A
1990 ^{b,c,d}	6,949	22,412	29,361	22%	4,507	25%	32,831	27%
1991 ^{b,c,d,e}	8,591	12,547	21,138	20%	3,719	20%	29,548	30%
1992 ^f	4,983	7,383	12,633	16%	0	0%	21,196	27%
1993 ^f	6,018	15,383	21,589	21%	0	0%	44,033	35%
1994 ^f	7,912	18,718	27,061	27%	114	1%	60,539	35%
1995 ^f	13,319	23,219	37,220	26%	212	1%	39,816	37%
1996 ^f	15,214	29,555	45,928	29%	0	0%	50,083	40%
1997 ^f	11,381	16,957	28,873	32%	0	0%	98,628	48%
1998 ^f	10,826	15,277	27,910	34%	0	0%	87,243	49%
1999	18,909	20,834	40,435	35%	0	0%	86,220	55%
Averages								
1979-86	11,547	21,374	32,921		24,523	-	NA	NA
1994-98	11,730	20,745	33,398	30%	-	-	67,262	42%

^a Effort is for combined Chena River fisheries - grayling, burbot, northern pike, salmon, etc, and total effort will exceed sum of upper and lower river because effort not specified to either area has been added.

^b Special regulations were in effect during 1987 through 1991. These regulations were: catch-and-release fishing from 1 April until the first Saturday in June; a 305 mm (12 inch) minimum length limit; and, a restriction of terminal gear to unbaited artificial lures.

^c In addition to the special regulations, a catch-and-release area was created on the upper Chena River (river km 123 to 141).

^d The daily bag and possession limits were reduced from 5 fish to 2 fish in 1990.

^e During 1991, the Chena River and its tributaries were closed to possession of Arctic grayling from 1 July through 31 December.

^f During 1992 - 1998, the Chena River and its tributaries were closed to possession of Arctic grayling.

^g NA = not available.

that same period. Stock assessment projects have been conducted in the Chena River since the early 1970's. Electrofishing boats (shockerboats) were the primary tool for collecting fish. The methodology evolved to entail an annual mark-recapture abundance estimate using two boats simultaneously to sample most of the width of the river. Two passes by the two boats over the lower 90 miles of the river were required. Between 1986 (Clark and Ridder 1987) and 1987 (Clark and Ridder 1988) population abundance declined 49%. As the population declined, more restrictive regulations were implemented. The bag limit was reduced (from 10 per day to five per day), fishing was closed during the spring spawning period, and the use of bait was eliminated in 1987.

Although harvest decreased for two years after the imposition of these restrictions, and abundance estimates increased, both harvest and effort increased substantially in 1989, prompting the lowering of the bag limit from five per day to two per day. This additional restriction was not sufficient to reduce harvest to sustainable levels, and in 1991 the fishery was further restricted to catch-and-release only. The grayling population in the Chena River appeared to be rebuilding during the early 1990s. Abundance (using estimates of abundance of grayling 150 mm FL and larger within the lower 90 miles of the river) rose and peaked in the mid - 1990's, with abundance estimates increasing to 45,000 fish in 1995 (Table 14). Subsequently, estimated abundance declined, decreasing between 1995 and 1997. (Ridder 1999). Abundance was estimated for Arctic grayling in the lower 90 miles (150 km) of the Chena River during 1998 (Ridder 1999). The estimate for 1998 was 27,565 fish over 150 mm in length, which represents a 23% decrease from the estimate of 1997, and a 30% decrease from the estimate of 1996. Age and size composition of Arctic grayling sampled during 1998 indicated that there was little decrease in the number of fish age-5 and older, but that the number of fish younger than 5 years old had dropped substantially from the 1997 estimate. Abundance of larger, older fish (age 5 and older) appears to be trending upward

Because harvest was ending at the same time that the SWHS began reporting both catch and harvest, little inference can be made about the proportion of catch that was harvested. Catches of Arctic grayling in the Chena River are trending upward and represented between 35% and 49% of all grayling caught in the LTMA between 1994 and 1998, reaching an all-time high of over 98,000 fish in 1997. Average contribution to total LTMA grayling catch during that period was 42% (Table 13).

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Effort in the both the lower and upper Chena increased to an estimated cumulative effort of 40,435 days fished in 1999 (Table 13). Catch declined slightly to about 86,000 grayling, but was an increased proportion of the total LTMA grayling catch.

2000 update

After a number of years of low flows due to minimal precipitation, rivers in the LTMA ran full during much of the summer of 2000. Catch of grayling in the Chena River may have declined due to turbidity and redistribution of the fish into habitats made available by higher river stages.

Table 14.-Estimated abundance^a of Arctic grayling within the assessed section (river mile 5 to river mile 90) of the Chena River, 1987 - 1998.

Year	Estimated Abundance
1987	29,891
1988	22,204
1989	19,028
1990	31,815
1991	26,756
1992	29,649
1993	39,618
1994	44,375
1995	45,114
1996	41,463
1997	35,837
1998	27,565

^a Abundance is for fish age-150 mm FL and longer.

^b Data from Ridder (1998) and B. Ridder, Dept. of Fish and Game, Delta, personal communication.

FISHERY MANAGEMENT OBJECTIVES

There is currently no Management Plan in place for Arctic grayling in the Chena River. There was a Chena River Arctic Grayling Conservation and Rehabilitation Plan adopted in 1992. That plan is no longer in effect. The rehabilitation enhancement efforts outlined in the plan proved to be unsuccessful, and are no longer being undertaken. In the absence of a management plan, the objectives for the Chena River Arctic grayling fishery were to not allow a consumptive fishery until the population of Arctic grayling in the assessed section of the river exceeds 40,000 fish, 230 mm or larger, for two years consecutively, while allowing the opportunity for catch-and-release angling. A management planning process began in 1999 and 2000. It was designed to assess public opinion and provide opportunities based on it, consistent with conservation of the resource. Strong public sentiment exists for maintaining catch and release fishing for grayling. The management planning process was set aside in favor of other priorities in 2000, and will be reopened in 2001. A statewide grayling management policy is in the early stages of formulation and the Chena River plan will be developed to be consistent with that policy.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

As well as eliminating sport harvest through regulation changes, the department initiated a program of stock enhancement, stocking hatchery and pond-reared Arctic grayling, spawned from Chena River stock. Approximately 61,000 fish (each year) were stocked in the 100 river miles of the Chena River during 1993 and 1994. Survival of these fish was estimated as part of ongoing stock assessment efforts during 1993, 1994, and 1995. Survival of introduced fish was determined to be too low to justify the cost of the enhancement effort and stocking was not continued after 1994 (Clark 1994, 1995 and 1996). Other management activities related to this fishery in the last several years have involved public education regarding the stock status and the current regulations. Regulatory signs have been posted at angler-access sites along the river, and information on catch-and-release techniques has been provided at campgrounds in the Chena River State Recreation Area.

BOF ACTIONS

There were no proposals submitted to the Board of Fisheries related to Chena River Arctic grayling during the 1995-97 board cycle, and no board action was taken relating to this fishery. There are no regulatory proposals submitted to the BOF for the January, 2001 meeting.

FISHERY OUTLOOK

The grayling fishery on the Chena River remains catch-and-release only. Overall abundance has not been increasing. Effort is trending upward, and catch is high. The catch-and-release fishery is prompting some concern over the amount of hooking mortality the stock can sustain. There has been little pressure from user groups to re-open the river to consumptive harvest. Catch may decline if river stages are again high in 2001. Such a decline may not be the result of declining abundance.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Division of Sport Fish has conducted research on the stock status of Arctic grayling in the Chena River every year since 1971. Early research produced abundance estimates in index sections of the river, but research since the late 1980s has involved estimating the abundance for the lower 90 miles of river. In addition to conducting ongoing stock assessment of Arctic grayling in the

Chena River, a radio-telemetry project investigating the contribution of fish upstream of the assessment area to the overall spawning stock was completed.

Stock assessment of Arctic grayling in the Chena River has ended for the immediate future. Should circumstances require it, stock assessment can be reinstated. There is some sentiment within the Department and from the public that the annual assessments should continue for the purpose of maintaining an unbroken stock status history of Chena River grayling. Electrofishing boats have been used annually to collect grayling in the Chena River for almost 30 years, and still are used occasionally in parts of the river when research on other species is conducted. While some narrowly-focused research on the effects of electrofishing has been done, no studies have assessed the impact on an entire river ecosystem. The impacts on target species such as grayling are minimized as much as possible through refinements in methodology, and those impacts are deemed to be an acceptable cost of obtaining stock status information. Nevertheless, the impacts on the target species and the collateral effects on all other animals within the range of the electrical field are not beneficial, are not neutral, and are likely detrimental. To what degree is unknown. While no immediate catastrophic impact is evident, there are likely subtle impacts that may cumulatively be greater in some aspects than impacts of natural events (such as abnormal river stages), or that may act in concert with such events. While an unbroken data set might be valuable, the potential benefits of not subjecting the vertebrate and invertebrate species in the lower 90 miles of the river to annual electroshocking should be considered.

Effort and catch will be monitored through the SWHS.

SECTION VII: PILEDRIVER SLOUGH ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Piledriver Slough is a clearwater stream that flows for some 21 miles parallel to and between the Richardson Highway and the Tanana River adjacent to Eielson Air Force Base. It was originally a slough of the (glacial) Tanana River and headwaters of Chena Slough, which flowed from the mainstem of the Tanana River north and west through Fairbanks. A dike was built at Moose Creek in the 1940s, cutting Chena Slough off from the Tanana River and creating Badger Slough and the lower Chena River as the non-glacial systems that exist today. The Chena River became a rapid-runoff stream along its entire length and Badger Slough is characterized as a "groundwater" or "spring-fed" system supplied by the aquifers of the Tanana and Chena rivers. Piledriver Slough remained as a turbid side slough of the Tanana River. During the early stages of the construction of the Chena Lakes Flood Control Project by the Army Corps of Engineers (COE) in 1975, dikes were constructed cutting off the headwaters of Piledriver Slough from the Tanana River. The lower section of Piledriver Slough below Moose Creek was routed through a series of slough channels and man-made channels to avoid the floodway and associated dikes. Piledriver Slough then became a system fed by upwellings analogous to Badger Slough, with silty water from the Tanana River flowing only when the Tanana is extremely high or there are ice jams, causing flooding in the area of the headwater dikes. Moose Creek is a tannic-stained tributary to Piledriver Slough, entering it about three river miles upstream from its confluence with the Tanana. Because the dikes were built for the purpose of protecting the main flood control project from Tanana River flooding until construction of the main flood control project was completed, the COE has in the past taken the position that they are no longer needed and

will not be maintained. This issue arose when the Tanana River was cutting a channel that had the potential to break into Piledriver Slough in the area of the dikes and return the slough to its original, glacial condition.

The slough is road accessible at several points, and there are rural neighborhoods along the upper reaches. The middle section flows through part of the Eielson Air Force Base reservation, and an easily obtained permit is required by the military for access. It can be traversed with a canoe or light inflatable boat, but powerboats can be used only on the lower 3 miles. The clarity of the water creates the best possible visibility conditions for anglers looking for fish, and the stream can be crossed on foot readily in most reaches.

When Piledriver Slough became a clear stream, fish species common to clear streams within the LTMA colonized it. They were likely present when glacial water flowed through, but most probably utilized it primarily as an overwintering area and migratory corridor. Piledriver Slough seasonally supports populations of or is visited by: Arctic grayling *Thymallus arcticus*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Arctic lamprey *Lampetra japonica*, and a few sheefish *Stenodus leucichthys*. A few chum salmon *O. keta* spawn there, and the slough is stocked annually with (sterile all-female triploid) rainbow trout. Grayling, rainbow trout, whitefish, pike, burbot, and sheefish are taken in the sport fishery.

The grayling that became established as a spawning stock after the dikes were built at the upper end were likely Moose Creek fish. A relatively large Arctic grayling fishery has developed at Piledriver Slough since the late 1970s (Table 15). Anglers have been attracted to the fishery by the easy availability of grayling and the only stream fishery for rainbow trout north of the Alaska Range. The small numbers of large predators (pike, burbot, and sheefish) and whitefish are present in the lower 3 miles (from Moose Creek downstream). While they add diversity to the fishery, the primary focus of anglers is the grayling/rainbow trout fishery. Both species inhabit the same waters and are taken with the same gear, so effort cannot be segregated. Effort at Piledriver Slough increased dramatically from the mid-1980s to 1990, and then began a declining trend that continues (Table 16). Grayling stock declines and regulatory restrictions may be partially responsible for the decline, but examination of Tables 15 and 16 indicate that catch rate is variable but not greatly increasing or declining..

Because of concerns about the vulnerability of the grayling to increasing fishing effort, in 1987 a 12 inch minimum size limit was implemented and the use of bait on small hooks eliminated at Piledriver Slough below its confluence with Moose Creek. Grayling fishing in the same area of Piledriver Slough was restricted to catch-and-release only in 1993.

Grayling abundance at Piledriver Slough declined dramatically between 1992 and 1997, with estimated abundance falling almost in half from about 14,000 to about 8,700 (Fleming 1997, 1998). However, density (fish per km) was 627, higher than the 1990 density of 530 and near the 7-year average of 620. Between 1991 and 1996, the amount of habitat available to Arctic grayling for spawning and rearing at Piledriver Slough has fallen by a little over half, due to the construction of several large beaver dams blocking fish passage. As long stretches of Piledriver Slough became devoid of fish, angling opportunity was also reduced. This habitat loss has been accompanied by a corresponding reduction in the estimated grayling abundance, but not a reduction in density.

Table 15.-Estimated sport catch and harvest of Arctic grayling in Piledriver Slough and in all LTMA fisheries, 1983-1999.

Year	Piledriver Slough		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A	5,822	N/A	60,748
1984	N/A	3,751	N/A	61,560
1985	N/A	N/A	N/A	37,611
1986	N/A	N/A	N/A	30,398
1987	N/A	4,907	N/A	24,723
1988	N/A	8,095	N/A	36,489
1989	N/A	4,459	N/A	39,407
1990	38,480	2,380	122,342	17,732
1991	20,815	3,987	98,562	18,503
1992	15,252	1,030	78,820	8,275
1993	32,036	759	127,383	11,377
1994	31,324	57	171,968	11,826
1995	17,431	0	108,325	13,217
1996	16,667	0	123,971	5,073
1997	24,585	0	204,338	8,598
1998	24,203	0	179,855	5,914
1999	19,571	0	157,762	6,729
Averages				
1983-98	N/A	N/A	N/A	24,466
1990-98	24,533	N/A	135,063	11,168
1994-98	22,842	N/A	157,691	8,926

NA = not available.

Table 16.-Estimated angling effort expended at Piledriver Slough, 1983-1999.

Year	Piledriver Slough
1983	4,148
1984	4,651
1985	N/A
1986	N/A
1987	13,257
1988	24,375
1989	22,746
1990	27,705
1991	17,703
1992	13,607
1993	17,253
1994	11,369
1995	12,613
1996	11,736
1997	6,791
1998	5,126
1999	8,955
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Averages	
<hr/>	
1987-98	15,357
1994-98	9,527

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Effort increased in 1999, and is near the five-year average (Table 16), and grayling catch declined to less than the five-year average but was within the range of the previous five years (Table 15). With catch at about 19,600 and the most recent estimated abundance at around 9,000, many fish are being caught repeatedly. At a (very liberal) hooking mortality rate of 5% for released fish, 980 of the released grayling would have died. This represents an 11% hooking mortality rate.

2000 update

During May and June of 2000 anglers found almost no grayling in Piledriver Slough in areas where they are normally abundant. Department employees verified their absence. Concerns were raised. Field research was conducted in late June during a small project to determine food habits of stocked rainbow trout. The author of this report assisted with the research. Adult grayling were present in what appeared to be normal densities in areas where they had been almost absent earlier, and recently emerged grayling fry were observed in what appeared to be high densities.

FISHERY MANAGEMENT OBJECTIVES

The fishery management objective in Piledriver Slough pertaining to grayling is to ensure that the fishing mortality on the Arctic grayling population does not exceed 20% annually. A habitat management objective of restoring fish passage to upper reaches of the stream blocked by beaver dams is emerging.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Grayling fishing in Piledriver Slough was restricted to catch-and-release only in 1993. Harvest of grayling has ended. Fishing mortality from the catch and release fishery is estimated to be less than 20%.

The department has initiated a study to investigate the effect on Arctic grayling abundance and distribution of increasing the amount of habitat available to Arctic grayling in Piledriver Slough. The study will allow fish passage to areas of the slough not currently available to fish by removing several of the lower beaver dams, and will determine if grayling in Piledriver Slough begin to utilize the habitat that is no longer blocked to fish passage. In October of 1998, trappers were permitted to begin before the regular season to remove beavers in the farthest downstream sections of Piledriver in which fish passage was blocked by beaverdams. Immediately after freezeup, the dams were breached down to the riverbed, and the ponds behind them drained. By late summer, 1999, adult and juvenile grayling had recolonized the areas upstream from the breached dams to the next solid dam (Wuttig, 2000). The author of this report also observed whitefish, lake chubs, and rainbow trout immediately upstream from a breached dam. Trapping was evidently completely successful, because the dams were not repaired in 1999 or 2000. In early winter 1999, more dams were breached, with similar successful fish recolonization evident in summer 2000 (Wuttig, pers comm.). In early winter of 2000, another dam was breached, opening a large area of Piledriver Slough to fish.

BOF ACTIONS

The BOF adopted a department proposal during the 1997 meeting to change the current codified regulation for Arctic grayling at Piledriver Slough to catch-and-release only. This change did not result in an actual change in regulations, since the regulation proposed by the department and adopted by the Board had already been in effect by emergency order since 1993. No regulatory proposals concerning Piledriver Slough were submitted for the January, 2000 BOF meeting.

FISHERY OUTLOOK

If grayling re-colonize the areas made available to them by beaverdam removal, density should decline as grayling spread out into the formerly barren areas. The catch rate might follow suit, particularly since the areas being re-opened to grayling are less accessible. Subsequently abundance might increase as grayling take advantage of more available spawning areas.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Evaluation of grayling distribution above removed beaverdams will continue. Stock assessment should be undertaken after the dam removal project has evolved into a maintenance phase and grayling distribution appears stable. Catch, harvest, and effort will be monitored through the SWHS. Stock status should be monitored on a regular basis to measure changes in the population. A management plan should be developed that sets thresholds for regulatory action if stocks should decline, and reinstates opportunity when stocks recover. Examination of stomach contents of rainbow trout sampled in the proximity of large numbers of grayling fry revealed that the trout were not preying upon grayling fry.

SECTION VIII: SALCHA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Salcha River is described generally in the section reporting on the Salcha River chinook salmon fishery. The Salcha River Arctic grayling fishery has supported increasing catch and fairly consistent harvest over recent years and provides a substantial proportion of the harvest opportunity for grayling in the LTMA (Table 17). The majority of the grayling fishing opportunity is accessible only by boat, and a high proportion of the effort is from people who have property along the river and their visitors. The harvest was higher prior to the regulations that were imposed in 1989 consisting of a 12-inch minimum size limit, restrictions on the use of bait, and the restriction to catch and release only during the spring spawning period. The restrictions, likely coupled with an attitude among anglers who fish there often that they need not harvest all of the fish they are legally entitled to in order to "get what they want", are probably causing the harvest rate (of fish over 12 inches in length that may be legally harvested) to remain steady. For example, in 1999 the catch of grayling over 12 inches in length was 9,243, and harvest was 1,524 (16%) (Howe et al. 1998). Overall, catch appears to be trending upward (Table 17).

Effort in 1997 declined from the previous two years, possibly due to low water conditions in this boat-dependant fishery (Table 18.) Effort on this multi-species fishery is impacted by the quality of the chinook salmon fishery from year to year, hydrological conditions that can at one extreme (high water) make grayling fishing very difficult and at the other (low water) limit boat access to fishing areas, and the weather and timing of breakup and freeze up. The low effort in 1992 is likely due in part to very bad weather that summer.

Catch rose to about 19,000 grayling in 1998, and harvest was stable at about 2,200 fish. Effort declined to about 5,800 days fished (Table 18) due to a combination of a poor run of chinook salmon and the emergency order closing salmon fishing, and very low river stages throughout the summer limiting boat access.

The most recent grayling stock assessment study was completed in 1993. Abundance was increasing (compared to estimates from 1990 - 1992) and indicators of good survival of younger fish were measured (Roach, 1994).

Table 17.-Estimated sport catch and harvest of Arctic grayling in the Salcha River and in all LTMA fisheries, 1977-1999.

Year	Salcha River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1977	N/A	6,387	N/A	N/A
1978	N/A	9,067	N/A	N/A
1979	N/A	5,980	N/A	N/A
1980	N/A	5,351	N/A	N/A
1981	N/A	3,983	N/A	N/A
1982	N/A	6,843	N/A	N/A
1983	N/A	9,640	N/A	60,748
1984	N/A	13,305	N/A	61,560
1985	N/A	5,826	N/A	37,611
1986	N/A	7,540	N/A	30,398
1987	N/A	4,762	N/A	24,723
1988	N/A	2,383	N/A	36,489
1989	N/A	5,721	N/A	39,407
1990	8,609	1,992	122,342	17,732
1991	4,697	1,688	98,562	18,503
1992	8,265	1,592	78,820	8,275
1993	11,254	1,768	127,383	11,377
1994	9,995	2,308	171,968	11,826
1995	12,173	2,685	108,325	13,217
1996	10,327	1,747	123,971	5,073
1997	27,307	2,959	204,338	8,598
1998	18,829	2,179	179,855	5,914
1999	13,932	1,524	157,762	6,729
Averages				
1983-98	N/A	4,256	N/A	24,466
1990-98	12,384	2,102	135,063	11,168
1994-98	15,726	2,376	157,691	8,926

NA = not available.

Table 18.-Estimated angling effort at the Salcha River, 1977-1999.

Year	Salcha River
1977	8,167
1978	9,715
1979	14,788
1980	8,858
1981	8,090
1982	14,126
1983	11,802
1984	8,449
1985	13,109
1986	13,792
1987	10,576
1988	7,494
1989	9,704
1990	9,783
1991	11,242
1992	4,833
1993	7,313
1994	7,653
1995	14,516
1996	13,046
1997	8,647
1998	5,789
1999	7,539
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Averages	
1977-98	10,068
1994-98	9,930

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Anglers caught about 14,000 and harvested about 1,500 grayling in 1999. Both were less than the five-year average (1994-1998) and less than in 1998. Catch was within the range of values for the previous five years but harvest was the lowest ever estimated. About 66% (9,243) of the grayling caught were larger than 12". Effort in 1999 increased from that of 1998 but was below the five year average. River stages were somewhat higher in 1999 than the low stages of 1998. As with the Chena River, grayling fishing in the Salcha may have been influenced by higher river stages providing better access for anglers but poorer fishing due to grayling redistribution and periods of turbidity.

2000 update

The Salcha River experienced high river stages through much of the summer and into freezeup during 2000.

FISHERY MANAGEMENT OBJECTIVES

The management objectives for this fishery include providing for a sustainable grayling fishery and the opportunity to sustain 7,500 days of angler effort per year.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The present regulatory regime seems to be conserving the grayling stocks and meeting the objectives.

BOF ACTIONS

There has been no BOF activity regarding this fishery recently, and there will be none at the January, 2001 BOF meeting..

FISHERY OUTLOOK

The grayling population should be able to sustain the current level of harvest unless biological factors such as a series of recruitment failures intercede.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and effort will be monitored through the SWHS. Stock status should be assessed if there are any observed changes that might indicate unsustainable fishing mortality . A management plan should be developed that sets thresholds for regulatory action if stocks should decline, and reinstates the present regulatory regime when stocks recover.

SECTION IX: CHATANIKA RIVER ARCTIC GRAYLING FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

The Chatanika River, formed by the confluence of Faith, McManus, and Smith creeks about 50 miles northeast of Fairbanks, flows southwest out of the White Mountains for about 170 river miles and ends at its confluence with the Tolovana River in Minto Flats about 50 miles west of Fairbanks. The Chatanika River is a clear or lightly tannic stained rapid-runoff stream, and flows through valleys between summits and uplands for about four-fifths of its length before it

enters Minto Flats. At that point the character of the river changes from one typical of rapid-runoff upland streams with pools, riffles, cutbanks and gravel bars and a substrate consisting largely of gravel or broken rock to a slower stream with an incised channel with high, fairly stable banks and a bottom substrate consisting primarily of sand and organic material. Mining activity dominated the upper Chatanika during the first half of the 20th century. A diversion dam one mile below Faith Creek still blocks fish passage, though the dam no longer serves any purpose.

The Chatanika River supports populations of: Arctic grayling *Thymallus arcticus*, chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, humpback whitefish *Coregonus pidschian*, broad whitefish *Coregonus nasus*, least cisco *C. sardinella*, northern pike *Esox lucius*, burbot *Lota lota*, sheefish *Stenodus leucichthys*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Alaska blackfish *Dallia pectoralis*, and Arctic lamprey *Lampetra japonicas*. Grayling, chinook and chum salmon, and humpback and round whitefish, and least ciscos are the focus of sport fishing effort upstream of Minto Flats. Pike and burbot are the mainstay of the Chatanika River sport fishery within Minto Flats, and small numbers of sheefish are taken in Minto Flats and in the lower portions of the Chatanika within the uplands.

The Chatanika River is paralleled by the Steese Highway along its upper 50 river miles. The Elliot Highway crosses it about 60 river miles upstream from Minto Flats, and the Murphy Dome Road ends at the Chatanika River about 3 miles upstream from Minto Flats. The river downstream from the Elliot Highway bridge is used by anglers traveling in powerboats. There are boat landings at the Elliot Highway bridge and at the Murphy Dome Road. Boaters also travel from Nenana down the Tanana River or from Manley up the Tanana River to get into Minto Flats and upstream into the Chatanika River. There is a boat launch at Minto Village into the Tolovana River, a short distance from the Chatanika River in Minto Flats. The upper Chatanika River is also a popular float trip. The majority of this is upstream from the Elliot Highway bridge, with some float trips downstream to the Murphy Dome Road and very few into Minto Flats.

The grayling sport fishery has been documented and studied since the 1950s and has probably been in existence in one form or another since the gold rush in the early 1900s. The grayling population undoubtedly went through periods of severe decline while either or both fishing and mining activity were unrestricted. We cannot say to what extent the stock has subsequently recovered, but it supports what is considered to be a healthy grayling population and stock assessments of Arctic grayling have been done periodically in the Chatanika River since the mid-1980s. The current regulatory regime for grayling fishing (a spring spawning period closure and a 12-inch minimum length limit, both throughout the drainage, and no use of bait upstream of the Elliot Highway bridge) was implemented beginning in 1992.

In the upper river, anglers focus almost entirely on grayling, while in the lower river grayling, pike, burbot, sheefish, salmon, and whitefish share the effort. Since 1995, the SWHS has provided effort, catch, and harvest estimates for the "Upper Chatanika" and "Lower Chatanika", with the river divided at the Elliot Highway bridge. However, because of the short duration (5 years) of the split estimates, trends cannot be discerned at the writing of this report. Tables 19 and 20 present whole river estimates, as they are reported from 1977 through 1994. Effort (for all species) varies within a range with no particular trend, as does catch, and harvest is declining.

Table 19-Estimated sport catch and harvest of Arctic grayling in the Chatanika River and in all LTMA fisheries, 1977-1999.

Year	Chatanika River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1977	N/A	6,737	N/A	N/A
1978	N/A	9,284	N/A	N/A
1979	N/A	6,121	N/A	N/A
1980	N/A	5,143	N/A	N/A
1981	N/A	3,808	N/A	N/A
1982	N/A	6,445	N/A	N/A
1983	N/A	9,766	N/A	60,748
1984	N/A	4,180	N/A	61,560
1985	N/A	7,404	N/A	37,611
1986	N/A	2,692	N/A	30,398
1987	N/A	5,619	N/A	24,723
1988	N/A	8,640	N/A	36,489
1989	N/A	6,934	N/A	39,407
1990	17,960	4,237	122,342	17,732
1991	12,830	2,642	98,562	18,503
1992	11,750	1,751	78,820	8,275
1993	14,283	2,001	127,383	11,377
1994	24,750	2,659	171,968	11,826
1995	15,859	2,108	105,251	16,291
1996	11,928	420	123,971	5,073
1997	24,484	1,550	204,338	8,598
1998	14,384	915	179,855	5,914
1999	13,851	1,462	157,762	6,729
Averages				
1983-98	N/A	3,970	N/A	24,466
1990-98	16,470	2,031	135,063	11,168
1994-98	18,281	1,530	157,691	8,926

NA = not available.

Table 20.-Estimated angling effort (number of angler-days) from the Chatanika River, 1977-1999.

Year	Chatanika River
1977	9,925
1978	10,835
1979	4,853
1980	5,576
1981	4,691
1982	9,417
1983	10,757
1984	8,605
1985	10,231
1986	7,783
1987	11,065
1988	11,642
1989	12,210
1990	11,801
1991	8,085
1992	6,775
1993	7,671
1994	7,272
1995	12,697
1996	12,032
1997	7,125
1998	6,000
1999	8,747
Averages	
1977-98	8,957
1994-98	9,025

Effort, catch, and harvest declined in 1998. Catch for 1998 was within the range of the catch for the period when catch has been estimated (1990 - 1997). Harvest was the lowest ever estimated. Stock assessments have been done periodically in the Chatanika River, most recently in 1997. There is no immediate conservation problem for Chatanika River grayling, but stream productivity is low (Fleming, 1998).

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Effort (8,747 days fished), catch (13,851), and harvest (1,462) increased in 1999. All were within the range of the previous five years (Table 19 and table 20) but were below the five-year average.

2000 update

The Chatanika was at high river stages during several times during 2000, which may have impacted grayling fishing by allowing grayling to distribute in lower densities and by reducing angler effectiveness when the water was turbid.

FISHERY MANAGEMENT OBJECTIVES

The primary fishery management objective for the Chatanika River is to ensure that harvests and incidental mortality of all species are sustainable and to produce a participation rate of 15,000 angler days per year.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The present regulatory regime appears to be maintaining a sustainable grayling fishery. Effort is falling short of the goal in the plan. When the plan is reviewed the effort goal will likely be modified or deleted.

BOF ACTIONS

There has been no BOF activity regarding this fishery recently, and there will be none at the January, 2001 BOF meeting..

FISHERY OUTLOOK

The grayling population should be able to sustain the current level of harvest unless biological factors such as a series of recruitment failures intercede.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and effort will be monitored through the SWHS. Stock status of the road-accessible portion of the fishery should be monitored regularly. A management plan should be developed that sets thresholds for regulatory action if stocks should decline, and restores opportunity when stocks recover.

SECTION X: OTHER WILD STOCK ARCTIC GRAYLING FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Arctic grayling are popular with recreational anglers, are generally abundant, and occur in many LTMA rivers and streams besides the major fisheries previously detailed (stocked grayling present in lakes are not described in this section). These other waters include high gradient Alaska Range streams such as Brushkana Creek along the Denali Highway and other upper Nenana River streams, groundwater/aquifer-fed lowland streams such as Julius Creek in the lower Nenana River drainage, and rapid-runoff streams through a variety of terrain such as Washington Creek and the Little Salcha River. Access ranges from roadside fisheries to those accessible only by traveling by boat along major rivers to the mouth of the tributary containing grayling. As with almost all grayling fisheries in the Tanana River drainage, these fisheries take place during the open-water season. With the exception of Five Mile Clearwater, the grayling fisheries in these streams fall under the background regulation for Arctic grayling in the Tanana River drainage (5 fish per day and 5 in possession with no size limit) that was instituted in 1975. Much of the reported catch from these fisheries is released rather than harvested (Table 21). With the exception of Brushkana Creek, these fisheries have attracted little research effort. Estimates of angler effort directed toward grayling can be developed if necessary for some of these streams in which the grayling are the focus of the fishery, but collectively effort upon these grayling stocks cannot be estimated due to the mix of species targeted by anglers in these streams. Depending on stream characteristics, all of the stream-resident species targeted by anglers within the Tanana River drainage are present in this aggregation of flowing waters. Estimates of effort, catch, and harvest for these waters are somewhat less reliable than those for the major fisheries because the estimates for the smaller fisheries are often based on a small number of responses to the SWHS questionnaire. Nevertheless, the trend information is useful and may provide a history of a fishery if conservation concerns raise its profile.

Catch and harvest vary considerably, in part because many of these small fisheries enter and drop out of the SWHS report from one year to the next, depending upon whether any of the small number of anglers utilizing them are selected for inclusion in the SWHS. Catch and harvest from these streams is a major component of the total LTMA grayling fishery (Table 21). The trends seem stable within a wide range. During 1998 estimated catch increased but was within the range of catches for 1990 - 1997. Harvest declined in 1998 to the lowest ever estimated.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Catch declined and harvest increased slightly in 1999. Both were below the 1994-1998 five-year average, and catch was the lowest ever. Harvest was within the range of previous harvests.

2000 update

There is no information for 2000.

FISHERY MANAGEMENT OBJECTIVES

There are no management plans for any of these fisheries. The "default" objective is to conserve the stocks while maintaining angler opportunity at a sustainable level.

Table 21.-Estimated sport catch and harvest of Arctic grayling in other wild stock LTMA stream fisheries, 1977-1999.

Year	Other Wild Stock Stream Fisheries		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A	13,074	N/A	60,748
1984	N/A	6,574	N/A	61,560
1985	N/A	15,318	N/A	37,611
1986	N/A	10,192	N/A	30,398
1987	N/A	5,115	N/A	24,723
1988	N/A	9,465	N/A	36,489
1989	N/A	5,850	N/A	39,407
1990	18,750	3,527	122,342	17,732
1991	24,624	4,840	98,562	18,503
1992	15,671	2,896	78,820	8,275
1993	15,254	4,251	127,383	11,377
1994	24,070	3,877	171,968	11,826
1995	13,965	6,285	108,325	13,217
1996	21,608	2,311	123,971	5,073
1997	16,471	3,243	204,338	8,598
1998	19,517	1,480	179,855	5,914
1999	10,863	1,724	157,762	6,729
Averages				
1983-98	N/A	6,144	N/A	24,466
1990-98	18,881	3,634	135,063	11,168
1994-98	19,126	3,439	157,691	8,926

^a NA = not available.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The current regulatory structure appears to be maintaining these fisheries.

BOF ACTIONS

During the 1997 BOF meeting the board amended and adopted a public proposal (supported by the department) to change the grayling bag and possession limit in Five Mile Clearwater Creek from 5 fish per day with no size limit, to 2 fish per day, only one of which could be over 12 inches. There will be no regulatory activity at the January, 2001 BOF meeting.

FISHERY OUTLOOK

It is likely that angler pressure will increase on these fisheries.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Stock status assessment work should begin on fisheries for which conservation concerns arise. The Brushkana Creek and Nenana River grayling stocks may become candidates for stock assessment research. A management plan should be developed that maintains opportunity and conserves stocks. If more restrictive regulations are proposed, they should be structured within the existing framework of regulations within the LTMA so that there is not a proliferation of different regulations.

SECTION XI: TOLOVANA RIVER DRAINAGE/MINTO FLATS/LOWER CHATANIKA RIVER NORTHERN PIKE FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Minto Flats, located about 30 miles west of Fairbanks, is an approximately 500,000-acre area of marsh and lakes interconnected by numerous sloughs and several rivers. Most of the area is included in the Minto Flats Game Refuge, and is one of the most important waterfowl nesting areas in the Tanana River drainage. The Chatanika, Tolovana, and Tatalina rivers and Washington, Goldstream, and numerous smaller creeks flow into Minto Flats, coming together as tributaries to the Tolovana River, itself a tributary to the Tanana River at its mouth at the southwestern end of the Flats. The glacial Tanana River forms the southern boundary of Minto Flats, and two major sloughs of the Tanana (Swanneck Slough and Grassy Slough) cut into the flats and flow into the lower Tolovana River. Except for the Tanana River, the waterways of the flats are slow and meandering. The lakes of Minto Flats are generally shallow and heavily vegetated. A group of interconnected lakes in the eastern flats, connected to Goldstream Creek, are called the Minto Lakes. The Minto Lakes are a major northern pike spawning and summer feeding area within Minto Flats. Big Minto Lake and Upper Minto Lake are the largest of these lakes. The surface area of the standing waters of Minto Flats varies drastically from summer to summer and sometimes within each summer, depending on the volume of tributary streams and the stage of the Tanana River. Summer habitat for northern pike in Minto Flats covers about 27,000 acres. In winter much of the flowing and standing water within the flats becomes anoxic, forcing fish to move to waters of the Tanana River or up tributary rivers to oxygenated areas. Winterkill is common, and can be a confounding factor in attempts to predict fish population dynamics and assess angler impact.

Fish species present in the lakes and waterways as residents for either part of the year or as migrants include northern pike *Esox lucius*, burbot *Lota lota*, sheefish *Stenodus leucichthys*, humpback whitefish *Coregonus pidschian*, broad whitefish *Coregonus nasus*, least cisco *C. sardinella*. Arctic grayling *Thymallus arcticus*, chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, round whitefish *Prosopium cylindraceum*, longnose suckers *Catostomus catostomus*, slimy sculpins *Cottus cognatus*, lake chubs *Couesius plumbeus*, Alaska blackfish *Dallia pectoralis*, and Arctic lamprey *Lampetra japonica*. The salmon are migrants through Minto Flats and the lower Chatanika River, traveling to and from spawning grounds in the middle and upper Chatanika River. The grayling and round whitefish are primarily residents of the rivers and streams beyond the periphery of Minto Flats, but some likely travel through Minto Flats to and from overwintering areas in the Tanana River. The northern pike fishery of the

lower Chatanika River (described in the SWHS reports as downstream from the Elliot Highway bridge) is included in this section because the Minto Lakes and Chatanika River northern pike stocks are commingled, the fisheries overlap, and the lower 35 miles of the Chatanika River is within Minto Flats. It is impractical to treat them separately. General references to Minto Lakes pike within this section, then, include the Chatanika River within the flats, downstream from the Murphy Dome Road. Similarly, because effort, catch, and harvest estimates for the Tolovana River appear occasionally in the SWHS data, and Minto Flats and all of its waters are within the Tolovana River drainage and are regulated as such, Table 20 contains all inclusive columns of catch and harvest for the Tolovana River drainage (Tolovana River, Minto Flats, and the lower Chatanika River). Where necessary, differentiation and clarification between the groups of waters will be made in the text.

The fisheries at Minto Flats and on the Chatanika River are accessed primarily by boat and float plane. Anglers travel from the Murphy Dome Road down the Chatanika River to Goldstream Creek, then up Goldstream Creek to the Minto Lakes. There is also a boat launch into the Tolovana River at Minto Village, located along the western margin of Minto Flats and accessible from the Elliot Highway. Boaters also travel from Nenana down the Tanana River or from Manley up the Tanana River to enter Minto Flats via the Tolovana River. People from Minto Village travel throughout the flats with boats and snowmachines year-round to fish, hunt, and trap.

The Minto Lakes are a popular pike fishing and waterfowl hunting area, and in addition to those who use boats, there are both guiding services and private pilots that travel to the lakes in floatplanes. Guides and private individuals have cabins on some of the sparse areas of higher ground that are not regularly flooded. The Minto Lakes support the majority of the sport fishery for northern pike within the Tolovana River Drainage.

The Tolovana Drainage/Minto Flats sport fishery has supported a major proportion of the LTMA northern pike sport fishery for many years (Table 22.). It was primarily a summer fishery until the mid-1980s, when an intensive sport fishery developed on concentrations of northern pike that were overwintering in the Chatanika River just upstream from the mouth of Goldstream Creek. Total harvest for the Tolovana River drainage doubled from 1984 to 1986. Many of the fish harvested were large females. It was felt (and later demonstrated by radiotelemetry studies, most recently by Roach, 1998) that these fish were the spawning stock for the Minto Lakes. After 1987, regulations were implemented closing sport fishing for northern pike at Minto Flats between October 15th and May 31, and the bag limit was reduced from ten per day to five per day, and only one over 30 inches in length could be retained as part of the bag limit. Estimated catch and harvest (and catch rate) peaked in 1994 with a catch in Minto Flats of 47,248 and a harvest of 8,438. Estimated catch and harvest have declined since. However, estimated effort in Minto Flats has also declined, so that catch rate has not declined excessively (Table 22, 23). Although effort is not estimated by target species (fishery), it is felt that the majority of the effort at Minto Flats is directed toward northern pike and that estimates of catch, harvest, and effort for Minto Flats are an acceptable trend index for the pike fishery. Unfortunately, the multi-species nature of the Lower Chatanika River fishery makes it difficult to determine effort directed toward pike. However, estimates of catch and harvest within the Lower Chatanika are germane to considerations of Minto Flats northern pike stock status.

A subsistence fishery for northern pike (and whitefish) occurs near Minto Village and at historically used sites in the eastern portions of Minto Flats (Andrews, 1988). Gill nets are used

Table 22.-Sport catch and harvest^a of northern pike in the Tolovana - Minto Flats complex and the LTMA, 1983-1999.

Year	Tolovana River		Lower Chatanika River		Minto Flats		Tolovana - Minto Flats Complex ^a		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	N/A	N/A	713	N/A	2,748	N/A	3,461	N/A	7,898
1984	N/A	286	N/A	389	N/A	2,453	N/A	3,128	N/A	6,357
1985	N/A	347	N/A	763	N/A	4,146	N/A	5,256	N/A	8,224
1986	N/A	279	N/A	1,282	N/A	4,927	N/A	6,488	N/A	8,112
1987	N/A	66	N/A	554	N/A	1,781	N/A	2,401	N/A	6,105
1988	N/A	109	N/A	364	N/A	1,492	N/A	1,965	N/A	7,599
1989	N/A	50	N/A	812	N/A	1,734	N/A	2,596	N/A	8,310
1990	135	51	979	388	4,946	1,570	6,060	2,009	23,964	5,414
1991	164	30	520	401	5,427	2,155	6,111	2,586	23,037	9,426
1992	0	0	410	26	6,175	1,299	6,585	1,325	24,477	4,200
1993	0	0	4,842	1,344	19,536	2,076	24,378	3,420	41,809	7,743
1994	0	0	4,943	1,051	47,248	8,438	52,191	9,489	76,372	13,200
1995	1215	0	6,155	1,354	21,823	3,126	29,193	4,480	43,578	10,581
1996	646	9	3,338	629	12,495	2,078	16,479	2,716	34,867	4,890
1997	0	0	1,321	172	9,932	1,074	11,253	1,246	19,816	2,320
1998	211	21	388	20	4,105	731	4,704	772	12,964	2,003
1999	0	0	375	190	3,261	908	3,636	1,098	10,641	2,013
Averages										
1983-1998	N/A	N/A	N/A	641	N/A	2,614	N/A	3,334	N/A	7,024
1990-1998	263	12	2,544	598	14,632	2,505	17,439	3,116	33,432	6,642
1994-1998	414	6	3,229	645	19,121	3,089	22,764	3,741	37,520	6,599

^a Tolovana and Chatanika rivers, and Minto Flats.

Table 23.-Estimated angling effort at Minto Flats, 1977-1999.

Year	Minto Flats
1977	3,886
1978	3,640
1979	2,709
1980	2,727
1981	2,045
1982	1,791
1983	1,281
1984	1,829
1985	2,011
1986	3,318
1987	1,539
1988	1,564
1989	699
1990	932
1991	1,532
1992	2,401
1993	3,911
1994	6,267
1995	6,260
1996	3,973
1997	3,332
1998	1,414
1999	2,431
<hr/>	
Averages	
1977-98	2,674
1989-98	3,072
1994-98	4,249

throughout the open-water period and pike are taken through the ice with hook and line. Based on the records of ADF&G Commercial Fish Division, subsistence harvest has ranged from about 800 to 1,500 northern pike during the period 1993 - 1997.

Stock assessments were done at Minto Flats almost annually after 1987, and most recently in 1997. Improvements in methodology produced better abundance estimates over the years (Roach, 1998). The Minto Lakes area is the study area within which stock assessment takes place, and because it receives most of the angler use, is an appropriate index of the impact of sport fishing on the northern pike population. The 1997 estimated abundance of northern pike in the Minto Lakes over 400 mm (16") in length was about 16,500. Radiotelemetry studies of movement and distribution were done in 1987, 1988, 1993 and 1995 - 1997. In addition to documenting movements and overwintering areas, these studies documented fidelity to specific

areas, which verified assumptions used in abundance estimates (Roach 1998). Abundance estimation was not done at Minto Flats during 1998. Effort declined in Minto Flats (Table 23) probably as a result of low water levels limiting river access. Catch in Minto Flats declined as a function of reduced effort (Table 22).

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Fishery

Estimated catch for 1999 (3,636) in the Tolovana -Minto Flats complex declined from 1998, and harvest (1,098) increased. Both were below the five year average (Table 22). Effort in Minto Flats (2,431 days fished) increased, but was also below the five year average (Table 23). The wetlands complex had been subjected to low river stages and lake water levels for several years due to inconsistent and reduced amounts of precipitation. That situation appeared to reverse itself in 1999, when river stages in the Tanana Basin rose to near normal levels.

2000 Update

Abundance of northern pike in the Minto Lakes was estimated in 2000. Numbers are not finalized as of 12/15, but will be 10,000 - 12,000 pike over 16" (400 mm) in length.

Water levels were very high in Minto Flats throughout the summer, creating difficulties during population sampling but undoubtedly benefiting the northern pike.

FISHERY MANAGEMENT OBJECTIVES

The Minto Flats Sport Fishery Management Plan sets out objectives of ensuring sustainable harvest and incidental fishing mortality; annual angler effort of 3,000 days per year; and maintenance of public access. The Minto Flats Northern Pike Management Plan for sport fisheries adopted by the Board of Fisheries in 1997 (5 AAC 70.044) states that the maximum annual exploitation rate for northern pike in all flowing waters and lakes of Minto Flats by all users may not exceed 20%. Also, should more than 750 northern pike be harvested in Goldstream Creek between January 1 and breakup, an E.O. must be implemented reducing the daily bag and possession limit to two pike per day, only one of which can be in excess of 30 inches in total length.

A problem with the management plan is the northern pike population to which the 20% exploitation cap applies is the population of the entire Minto Flats. In order to measure exploitation, abundance must be estimated regularly. Experiments done in the early years of stock assessment in Minto Flats indicated that estimation of abundance of the northern pike population within the 27,000 acres of summer habitat spread through the 500,000 acres of Minto Flats was not feasible. However, reliable methods of estimating the Minto Lakes northern pike abundance and stock status have been developed.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Catch rates seem sustainable and exploitation is in compliance with the management plans under the present regulatory regime. No in-season management activities were undertaken in 1999 or 2000.

Sport Fish Division is forwarding a proposal to the BOF for consideration at the January, 2001 meeting that will apply the 20% exploitation cap to the Minto Lakes northern pike stock, rather than to all of the northern pike in Minto Flats. While there is some interchange between stocks

of northern pike in western Minto Flats (Tolovana River and lakes complex near Minto Village) and those in the eastern Flats (Minto Lakes area) many of the pike in the Lower Chatanika River are thought to be of the Minto Lakes stock. As a consequence, abundance estimates from Minto Lakes will be considered to be a minimum estimate of the combined Minto Lakes/Lower Chatanika stock. Estimated harvest from the lower Chatanika and Minto Lakes will be combined in order to compute exploitation. Should exploitation exceed 20% of the most recent abundance estimate for two consecutive years, stock assessment will be undertaken to determine whether excessive exploitation is occurring or the abundance has increased.

BOF ACTIONS

Recent BOF actions are described in the fisheries objectives section. No BOF actions involving Minto Flats occurred in 1999. During the 2001 meeting the BOF will consider Proposal 189 aligning the designated maximum exploitation rate with the area where both the population can be assessed and the majority of angler effort occurs. Complete text of the proposal and staff comments are in Appendix B.

FISHERY OUTLOOK

Effort may increase if water levels in the rivers of Minto Flats remain at normal or high stages, improving boat access. Higher water in Minto Flats should be beneficial to the northern pike, greatly enlarging spawning and rearing areas and reducing cannibalism.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Stock status assessment work should be undertaken at least every three years, in conjunction with the BOF cycle.

SECTION XII: HARDING LAKE NORTHERN PIKE FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Harding Lake is located in the central Tanana Valley, about four miles southeast from the confluence of the Salcha and Tanana rivers. The Salcha River passes just north of Harding Lake, and the broad, braided floodplain of the Tanana River passes just to the west. The lake is about 35 miles southeast in a straight line and about 45 road miles on the Richardson Highway from Fairbanks. It is the largest, deepest, and most accessible of the four large roadside lakes (Birch, Harding, Chena, and Quartz lakes) in the central Tanana Valley and until Chena Lake was constructed, Harding Lake was the closest large lake to Fairbanks. Harding Lake has been used for all types of aquatic recreational activity over the years, including fishing (Doxey 1991).

Harding Lake is generally circular in shape, except for a prominent point in the middle of the southern shoreline, and is surrounded by forested hills. Surface elevation is about 715 ft, surface area is 2,500 acres, and maximum depth is 144 ft. Water color is transparent green, and the lake is oligotrophic and relatively unproductive (LaPerriere 1975). There is no surface outlet, although water has been observed to flow into wetlands to the north during high water periods. The lake is fed by hillside runoff, a few springs, and two inlets. A small inlet drains the adjacent Little Harding Lake basin. The east inlet (Rogge Creek) drains a larger basin (approx. 6,400 acres) to the east. The channel of Rogge Creek comes to a divide at which the water periodically flows into either Harding Lake or the Salcha River. When the channel shifts such that the water flows toward the Salcha River, the lake volume and level is stable or it declines depending on

annual precipitation. When Rogge Creek flows into the lake, the lake volume and level remains stable or rises. When the lake level drops, the majority of the wetlands along the shoreline (principally the northern shoreline) dry up. This happened in the mid-1970s and again in the late 1990s. The dry flats are colonized by terrestrial grasses and deciduous shrubs and trees. This phenomenon and its implications are described and quantitatively assessed in Nakao 1980, Kane 1979, and Doxey 1991. More complete descriptions of the lake are available in those reports.

Harding Lake is very accessible. About 75% of the shoreline is ringed with lakefront cabins which are road-connected to the Richardson Highway. There is a large State campground with a major boat launching area, and several other small public access right-of-ways and private boat launches. The boat launches become progressively more unusable when the lake level recedes, reducing angler access.

Indigenous fish species are northern pike *Esox lucius*, burbot *Lota lota*, least cisco *C. sardinella*, and slimy sculpins *Cottus cognatus*. Introduced species are lake trout *Salvelinus namaycush* and Arctic char *Salvelinus alpinus*. The lake trout are naturally reproducing and have been augmented by small additions of hatchery fish. Natural reproduction of the Arctic char has not yet been documented and the fishery is entirely sustained by stocked fish.

The northern pike are a high profile game fish in Harding Lake because they are readily caught and their preference for shallow water habitats makes them highly visible to anglers. This is in contrast to the other large predators (burbot, lake trout, and Arctic char), which are available to anglers as lower density populations in deep water. In 1991, pike fishing at Harding Lake was closed between April 1 and May 31, spear fishing was closed, and a 26 inch minimum length limit was imposed.

Although effort is not estimated by target species (fishery), it is felt that the majority of the effort at Harding Lake is directed toward northern pike. Estimated effort increased through the mid-1980s and ranged around 5,000 angler-days from 1990 to 1994 (Table 25). Effort increased to 6,700 angler days in 1995 and 1996, then declined thereafter to about 3,400 angler days during 1997 - 1998.

As northern pike generally increased in popularity as a game fish (Doxey 1991) and anglers became more aware of their presence in Harding Lake, harvests increased through the 1980s (Table 24), then fell dramatically during the early 1990s (in part due to regulatory changes) and declined again after 1995. Catches peaked in 1993 at about 8,500 fish and declined slowly thereafter to about 1,400 in 1998.

Abundance estimates for Northern pike were conducted at Harding Lake annually during the period 1991-1999 except in 1994. Abundance of northern pike over 300 mm in total length increased from about 2,300 in 1991 to about 3,800 in 1993. Estimated abundance increased between 1995 and 1996, from 2,338 to 3,337, but declined to 1,780 in 1997 (Roach, 1998). The abundance estimate for 1998 was about 1,400 fish over 12 inches in length (300 mm fork length), which is a decline of about 16% from the estimate of 1997, and a decrease of about 44% from the average of the seven population estimates done between 1990 and 1997 (Roach and McIntyre 1999) and was the smallest since assessment efforts have been done.

In 1998 a risk and sustained-yield analysis was completed as part of the research studies on the Harding Lake northern pike population. The risk analysis assessed the likely ability of various regulatory regimes to maintain the northern pike spawning population at about 1,728 fish, the

Table 24.-Sport catch and harvest of northern pike in Harding Lake and in the LTMA, 1983-1999.

Year	Harding Lake		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	178	N/A	7,898
1984	N/A	766	N/A	6,357
1985	N/A	503	N/A	8,224
1986	N/A	673	N/A	8,112
1987	N/A	1,886	N/A	6,105
1988	N/A	2,092	N/A	7,599
1989	N/A	1,764	N/A	8,310
1990	3,629	591	23,964	5,414
1991	5,071	1,888	23,037	9,426
1992	3,400	341	24,477	4,200
1993	8,471	391	41,809	7,743
1994	5,559	539	76,372	13,200
1995	3,852	502	43,578	10,581
1996	4,070	363	34,867	4,890
1997	1,665	62	19,816	2,320
1998	1,425	139	12,964	2,003
1999	828	38	10,641	2,013
Averages				
1983-1998	N/A	792	N/A	7,024
1990-1998	4,127	535	33,432	6,642
1994-1998	3,314	321	37,520	6,599

^a NA = data not available

Table 25.-Estimated angling effort at Harding Lake, 1983-1999.

Year	Harding Lake
1983	708
1984	1,707
1985	850
1986	2,064
1987	5,125
1988	3,256
1989	4,935
1990	3,895
1991	5,155
1992	5,068
1993	4,885
1994	4,913
1995	6,743
1996	6,734
1997	3,383
1998	3,410
1999	2,973
<hr/>	
Averages	
1983-98	3,871
1989-98	4,912
1994-98	5,037

abundance calculated to produce maximum sustained yield (about 400 fish). The recommendation was to increase the minimum length limit from 26 inches to 30 inches (Roach and McIntyre 1999). Plans were made to pursue this recommendation at the December 2000 BOF meeting.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Estimated catch (828) and harvest (38) of northern pike in Harding Lake during 1999 was the lowest recorded. An abundance and age composition estimate revealed that the population of northern pike over 12" (300 mm fork length) had declined to 583 fish and that a recruitment failure was occurring (Scanlon and Roach, 2000). Only about 11% of the population consisted of young fish between Age 1 and Age 6. These diminished cohorts (Ages 2-5) are the recruitment from strong parent classes (1993 -1997) when adult northern pike were abundant in the lake. The loss of most of the high-quality spawning and rearing habitat as the lake level dropped in the mid-to late 1990s caused the recruitment failures. Scanlon and Roach allude to descriptions in fisheries literature of the importance to survival of young of year northern pike of

vegetated zones like those that have disappeared in Harding Lake. Young pike prefer warm, shallow, productive, and sheltered areas. Cannibalism is a major mortality factor acting upon alevins and fingerlings when cover is not available.

2000 update

On May 1, 2000 an emergency order was issued closing northern pike fishing in Harding Lake until further notice. This E.O. will be rescinded after the BOF takes action on a proposal that will indefinitely close northern pike fishing in Harding Lake by regulation.

FISHERY MANAGEMENT OBJECTIVES

Department intent is to structure the closure and management regime for Harding Lake northern pike to allow restoration of angling opportunity if the population recovers sufficiently. The Department will initially plan for catch-and-release fishing after abundance increases to a level at which the population can withstand catch-and-release mortality without significant slowing of growth rate. As the population of mature fish exceeds 1,700 fish harvest of northern pike greater than 30" in length will be allowed. If abundance and composition indicators will permit, further liberalizations of harvest will follow.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The declining population of adult northern pike in Harding Lake is indicative of a situation that is presently not controllable while any harvest occurs. The E.O. has effectively ended most legal fishing mortality for northern pike at Harding Lake, since the other game fish in Harding Lake are deepwater species in summer, when most of the angler effort occurs. Lake trout, burbot, and Arctic char are segregated from northern pike by habitat preference, and anglers targeting them seldom hook northern pike. Anglers have been alerted to the fact that fishing in the shallows of Harding Lake in the summer will not result in the taking of the deepwater species, and that hooking a northern pike in the shallows is evidence of an attempt to take pike, a violation under the closure. Observation of anglers at Harding Lake during summer of 2000 indicated good, but not perfect compliance. There is little winter fishing.

A proposal to close northern pike fishing by BOF regulation has been placed into the BOF process by the Department, and Advisory Committee and public comment has supported it.

Progress is slowly occurring on planning for a public works project to control Rogge Creek and cause rising lake water levels. The Department is providing information and expertise in support of this project.

BOF ACTIONS

The BOF will take action on Proposal 187 to close northern pike fishing in Harding Lake in January 2001. Complete text of the proposal and staff comments are in Appendix B.

FISHERY OUTLOOK

Until the lake level rises and the dry flats along the north end of Harding Lake are recolonized by emergent aquatic vegetation, the outlook is dismal. Should the aquatic habitat be restored, northern pike abundance should increase rapidly as a low-density population takes advantage of large areas of unused habitat. Cannibalism, other predation, and competition for food and cover will be minimal. It will likely be at least five years after a recovery begins before catch and release fishing can resume.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Enforcement of the closure on northern pike fishing will be encouraged.

The Management Plan with thresholds for restoration of angling opportunity will be written and adopted.

No abundance estimates or other invasive research activities will be undertaken until it appears that the northern pike population is increasing. Because northern pike inhabit shallow, accessible areas, the beginnings of a population recovery will be discernible by visual observation. After this recovery has begun, population monitoring will be undertaken, and the plan will be implemented as appropriate.

The department will support habitat restoration projects at Harding Lake.

If a significant restoration of habitat occurs, the department will undertake enhancement of the northern pike population by attempting to find donor stocks in the Tanana Valley from which adults can be transferred to Harding Lake to augment the spawning population.

SECTION XIII: OTHER NORTHERN PIKE FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Pike are common in many smaller lakes and in sloughs and tributaries of the Tanana River, and small harvests are reported annually from many locations throughout the LTMA. The lower Chena, Zitziana, and Salcha Rivers, Piledriver Slough, and gravel pits in south Fairbanks and on Eielson Air Force Base are examples of the types of areas that produce northern pike for anglers. Other fisheries occur in lakes in the Kantishna River drainage (such as East Twin and Mucha) and in clear boat-accessible sloughs, backwaters, and small tributaries off of the Tanana River. Fish Creek, a small drainage downriver on the Tanana River from Manley, produced a pike that held the State Record for many years. The northern pike present in the river system and in waters connected to the river provide the population reservoir which, through the movements of individual fish, ensures the continued viability of small stocks and availability of fishing opportunity wherever suitable habitat occurs. This includes the colonization of ponds. Northern pike colonize suitable gravel pits and other ponds either when the river floods them or the pits are connected to the river, or when people illegally introduce northern pike into those waters. Many of these areas are road-accessible. None of these produce large numbers of fish or very many large fish, but collectively they provide about one-third of the catch and about one-half of the harvest of northern pike in the LTMA (Table 26). Catch and harvest may be trending downward. It is not presently possible to develop a direct estimate of effort because of the mixed stock fisheries of which these pike fisheries are a part. However, effort can be inferred from catch. It is safe to assume that the large majority of effort at Minto Flats is directed toward northern pike. Five-year average effort in Minto Flats is 4,249 angler days (Table 23). Five-year average catch rate for northern pike in Minto Flats is 4.5 fish per day (Tables 22 and 23). It is also safe to assume that the collective catch rate (fish per angler day) for northern pike in the small LTMA fisheries is no better than that of Minto Flats. The 5-year average annual catch for these small fisheries is 11,441 pike. That catch divided by the best possible catch rate (Minto Flats) indicates an annual average effort of about 2,500 angler-days. The catch rate for the small fisheries is likely much less than that of Minto Flats, so the estimate of 2,500 days is a minimum. The wide range of accessibility for anglers, and the diversity of types of angling opportunity

Table 26.-Sport catch and harvest of northern pike in the LTMA waters other than Minto Flats and Harding Lake, and LTMA totals, 1983-1999.

Year	Other Lakes and Streams		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	4,259	N/A	7,898
1984	N/A	2,463	N/A	6,357
1985	N/A	2,465	N/A	8,224
1986	N/A	951	N/A	8,112
1987	N/A	1,818	N/A	6,105
1988	N/A	3,542	N/A	7,599
1989	N/A	3,950	N/A	8,310
1990	14,275	2,814	23,964	5,414
1991	11,855	4,952	23,037	9,426
1992	14,492	2,534	24,477	4,200
1993	8,960	3,932	41,809	7,743
1994	18,622	3,172	76,372	13,200
1995	10,533	5,599	43,578	10,581
1996	14,318	1,811	34,867	4,890
1997	6,898	1,012	19,816	2,320
1998	6,835	1,092	12,964	2,003
1999	6,177	877	10,641	2,013
Averages				
1983-1998	N/A	3,327	N/A	7,024
1989-1998	11,866	2,991	33,432	6,642
1994-1998	11,441	2,537	37,520	6,599

^a NA = data not available

(from that available at roadside picnic or swimming spots to waters only accessible by boat or airplane) add value to these fisheries. Angler interest in road accessible northern pike fisheries is high. However, the nature of northern pike as a voraciously piscivorous top-level predator that takes the hook readily but requires many years to grow to the larger sizes valued by anglers makes it difficult to manage for high quality pike fisheries in roadside situations.

Abundance and age and sex composition studies were conducted in East Twin Lake in 1993 (Pearse 1994) and Deadman Lake in 1994 (Hansen and Pearse 1995). In both cases the populations were judged to be healthy and capable of sustaining existing harvest levels. A radiotelemetry study done in 1993 and 1994 in the Chena River indicated that adult northern pike in that river move little during the year, although difficulties with some aspects of the studies caused the results to be somewhat qualified (Pearse 1994).

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Catch and harvest continued a slow decline, and both were below the 5-year average.

2000 update

There is no information available for 2000.

FISHERY MANAGEMENT OBJECTIVES

Management on a sustainable basis is an overriding obligation. However, in roadside ponds stocked with salmonids such as rainbow trout, where northern pike have been illegally introduced, maximum harvest rate is beneficial.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

In 1992, northern pike fishing in lakes of the Tanana drainage was closed during all of April and May to protect pike just prior, during, and immediately after spawning. This closure was subsequently judged to be unnecessarily restrictive, and in 1997 the BOF adopted a revision leaving all lakes in the LTMA except Harding Lake open until April 20, then closed until June 1.

BOF ACTIONS

There have been no BOF actions since 1997. At the January 2001 meeting the BOF will consider a public proposal to reduce the length of the spring spawning closure in (all) Tanana Drainage lakes by ending the closure on May 20 rather than June 1. The department is not supporting that proposal.

FISHERY OUTLOOK

Angler interest in opportunities to utilize the small roadside fisheries remains high, and the pike stocks in waters not connected to the river will not meet the demand. Northern pike in road accessible waters connected to the river system will continue to provide a steady but relatively low level of opportunity. Northern pike populations in remote waters will continue to provide higher-quality opportunities for the foreseeable future.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment work on remote fisheries should be undertaken.

SECTION XIV: LTMA BURBOT FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

Burbot are found in suitable habitat throughout the Yukon River drainage in Alaska (and throughout the rest of the State except in Southeast Alaska). The Tanana River is the mainstem glacial river that drains the Tanana Valley and is a major tributary of the Yukon River. It is utilized by burbot during all phases of their life history. The Tanana River and adjacent lowlands are also utilized by humans as a transportation corridor during both winter and summer. Within the LTMA the Tanana River is accessible from many communities, long stretches of the road system, and tributary streams and rivers with adjacent communities and road systems.

LTMA communities to which the Tanana River is very important include Salcha, North Pole, Fairbanks, Nenana, and Manley.

Within the LTMA burbot occur in the Tanana River and lower sections of clear tributaries such as the Chena, Lower Chatanika, Salcha, and Tolovana rivers, and in deeper lakes such as Harding Lake and West Twin Lake. They can also colonize suitable ponds and gravel pits when flooding from a nearby river occurs. Burbot are a member of the cod family (Gadidae), and are valued by LTMA residents for the quality of their flesh. Fishing occurs year-round, but the majority of the effort in the LTMA appears to occur in fall and winter. The most common gear type in flowing waters of the drainage is set lines, on which up to 15 hooks may be used, but hand held gear is used by anglers in lakes and to a certain extent in rivers. Burbot stocks in the Tanana River system are harvested most heavily near population centers such as Fairbanks, North Pole, and Nenana. Population assessments were conducted annually from the late 1980s through 1998 in the Lower Chena River and the Tanana River near Fairbanks, where the most intensive river fishery occurs. Radiotelemetry studies have also been conducted. Extensive movements and exchange of burbot within the Tanana River drainage tends to minimize effects of concentrated local fishing effort, and overall stocks in the Tanana River appear to be lightly exploited (Evenson 1997). For the purposes of apportioning the effort, catch and harvest estimate for the area described in the SWHS reports as the Middle Tanana River (mainstem Tanana from Delta Junction to Nenana) into the UTMA and LTMA (dividing the Tanana at the confluence with the Little Delta River), one third of the effort, catch, and harvest for the Middle Tanana is allocated to the UTMA, and two thirds to the LTMA.

Although exploitation rates of burbot in the Tanana River are not considered excessive, studies suggest low abundance in most of the easily accessible lakes examined within the Tanana drainage. Population density of burbot in many lakes declined dramatically in the early 1980's due to unsustainable rates of sport fishing exploitation. More recent stock assessment studies conducted in lakes of the Tanana River drainage demonstrate the detrimental effects of long-term high exploitation rates on stocks (Parker 1998). Stock assessments in (easily accessible) Harding Lake (Lafferty et al. 1992) have precipitated regulatory restrictions. Set lines may not be used in Harding Lake, and in other lakes in the LTMA where set lines are allowed, they may only be used in winter. Bag and possession limit in Harding Lake is two fish.

While most of the effort in the Tanana River fishery is probably directed toward burbot, it can be difficult to make inferences about effort in the burbot fisheries because the fisheries are mixed-stock fisheries. Also, the variable fishing power of the allowable gear-types for burbot confound inferences of effort based on estimated catch. The SWHS bases its estimates on calendar years, which divide the winter fishery into two segments and assigns the first portion to the end of one year and the second portion to the beginning of the next. The impact of early winter weather conditions, timing of freeze-up, etc on effort are thus combined with those in the second part of the previous winter fishery. Anglers fish for burbot all winter, and casual observations indicate that effort increases as the ice becomes safer to travel on in November, declines in late December, and climbs again after mid-January. This decline coincides with the darkest, coldest time of the year, and with the general timing of burbot spawning in the rivers.

Comparison of Table 27 with the SWHS estimates (Howe et al. 1998) indicates that the LTMA burbot fishery provides well over half of the statewide burbot catch and harvest annually. The estimated catch of burbot in the LTMA varies from year to year within a range of about 2,000 to 4,000. The 5-year average harvest is 78% of the catch, which is higher than any other fishery in

Table 27.-Sport harvest and catch of burbot in the LTMA, 1983-1999.

Year	Harding Lake		Chena River		Tolovana River & Minto Flats		Chatanika River		Piledriver Slough	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	157	N/A	1,055	N/A	0	N/A	21	N/A	84
1984	N/A	428	N/A	1,233	N/A	39	N/A	13	N/A	0
1985	N/A	0	N/A	2,065	N/A	105	N/A	175	N/A	70
1986	N/A	0	N/A	884	N/A	433	N/A	40	N/A	0
1987	N/A	53	N/A	149	N/A	132	N/A	13	N/A	79
1988	N/A	73	N/A	386	N/A	0	N/A	55	N/A	55
1989	N/A	10	N/A	1,322	N/A	20	N/A	10	N/A	100
1990	17	17	338	304	0	0	17	17	456	456
1991	45	45	609	225	56	56	0	0	237	203
1992	17	17	1,235	1,032	0	0	17	8	203	195
1993	0	0	1,328	1,135	0	0	0	0	760	568
1994	31	31	685	592	218	208	0	0	135	73
1995	46	46	1,045	597	172	161	206	91	500	299
1996	133	80	540	441	18	18	9	9	117	80
1997	52	52	1,018	703	232	52	70	32	155	155
1998	8	0	1,144	854	17	0	0	0	143	135
1999	139	38	657	350	0	0	0	0	279	127
Averages										
1983-1998	N/A	63	N/A	811	N/A	77	N/A	30	N/A	160
1990-1998	39	32	882	654	79	55	35	17	301	240
1994-1998	54	42	886	637	131	88	57	26	210	148

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Table 27.-Page 2 of 2.

Year	Nenana River		Middle and Lower Tanana River		Other		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A	N/A	N/A	1,652	N/A	346	N/A	3,315
1984	N/A	N/A	N/A	1,210	N/A	208	N/A	3,131
1985	N/A	N/A	N/A	860	N/A	256	N/A	3,531
1986	N/A	53	N/A	1,236	N/A	431	N/A	3,077
1987	N/A	132	N/A	1,302	N/A	346	N/A	2,206
1988	N/A	0	N/A	1,335	N/A	0	N/A	1,904
1989	N/A	60	N/A	1,301	N/A	140	N/A	2,963
1990	68	68	961	838	844	507	2,701	2,207
1991	11	11	857	683	150	150	1,965	1,373
1992	102	76	1,323	981	75	59	2,972	2,368
1993	21	11	1,814	1,635	241	135	4,164	3,484
1994	0	0	2,063	1,626	21	21	3,153	2,551
1995	0	0	2,120	1,684	229	172	4,318	3,050
1996	44	44	818	537	256	169	1,935	1,378
1997	52	52	3,032	2,437	324	341	4,935	3,824
1998	25	25	1,262	876	233	198	2,832	2,088
1999	0	0	1,521	1,328	599	206	3,195	2,049
Averages								
1983-1998	N/A	N/A	N/A	1,262	N/A	211	N/A	2,647
1990-1998	36	32	1,583	1,255	235	184	3,191	2,469
1994-1998	24	24	1,859	1,432	172	157	3,394	2,555

^a NA = data not available

the Tanana drainage, indicating the value of this fishery in providing food for Interior residents (Table 8). The Tanana River and the Lower Chena River fisheries provide most of the catch and harvest in the LTMA. These fisheries are on the same stock of burbot, which could be characterized as a "middle Tanana" stock.

Estimated catch and harvest in 1998 were below the 1993 - 1997 five-year average but were within the range of annual provisional estimates of catch and harvest for those years. The 1998 population assessment indicated that the burbot population parameters were within the range measured in previous years (Stuby and Evenson, 1999).

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Catch and harvest were again below the LTMA five-year (1994-1998) average, but within the range of values for that period. The fishery appears to be stable. Retention rate (caught and kept) was 64%, well below the five-year average of 78%, and was below the range of values for that period. In a fishery with a species valued primarily as food, the lower retention rate may be an indicator of a high proportion of small fish in the burbot population. Anglers don't normally go fishing for burbot with the intent of engaging in catch-and-release recreational fishing. Most of the burbot landed that are considered large enough to be suitable for consumption are harvested.

No stock assessment work was done in 1999.

2000 update

No stock assessment was done in 2000. As of December, 2000, scattered angler reports of poor fishing in the Tanana River from Fairbanks to Nenana were being relayed to the Area Management Biologist.

FISHERY MANAGEMENT OBJECTIVES

The Management objective for the Tanana River and LTMA lakes is to ensure that harvests and incidental mortality of burbot are sustainable. Healthy stocks such as the Tanana River burbot are managed to permit maximum sustained yield while depressed stocks, such as in road accessible lakes, are managed to allow the stocks to rebuild.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The restrictive regulations (possibly combined with low abundance) in Harding Lake have kept harvest low there.

The bag and possession limit of 15 fish in rivers seems to be allowing the stock to sustain itself at the current level of fishing effort.

BOF ACTIONS

No regulatory matters were brought before the Board of Fish during the 1997 cycle. There will be no regulatory activity directed toward burbot at the January 2001 BOF meeting.

FISHERY OUTLOOK

The fishery should remain stable. Increased participation would increase harvest, but angler interest in this fishery appears to be steady.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment efforts are being reduced. Should trend information develop that indicates that the fishery is changing, assessment should be reinstated to evaluate stock status.

SECTION XV: CHATANIKA RIVER WHITEFISH FISHERY

BACKGROUND AND HISTORICAL PERSPECTIVE

During late summer and fall, humpback whitefish and least cisco migrate up the Chatanika River to spawn in the middle section of the river between Hard Luck Creek and a few miles upstream of the Elliot Highway bridge. They then move downriver to as yet undefined overwintering areas. It's quite possible that some of overwintering areas are outside of the Minto Flats complex. Fleming (1999) describes the potential compound life history of the stocks, which might include long migrations in the Tanana and Yukon rivers. During the course of northern pike research, humpback whitefish and least ciscos have been observed moving into the Minto Lakes immediately after breakup. They likely feed for a period of time during the summer before moving on to spawning areas.

The only major sport fishery for whitefish in the LTMA was the spear fishery on the Chatanika River in the vicinity of the Elliot Highway bridge. This fishery took place in September, while least cisco and humpback whitefish were migrating upstream to spawn. Both of these species were harvested, as were a small percentage of round whitefish. Harvests during the late 1970s were generally under 5,000 fish, but the fishery became very popular during the 1980s, and harvests had increased to 25,000 by 1987 (Table 28).

This fishery had no bag limit until 1988, when a 15 fish per day limit was implemented. Harvest decreased in 1988 after the bag limit was imposed, but increased again in 1989. Declines in abundance combined with harvest estimates that were considered unsustainable prompted the department to close the fishery by emergency order on October 10 of 1990, and again on September 9 of 1991. In February of 1992, the Board of Fisheries adopted a department proposal to limit the fishery to the month of September, and to limit the area where the fishery took place to downstream of a point one mile above the Elliot Highway bridge.

During 1992, the department also adopted a management plan that set threshold abundance levels required to allow harvest. The threshold abundance level for humpback whitefish is 10,000 spawners, and the threshold abundance level for least cisco is 40,000 spawners. Stock assessment done in 1992 indicated abundance levels above the threshold levels in the management plan (Table 29), and the fishery was open during 1992, but an extremely early winter resulted in low participation in the fishery that year, and harvest barely exceeded 2,000. Stock assessment in 1993 also indicated abundance levels above the threshold levels allowing harvest, and the fishery remained open, but harvest levels were again very low. The low harvest in 1993 was attributed to heavy rainfall and flooding which persisted during much of the spear fishery, creating high turbid water conditions which made spearing difficult. Stock assessment during 1994 indicated that the abundance level of least cisco was below the management plan threshold allowing harvest, and the fishery was closed by emergency order on September 5, 1994. The whitefish fishery on the Chatanika River has been closed by emergency order since that date. Harvest has been minimal, and may be from anglers hook-and-line fishing who do not realize that the current closure affects all harvest, not just spear fishing. Abundance estimates for

Table 28.-Sport catch and harvest of whitefish in the Chatanika River and the LTMA, 1977-1999.

Year	Chatanika River		LTMA Total	
	Catch	Harvest	Catch	Harvest
1983	N/A ^a	5,895	N/A	7,436
1984	N/A	9,268	N/A	10,472
1985	N/A	14,350	N/A	18,480
1986	N/A	22,038	N/A	26,995
1987	N/A	25,074	N/A	25,937
1988	N/A	7,983	N/A	9,123
1989	N/A	15,542	N/A	16,688
1990	5,334	5,216	8,014	6,299
1991	23	0	619	356
1992	2,033	2,033	3,140	2,810
1993	558	558	948	722
1994	436	97	1,677	242
1995	71	9	1,187	578
1996	320	46	660	149
1997	95	24	1404	773
1998	60	0	1,115	490
1999	14	0	976	219
Averages				
1983-1997	N/A	N/A	N/A	7,972
1990-1998	992	N/A	2,077	1,380
1994-1998	196	35	1,209	446

^a NA = data not available.

Table 29.-Humpback whitefish and least cisco abundance estimates from the Chatanika River, 1992-1997^a.

Assessment Year:	Humpback Whitefish	Least Cisco
1992	19,187 fish (SE = 1,617)	75,035 fish (SE = 8,555)
1993	13,112 fish (SE = 1,096)	46,562 fish (SE = 5,971)
1994	12,700 fish (SE = 1,138)	27,639 fish (SE = 3,211)
1995	N/A ^b	NA
1996	NA	NA
1997	16,107 (SE = 1,260)	22,811 (SE = 4,496)

^a Data from Fleming (1997).

^b NA = data not available.

whitefish in the Chatanika were not conducted in 1995 or 1996, but estimates of stock composition were obtained in 1996 (Fleming, 1997) and an abundance estimate was done in 1997 (Fleming, 1997). Abundance of humpback whitefish increased in 1997 above the levels of 1993 and 1994, but the estimate for least cisco was below estimates for 1993 and 1994, and was almost 70% lower than the 1992 estimate (Table 29). Although the spawning population of humpback whitefish has recovered, and that stock is showing good recruitment of younger age classes, stock composition data showed a continuing decline in the number of three-year-old least cisco. Whereas stock assessment between 1992 and 1994 showed three year-old least cisco making up over 30% of the total estimate, three year-olds only represented 14% of the 1997 sample, and only 5% of the 1997 abundance estimate. This recruitment failure will result in a weak year class that will slow any stock rebuilding.

No abundance estimate for whitefish in the Chatanika River was conducted during 1998. Stock monitoring in late summer of 1998 indicated that the growth of the humpback whitefish spawning stock through recruitment had slowed, and that there were slight improvements in recruitment to the least cisco spawning stock (Fleming 1999). The fishery remained closed. Fleming described possible causes of natural mortality that might be reducing recruitment, including severe winter conditions in spawning areas, sub-optimum hydrological conditions, and predation.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

No abundance estimate for whitefish in the Chatanika River was conducted during 1999. Stock monitoring indicated that recruitment of humpback whitefish was stable, and similar to that observed in 1991 and 1992 (when humpback whitefish were quite abundant, Table 29). However, the proportion of large, old fish had declined somewhat between 1998 and 1999. Recruitment of least ciscos remained poor, with a low proportion of Age 2 and Age 3 fish (Doug Fleming, unpub.). Capture rate of least ciscos was less than half of that of humpback whitefish during stock sampling. Assuming that the abundance of humpback whitefish is fairly stable, this

low proportion of least ciscos is a crude indicator that the 4:1 proportion of least cisco to humpback whitefish spawners that would indicate that the least ciscos population might be recovering to a level which can sustain a harvest has not been achieved, and supports the evidence of low recruitment.

The sport fishery remained closed.

2000 update

No abundance estimate for whitefish in the Chatanika River was conducted during 2000. Stock monitoring indicated that recruitment of humpback whitefish was improving, and that strong year classes were present as age 9 - 11 fish. Stock composition was similar to that of 1994, when the threshold abundance that could sustain a spearfishery was present in the river.

A high proportion (about 75%) of the least ciscos sampled were Age 3 and Age 4. These fish are fully recruited to the spawning population. Capture rate of least ciscos (with an electrofishing boat) slightly exceeded that of humpback whitefish (53% of the sample was ciscos), a crude indicator that greater abundances of ciscos may be present than during 1997 - 1999. The fishery remained closed.

FISHERY MANAGEMENT OBJECTIVES

The whitefish fishery on the Chatanika River is managed under the Chatanika River Sport Fisheries Management Plan written and adopted in 1992. The objectives of the Plan are to ensure that harvests and incidental mortality of whitefish are sustainable, to increase participation in the recreational fishery (for all species) to 15,000 angler-days by 1995, and to ensure that public benefits derived from the fisheries on the Chatanika River outweigh the costs of fishery management. The plan sets threshold abundance levels for both humpback whitefish and least cisco below which no harvest is allowed, and a range of maximum exploitation rates depending on the threshold abundance for that species. The threshold abundance level for humpback whitefish is 10,000 spawners, and the maximum exploitation rate is from 10 to 15%. The threshold abundance level for least cisco is 40,000 spawners, and maximum exploitation rate is from 20% to 25%.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

The E.O. closure has ended utilization of humpback and round whitefish and least ciscos by all except subsistence fishermen. The humpback whitefish and least cisco stocks are being allowed to rebuild.

BOF ACTIONS

The humpback whitefish population has recovered to a level that can sustain a harvest. Round whitefish were taken occasionally in the spearfishery and by anglers fishing for grayling. Round whitefish stocks were not considered to be threatened and are considered underutilized. Anglers have expressed interest in the opportunity to harvest whitefish in the Chatanika River. Because the spawning stock of humpback whitefish in the Chatanika is above the threshold level in the Management Plan set to allow harvest, and because hook-and-line fishing would allow anglers to selectively exclude least ciscos, a Department proposal has been submitted to the BOF for consideration during the January, 2001 meeting. It would restrict whitefish sport harvest to rod and reel in the Chatanika River, lower the bag limit to five fish daily and in possession, and exclude least ciscos from the take. Should the BOF adopt this proposal, the emergency order will be revoked.

Complete text of Proposal 185 and staff comments are in Appendix B.

FISHERY OUTLOOK

Because the stock of least cisco in the Chatanika is rebuilding slowly, and research indicates that a recruitment failure took place in 1997, it is unlikely that abundance levels of least cisco will reach the threshold level set to allow harvest or a spearfishery in 2001. Catch rates are low elsewhere in the LTMA where it is legal to take round and humpback whitefish with rod and reel (Table 30). Harvest rates are expected to be low if the BOF accepts Proposal 185.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Stock assessment of whitefish was not done on the Chatanika River during 1995. In 1996, size and age composition was estimated, and during 1997, abundance was estimated. A stock composition sample was collected during 1998, 1999, and 2000. Because the current emergency order closing the fishery remains in effect until superceded by a new emergency order, no management action was taken relating to the Chatanika whitefish fishery between 1995 and 2000. The Department provides news releases and other public information to ensure that the fishing public is aware that the fishery remains closed.

Research on whitefish stocks in the Chatanika River should be limited to estimating stock composition until this research indicates that stocks may be rebuilding and an abundance estimate is needed to confirm the recovery.

SECTION XVI: OTHER WHITEFISH FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

Besides the Chatanika River, harvests and catches of whitefish from the LTMA that are consistently reported in the SWHS come from the Chena, Salcha, and Tanana rivers. These fisheries may involve spearing of fish migrating to spawning grounds in the fall and some hook-and-line angling. Round whitefish share a common habitat preference with grayling and are abundant in many areas where anglers fish for grayling. They are occasionally taken with rod and reel, as are humpback whitefish. Least ciscos rarely take a hook. Of the fisheries other than the Chatanika River, the Chena and Tanana rivers have accounted for the largest harvests. Harvest after the late 1980's in the Chena River declined sharply when the use of bait on small hooks was prohibited as part of a regulatory package protecting Arctic grayling. Given their wide distribution and low catch rate, whitefish are judged to be an underutilized resource at this time.

Although it has been felt in the past that there was very little hook-and-line angling for whitefish in the LTMA, and that most harvests and effort involved spear fisheries, estimated catches in many cases are much higher than estimated harvests (Table 30). This clearly indicates that a substantial portion of the catch is caught with hook-and-line, and is subsequently released. These data also indicate that although the fishery for whitefish on the Chatanika River was almost entirely a spear fishery, catches at many other locations were probably from hook-and-line fisheries. LTMA whitefish catch (1,115) and harvest (490) in 1998 were near the 5-year average, and indicative of a low-level fishery.

Table 30.-Sport catch and harvest of whitefish in the LTMA, 1977-1999.

Year	Chena River		Chatanika River		Salcha River		Tanana River		Other Locations		LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983	N/A ^a	1,064	N/A	5,895	N/A	94	N/A	13	N/A	370	N/A	7,436
1984	N/A	883	N/A	9,268	N/A	117	N/A	33	N/A	171	N/A	10,472
1985	N/A	3,780	N/A	14,350	N/A	35	N/A	0	N/A	315	N/A	18,480
1986	N/A	1,954	N/A	22,038	N/A	783	N/A	801	N/A	1,419	N/A	26,995
1987	N/A	56	N/A	25,074	N/A	277	N/A	128	N/A	402	N/A	25,937
1988	N/A	790	N/A	7,983	N/A	0	N/A	41	N/A	309	N/A	9,123
1989	N/A	603	N/A	15,542	N/A	362	N/A	28	N/A	153	N/A	16,688
1990	287	136	5,334	5,216	68	68	112	0	2,213	879	8,014	6,299
1991	137	34	23	0	0	0	26	26	433	296	619	356
1992	212	129	2,033	2,033	28	0	276	261	591	387	3,140	2,810
1993	148	96	558	558	17	9	31	0	194	59	948	722
1994	249	0	436	97	58	19	90	29	844	97	1,677	242
1995	436	155	71	9	54	0	12	12	614	402	1,187	578
1996	150	18	320	46	35	0	0	0	155	85	660	149
1997	425	325	95	24	331	240	68	68	485	116	1,404	773
1998	425	83	60	0	8	8	13	13	609	386	1,115	490
1999	311	41	14	0	75	27	5	5	571	146	976	219
Averages												
1983-1998	N/A	632	N/A	N/A	N/A	126	N/A	91	N/A	352	N/A	7,972
1990-1998	274	108	992	N/A	67	38	70	45	674	301	2,077	1,380
1994-1998	337	116	196	35	97	53	37	24	541	217	1,209	446

^a NA = data not available.

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Both catch and harvest in 1999 were less than in 1998, below the 1994 - 1998 five year average, and within the range of values for that period.

2000 update

No information has surfaced for 2000.

FISHERY MANAGEMENT OBJECTIVES

The background management objective for the LTMA whitefish outside of the Chatanika River is to ensure that harvests (are sustainable) and incidental mortality is minimized.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Anglers are encouraged to fish for whitefish and to look for other stocks that might provide opportunity for fall spear fishing. Because of ongoing interest, it is possible that new spear fisheries may emerge on small stocks of whitefish in some of the clearwater tributaries of the Tanana River, and reported harvest levels should be watched in future years, especially from those streams that are easily accessible.

To date there has been little success at developing spear fisheries on other stocks.

BOF ACTIONS

No regulatory matters concerning whitefish were brought before the Board of Fish during the 1997 cycle. There will be no regulatory activity directed toward burbot at the January, 2001 BOF meeting.

FISHERY OUTLOOK

The fishery should remain stable. Increased participation would increase harvest, but angler interest in this fishery appears to be steady. There remains a segment of the angling public who desire to participate in a spear fishery for whitefish in the Tanana drainage. The department receives inquiries each fall as to whether or not the Chatanika will open to spearing that year. Because of this ongoing interest, it is possible that new spear fisheries may emerge targeting small stocks of whitefish in some of the clearwater tributaries of the Tanana River, and reported harvest levels should be monitored in future years, especially from those streams that are easily accessible.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Catch, harvest, and to a certain extent effort will be monitored through the SWHS. Assessment efforts are being reduced. Should trend information develop that indicates that the fishery is changing, assessment should be reinstated to evaluate stock status.

Whitefish are highly migratory. In the Tanana and Yukon rivers there are subsistence and personal use fisheries. There is little information available describing the relationship between whitefish stocks available to and utilized by LTMA anglers/spearfishermen and those utilized within other fisheries. Research projects should be developed and implemented to delineate the life history patterns of Tanana drainage whitefish.

SECTION XVII: STOCKED WATERS FISHERIES

BACKGROUND AND HISTORICAL PERSPECTIVE

This section briefly describes the harvest and effort trends and issues for LTMA stocked waters. The Region III stocked waters staff produces detailed Annual Management Reports describing the stocking program from a perspective of both Region III and by Management Area. The forthcoming report will complement this Area Management Report with sections describing the history and results of the stocking program within the LTMA (Skaugstad *In prep*). Effort estimates for stocked waters in this section are from that report.

The program of stocking hatchery produced fish to augment angling opportunity in Alaska began in 1952 when lakes along the road system near Fairbanks were stocked with rainbow trout and coho salmon. The first sport fish hatchery in Alaska (then the Territory of Alaska) was constructed at Birch Lake in 1952 and remained in operation until the 1960's. Subsequently hatcheries at Fire Lake, Ft. Richardson, Elmendorf AFB, Clear Air Force Station, and other locations supplied fish to LTMA waters. Presently the Ft. Richardson and Elmendorf hatcheries are in operation and supply the stocked production for Interior Alaska.

The hatcheries presently produce rainbow trout, chinook and coho salmon, Arctic grayling, Arctic char, and lake trout for stocking into LTMA waters. Experimental groups of sheefish and chinook - coho hybrids have been produced and stocked into LTMA waters, and sockeye salmon from the Gulkana Hatchery were stocked into Harding Lake for two years. Those species were found to be cost-ineffective and production was discontinued.

At present a total of 54 lakes are stocked in the LTMA. They range in size from Harding Lake at about 2,500 acres to small urban ponds less than 1 acre in surface area. Piledriver Slough is the only stream stocked, with (sterile) rainbow trout. The stocked waters offer opportunities ranging from neighborhood urban ponds and large and small roadside lakes through remote lakes that are only trail-accessible, sometimes only in winter, to a few remote lakes only accessible by airplane. Within the spectrum of fisheries management needs within the LTMA they function to provide additional and more diverse angling opportunity and to shift pressure from and provide harvest alternatives for wild stocks. Perhaps one of the most important aspects of the diversity provided is the major, sustainable opportunity for winter fishing.

Fish have been stocked at four sizes: fingerling (2 grams), subcatchables (20 - 60 grams), catchables (100 - 200 grams) and surplus broodstock (rainbow trout only, up to 1500 grams). Size at stocking depends on management needs for the particular stocking location and hatchery production capability. For example, catchables are stocked in roadside and urban ponds because the angler use of such places produces demand far in excess of the production capacity of the pond to sustain the fishery with fingerling stockings. Conversely, fingerlings are stocked into remote lakes because those lakes have the productivity to meet the lower demand and it is too expensive to transport larger fish with aircraft.

Catch and harvest for the period 1990-1999 are detailed in Table 31. Stocked species provide a consistently high proportion of the total LTMA catch and harvest (Tables 6 & 7). Catch averaged 35% of the LTMA total catch during 1994 - 1998, and harvest for the same period averaged 68% of the LTMA total harvest. It is important to note that both catch and harvest appear to be impacted by the size of the fish at stocking. If the hatchery goals for size are met or

Table 31.-Sport catch and harvest of stocked fish in the LTMA waters and totals for all species, 1990-1999.

Year	Landlocked Salmon		Rainbow Trout		Arctic Char		Lake Trout		Grayling	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	16,951	6,566	90,248	35,377	1,267	440	321	102	5,131	929
1991	16,417	10,604	82,345	40,039	2,120	494	289	229	5,767	1,522
1992	15,424	6,836	57,907	20,164	4,588	1,311	1,797	363	6,041	700
1993	9,952	5,976	82,695	27,976	6,704	2,608	770	173	10,509	1,657
1994	10,242	3,645	53,518	17,014	2,642	1,068	332	73	20,674	2,665
1995	10,140	3,497	59,254	18,743	4,671	1,382	381	212	9,936	920
1996	13,682	5,094	115,218	34,382	5,398	1,697	1,200	246	12,460	617
1997	11,967	3,701	68,025	21,516	5,370	1,665	785	215	10,948	743
1998	18,005	4,867	63,327	19,200	4,925	2,298	416	51	15,070	1,325
1999	10,025	2,590	79,297	27,067	6,914	2,505	1,071	343	10,533	1,681
Averages										
1990 – 1998	13,642	5,643	74,726	26,046	4,187	1,440	699	185	10,726	1,231
1994 – 1998	12,807	4,161	71,868	22,171	4,601	1,622	623	159	13,818	1,254

-continued-

Table 31.-Page 2 of 2.

Year	All Stocked Species		LTMA Total		Stocked as a % of LTMA Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	113,918	43,414	269,361	75,186	42%	58%
1991	106,938	52,888	229,970	83,237	47%	64%
1992	85,757	29,374	192,594	47,466	45%	62%
1993	110,630	38,390	282,500	63,490	39%	60%
1994	87,408	24,465	325,269	52,501	27%	47%
1995	84,382	24,754	239,737	59,741	35%	41%
1996	147,958	42,036	316,837	58,414	47%	72%
1997	97,095	27,840	327,712	45,676	30%	61%
1998	101,743	27,741	287,586	37,789	35%	73%
1999	107,840	34,186	276,123	45,216	39%	76%
Averages						
1990 – 1998	103,981	34,545	274,618	58,167	38%	59%
1994 – 1998	103,717	29,367	299,428	50,824	35%	58%

exceeded for catchables, more anglers are attracted to fish for the larger fish, driving catch up, and a higher proportion are harvested than if the fish are small. Similarly, when fingerlings are stocked at or larger than the target size, survival to catchable size will generally be better, resulting in better fishing. Conversely, undersized fingerlings exhibit lower survival.

Effort upon stocked waters ranged from 31% to 41% of the LTMA total effort during the period 1990 - 1998 (Table 32). During 1997 and 1998 effort (about 28,000 days fished) was lower than during the period 1990 - 1996.

Table 32.-Estimated angling effort (number of angler-days) expended on stocked waters in the LTMA and LTMA total effort, 1990-1999

Year	Stocked Waters Effort	LTMA Total Effort	Stocked Waters Effort as a % of Total LTMA
1990	54,087	133,365	41%
1991	43,895	106,959	41%
1992	32,834	81,378	40%
1993	40,690	103,713	39%
1994	33,113	99,906	33%
1995	44,344	141,231	31%
1996	57,762	159,027	36%
1997	27,565	89,911	31%
1998	27,934	81,789	34%
1999	39,935	114,592	35%
Averages			
1990 – 1998	43,750	115,184	36%
1994 – 1998	43,669	119,954	33%

RECENT FISHERY PERFORMANCE (1999 SUMMARY AND AVAILABLE INFORMATION FOR 2000)

1999 Summary

Stocked fisheries performed well in aggregate during 1999. Catch and harvest were above 1998 levels, and exceeded the 1994-1998 five-year average (Table 31). Stocked waters provided 76% of the LTMA harvest in 1999. Arctic char catch and harvest is trending upward, as these long-lived fish increase in abundance and anglers learn to catch them.

Increases in effort upon stocked waters paralleled total effort increases within the LTMA in 1999, and the proportional contribution of stocked waters remained about the same at 35% (Table 32). Effort upon stocked waters in 1999 (about 40,000 days fished) was less than 1994-1998 five-year average (about 43,700 days fished).

A total of 332,083 fish were stocked into LTMA waters in 1999 (Table 33). The largest proportion were catchables, and the largest proportion of those were rainbow trout.

Table 33.-Species, number stocked, and size of fish stocked into LTMA waters, 1999.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	52,906	28,000	0	6,050	0	0	86,956
Subcatchable	0	49,772	0	58,956	0	0	108,728
Catchable	98,398	0	29,742		1,300	4,904	134,344
Broodstock	1,055	0	0		0	0	1,055
Total	152,359	77,772	29,742	65,006	1,300	4,904	331,083

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

Table 34.-Species, number stocked, and size of fish stocked into LTMA waters, 2000.

Size at Stocking	Species and Number Stocked ^a						Total
	Rainbow Trout	Coho Salmon	Chinook Salmon	Arctic Char	Arctic Grayling	Lake Trout	
Fingerling	6,009	64,125	0	0	35,974	0	86,956
Subcatchable	0	0	0	0	0	0	0
Catchable	93,649	0	28,728	2,940	21,897	10,400	157,614
Broodstock	1,226	0	0		0	0	1,226
Total	100,884	64,125	28,728	65,006	65,005	10,400	264,768

^a Depending on hatchery production and management needs, other mixes of sizes and numbers of each species are stocked in other years.

2000 update

A total of 264,768 fish was stocked into LTMA waters in 2000 (Table 34). Rainbow trout predominated among species, and catchables predominated among sizes. The State Hatchery system discontinued production of subcatchables, and the lake trout production was ended with the final production in 2000.

FISHERY MANAGEMENT OBJECTIVES

Fishery Management objectives are set out in the 1999 Statewide Stocking Plan for Recreational Fisheries, and are addressed in the report in preparation by the Region III stocked waters staff.

FISHERY MANAGEMENT ACTIVITIES/RESULTS

Fishery management activities include publicizing the stocked waters, in order to highlight the additional year-round angling opportunity provided by stocked fish and to provide alternatives to the harvest of wild stocks. Little Harding Lake was successfully converted to a special management lake providing opportunity to catch and release larger than average rainbow trout with a limited harvest opportunity, while more liberal opportunities for harvest were provided within a variety of settings from urban ponds to remote lakes.

BOF ACTIONS

There will be two proposals for stocked fisheries for the consideration of the BOF at the January 2001 meeting. Proposal 184 is a public proposal seeking to reduce the daily bag and possession limit for rainbow trout in Dune Lake from 10 with no size limit to 5 (only 1 over 18"). Dune Lake is valued by anglers because it can produce large rainbow trout. However, because Dune lake is stocked only every other year with fingerlings and because harvest seems to increase rapidly when cohorts of large rainbow trout are available, availability of those large fish is inconsistent. This is an attempt to create a more consistent availability of large rainbow trout. The Department is supporting this proposal. Complete text of the proposal and staff comments are in Appendix B.

Proposal 188 seeks to reduce the daily bag and possession limit for lake trout in Harding Lake from two (over 18") to one (over 24"). It is a Department proposal to conserve a low density stock of lake trout which are valued by anglers for their large size. Reproduction is occurring at a low level, and the augmentation of the population by stocking is ending as the lake trout program is being terminated at the State Hatcheries. Complete text of the proposal and staff comments are in Appendix B.

FISHERY OUTLOOK

As the hatcheries improve their ability to meet the needs of the statewide stocking program and the stocked waters staff are developing the knowledge needed to use the management tools provided by the range of fish species and sizes available, angling opportunity based on stocked waters is improving in the LTMA.

ONGOING AND RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Research activities and management activities are addressed in the report in preparation by the Region III stocked waters staff.

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APPENDIX A

Appendix A.-Area regulations for the LTMA.

GENERAL FISHING SEASONS

The Tanana River drainage is open to sport fishing the entire year—**except for those seasons listed below or under Special Regulations.**

The open season for fishing in Little Harding Lake is **May 15 through September 30.**

Northern Pike Fishing Season:

The open season for northern pike fishing in **flowing waters** of the *Lower* Tanana River drainage is **January 1 through December 31—except:**

In the Tolovana River drainage, including Minto Flats and Goldstream Creek, including the Chatanika River, the open season for northern pike is **June 1 through Oct. 14.**

The open season for northern pike in **lakes** of the *Lower* Tanana River drainage is **June 1 through April 20—except:**

In Harding Lake, the open season for northern pike is **June 1 through March 31.**

Use of Spears or Bow and Arrow

Suckers and burbot may be taken with spear or bow and arrow the entire year.

Northern pike may be taken by spear or bow and arrow from **September 1 through April 30** and may be speared only by persons completely submerged from **Jan. 1 through Dec. 31, except in lakes and in the Tolovana River drainage (see above).**

Whitefish (excluding sheefish) may be taken by spear or bow and arrow from **Sept. 1 through April 30** and may be speared the entire year **only** by persons completely submerged.

BAG, POSSESSION, AND SIZE LIMITS

GENERAL REGULATIONS

The general regulations for all waters of the Tanana River drainage are listed below. **Special regulations** for individual water bodies are listed on pages 12-15.

-continued-

Daily Bag, Possession, and Size Limits

Species	In Flowing Waters	In Lakes
King salmon	1 no size limit	10 in combination
Chum salmon	{ 3 in combination }	no size limit
Coho salmon	{ no size limit }	
Arctic char/Dolly Varden	10 no size limit	10 no size limit
Lake trout	2 no size limit	2 no size limit
Rainbow trout	10 no size limit	10 no size limit
Arctic grayling	5 no size limit	5 no size limit
Whitefish	15 no size limit	15 no size limit
Sheefish	2 no size limit	2 no size limit
Northern pike	5 (only 1 over 30 inches) (open season—June 1 through March 31)	5 (only 1 over 30 inches)
Burbot	15 no size limit	5 no size limit
Other fish	no bag, possession or size limits	

-continued-

Burbot set line regulations

Statewide

The total aggregate number of hooks which may be used each day for set lines may not exceed the daily bag limit for burbot in the water being fished (e.g., if the daily bag limit is five burbot, then a total of five hooks may be fished each day). More than one hook may be attached to a set line.

All hooks must be single hooks with a gap between point and shank larger than $\frac{3}{4}$ inch.

Each hook must be set to rest on the bottom of the lake or stream.

Each set must be labeled with the angler's name and address.

Each set must be physically inspected at least once during each 24-hour period.

Tanana River drainage—lakes

Burbot set lines **may not** be used in Harding Lake.

In all other lakes in the *Lower* Tanana River drainage, burbot set lines may be used **only** from October 15 through May 15.

Daily bag and possession limit in lakes where set lines are allowed is 5 burbot, any size.

Tanana River drainage—rivers and streams

Set lines may be used year-round to catch burbot in all flowing waters of the Tanana River drainage.

Daily bag and possession limit in rivers is 15 burbot, any size.

Ice houses

All ice houses not removed from the ice at the end of a day's fishing must be registered and a permit obtained from the ADF&G. Each registered ice house must have the permit number displayed on its side and roof in distinguishable numbers not less than 12 inches in height. Ice houses must be removed from all water bodies by April 30.

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SPECIAL REGULATIONS

Unless listed below, seasons, bag and possession limits for the *Lower Tanana River* drainage appear in the general regulations.

CHATANIKA RIVER AND ITS TRIBUTARIES:

1. Arctic grayling:

April 1 through May 31, *catch-and-release only*. All grayling **must be released** immediately.

June 1 through March 31, daily bag and possession limit is 5 fish. All **must be 12 inches or larger**.

2. April 1 through May 31, only unbaited, single-hook, artificial lures may be used upstream from the ADF&G marker located 1 mile upstream of the Elliott Hwy. bridge.

3. ***Closed to all salmon fishing*** upstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.

4. ***Closed to all whitefish fishing:***

- from September 1 through April 30, upstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.
- from October 1 through April 30, downstream from the ADF&G marker located 1 mile upstream of the Elliott Highway bridge.

5. Northern pike:

- season open June 1 through October 14 only.
- daily bag and possession limit is 5 fish; **only 1 may be over 30 inches long**.

6. Only a **single hook** may be used when fishing in that portion of the Chatanika River from the mouth of Goldstream Creek upstream to the boundary of the Fairbanks Nonsubsistence Use area (identified by an ADF&G marker located approximately 1 mile downstream of the Murphy Dome Road).

CHENA RIVER AND ITS TRIBUTARIES:

1. Arctic grayling:

- *catch-and-release only* for the entire year. All grayling **must be released** immediately.

2. Upstream of Chena River dam, only unbaited, single-hook, artificial lures may be used.

3. Downstream of Chena River dam, bait may be used on hooks with a gap larger than $\frac{3}{4}$ inch.

-continued-

Appendix A.-Page 5 of 6.

Special Regulations-continued)

4. **Closed to salmon fishing** upstream from the ADF&G marker located 300 feet downstream of the Chena River dam.

FIVE-MILE CLEARWATER CREEK:

1. Arctic grayling:
 - daily bag and possession limit is 2 fish, **only one** of which **may be over 12 inches.**
2. Only unbaited, **single-hook**, artificial lures may be used from January 1 through August 31.
3. Only unbaited, artificial lures may be used from September 1 through December 31.

HARDING LAKE:

1. Northern pike:
 - open season June 1 through March 31.
 - daily bag and possession limit is 5 pike; **all must be 26 inches or larger.**
2. Burbot:
 - daily bag and possession limit is 2 fish, no size limit.
3. Set lines may not be used.
4. Harding Lake is closed to the taking of northern pike with spear or bow and arrow.
5. Lake trout:
 - daily bag and possession limit is 2 fish; **all must be 18 inches or larger.**

KANTISHNA RIVER DRAINAGE (downstream from the mouth of the Toklat River):

1. Chum salmon:
 - August 15 through December 31, **catch-and-release only.** All chum salmon **must be released** immediately.

LITTLE HARDING LAKE:

1. Open to fishing from May 15 through September 30 only.
2. Only unbaited, single-hook, artificial lures may be used.
3. Rainbow trout:
 - daily bag and possession limit is 1 fish which **must be 18 inches or larger.**

-continued-

PILED RIVER SLOUGH (upstream from its confluence with Moose Creek):

1. Arctic grayling:
 - *catch-and-release only* for the entire year. All grayling **must be released immediately**.
2. Only unbaited, **single hook**, artificial lures may be used.

SALCHA RIVER AND ITS TRIBUTARIES:

1. Arctic grayling:
 - April 1 through May 31, *catch-and-release only*. All grayling **must be released** immediately.
 - June 1 through March 31, daily bag and possession limit is 5 fish. All **must be 12 inches or larger**.
2. Only unbaited, artificial lures may be used upstream of the Richardson Hwy. bridge, except that bait may be used only on hooks with a gap size larger than ¾ inch throughout the Salcha River drainage.
3. Fishing from the Richardson Highway bridge over the Salcha River is *prohibited*.
4. *Closed to salmon fishing* upstream from the ADF&G marker located about 2½ miles upstream of the Richardson Hwy. bridge.

TOKLAT RIVER DRAINAGE: *Closed to sport fishing August 15 through May 15.*

TOLOVANA RIVER DRAINAGE—including Minto Flats, Tatalina River, and Goldstream Creek:

1. Northern pike:
 - season open June 1 through October 14 only.
 - daily bag and possession limit is 5 fish; **only 1 may be over 30 inches long**.

APPENDIX B

Appendix B.-LTMA Regulation proposals and staff comments presented to the BOF in January, 2001.

PROPOSAL 183 - 5 AAC 70.060. TANANA RIVER DRAINAGE CHINOOK SALMON GUIDELINE HARVEST RANGES: [Note: 5AAC70.060 does not appear in recent versions of the Alaska Administrative Code due to a printing error.] Amend this regulation as follows:

Original Regulation:

5 AAC 70.060. TANANA RIVER DRAINAGE CHINOOK SALMON GUIDELINE HARVEST RANGES (a) If an annual chinook salmon guideline harvest range has been established in this section for a particular area in the Tanana River Drainage, and if the guideline harvest for this particular area has been attained, the department shall close the king salmon sport fishery by emergency order.

(b) The annual guideline harvest range for the Salcha River is 300 to 700 chinook salmon.

(c) The annual guideline harvest range for the Chena River is 300 to 600 chinook salmon

Proposed Change:

(a) Chinook salmon fisheries within the Tanana River Drainage will be managed to achieve established spawning escapements for the Salcha and Chena Rivers with adjustments made to guideline harvest ranges commensurate with inriver abundance.

PROBLEM: Regulations presently require that management of the chinook salmon sport fisheries in the Chena and Salcha Rivers be based on guideline harvest ranges, which do not reflect abundance based harvests. They are unnecessarily restrictive, requiring closure of the fishery when maximum guideline harvest levels are met even in the face of strong runs when escapements have or are going to be attained. Conversely, the guideline harvest ranges only mandate regulatory action when the guideline harvest range has been met, which could leave the sport fishery open during a weak run, when restrictions should be imposed.

In season estimates of total harvest are difficult to obtain because of the nature of the fisheries. Anglers can leave the fisheries at many different locations, making a creel census difficult and costly to implement. Chinook salmon counting projects in place since 1987 on the Salcha River and 1986 on the Chena River allow management of the sport fishery to be based on escapement goals rather than on determination of in-season harvest levels relative to the guideline harvest levels.

WHAT WILL HAPPEN IF NOTHING IS DONE? More efficient and timely management based on escapement goals will not be formally implemented.

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WHO IS LIKELY TO BENEFIT? The resource and all users.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? Regulate based on trend information available from the Statewide Harvest Survey. Rejected because this method cannot provide in-season protection of weak runs.

PROPOSED BY: Alaska Department of Fish and Game.

(HQ-00-F-196)

Staff comments:

Proposal No 183. , Page 133, 5 AAC 70.060. TANANA RIVER DRAINAGE CHINOOK SALMON GUIDELINE HARVEST RANGES: [Note: 5AAC70.060 does not appear in recent versions of the Alaska Administrative Code due to a printing error.] Repeal this regulation and replace with:

5 AAC 70.xxx. CHENA AND SALCHA RIVER CHINOOK SALMON SPORT HARVEST MANAGEMENT. (a) Chinook salmon fisheries within the Chena and Salcha will be managed to achieve established spawning escapement goals, with adjustments to harvest made commensurate with inriver abundance.

WHAT WOULD THE PROPOSAL DO?

This proposal would facilitate and justify management of the chinook salmon sport fisheries in the Chena and/or Salcha Rivers if necessary in order to ensure spawning escapements within the Biological Escapement Goal (BEG) ranges of 2,800 - 5,700 chinook salmon for the Chena River and 3,300 - 6,500 chinook salmon for the Salcha River. If escapements are projected to be above or below of BEG ranges, the fisheries would be managed as prescribed in 5AAC 75.003 EMERGENCY ORDER AUTHORITY, (1)(A) and (2)(A). There will be post-season evaluation of the guideline harvest ranges relative to the BEG strategy.

WHAT ARE THE CURRENT REGULATIONS?

5 AAC 70.060. TANANA RIVER DRAINAGE CHINOOK SALMON GUIDELINE HARVEST RANGES (a) If an annual chinook salmon guideline harvest range has been established in this section for a particular area in the Tanana River Drainage, and if the guideline harvest for this particular area has been attained, the department shall close the king salmon sport fishery by emergency order.

(b) The annual guideline harvest range for the Salcha River is 300 to 700 chinook salmon.

(c) The annual guideline harvest range for the Chena River is 300 to 600 chinook salmon.

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WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

Regulatory language would be in place more appropriately facilitating conservation of Chena and Salcha River chinook salmon stocks during the sport fisheries. Sport Fisheries would be managed based on in-season run strength.

BACKGROUND:

Regulations presently require that management of the chinook salmon sport fisheries in the Chena and Salcha Rivers be based on guideline harvest ranges, which do not reflect abundance based harvests. They are unnecessarily restrictive, requiring closure of the fishery when guideline harvest ranges are met even in the face of strong runs when escapements have or are going to be attained. Conversely, the guideline harvest ranges only mandate regulatory action when the guideline harvest range has been met, which could leave the sport fishery open during a weak run, when restrictions should be imposed.

In-season estimates of total harvest are difficult to obtain because of the nature of the fisheries. Anglers can leave the fisheries at many different locations, making a creel census difficult and costly to implement. Chinook salmon counting projects in place since 1987 on the Salcha River and 1986 on the Chena River will facilitate management of the sport fishery be based on escapement goals rather than on the determination of in-season harvest levels relative to the guideline harvest levels.

Biological Escapement Goals of 2,800 - 5,700 chinook salmon for the Chena River and 3,300 - 6,500 chinook salmon for the Salcha River have been established by the Department of Fish and Game. Managing these sport fisheries to ensure that escapements fall within the BEG ranges is much more focused than managing for a guideline harvest.

DEPARTMENT COMMENTS:

Department sponsored proposal.

PROPOSAL 184 - 5 AAC 70.020 (b) CODE KEY FOR BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS and 5AAC 70.022 (d) (XX). TANANA RIVER PORTION OF THE ARCTIC - YUKON KUSKOKWIM AREA WATERS, SEASONS, AND BAG LIMITS.
Amend these regulations to provide the following:

Dune Lake: Daily bag and possession for rainbow trout is five fish. Only 1 may be over 18 inches.

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PROBLEM: Dune Lake is a remote lake west of Nenana accessible by light aircraft equipped with skis or floats, or by snowmachines over a rough trail. It is stocked every other year with rainbow trout. Coho salmon and grayling are also stocked. Because rainbow trout grow to a large size in Dune Lake, it has become a popular fishing destination for guided and unguided anglers. Rainbow trout at lengths of 20 inches and greater have been consistently available in the past. Daily bag and possession limit is 10 rainbow trout, 10 coho salmon, and 5 grayling (no size limit). Catches and catch rates for rainbow trout are declining and it appears that large rainbow trout are less abundant, probably because of a combination of angler effort and variable survival of stocking cohorts of rainbow trout.

WHAT WILL HAPPEN IF NOTHING IS DONE? The high-quality rainbow trout fishery that Dune Lake is capable of producing will be intermittent or will decline to a lower level.

WHO IS LIKELY TO BENEFIT? Anglers who would like to work toward a consistent, high quality rainbow trout fishery.

WHO IS LIKELY TO SUFFER? Anglers who would like to keep more than 5 rainbow trout or more than 1 over 18 inches.

OTHER SOLUTIONS CONSIDERED? Stock more fish. ADF&G is reluctant to take this approach because stocking density may exceed the productive ability of the lake to produce large rainbow trout, resulting in an overabundance of small fish.

PROPOSED BY: Chuck Gray, Bud (H.C.) Weise, and 30 other individuals, all of whom fish at Dune Lake.

Staff Comments:

Proposal No. 184, Page,134. 5 AAC 70.020(b). CODE KEY FOR BAG LIMITS, POSSESSION LIMITS AND SIZE LIMITS; and 5 AAC 70.022(d)(23). WATERS; SEASONS; BAG,POSSESSION, AND SIZE LIMITS; AND SPECIAL PROVISIONS. Amend this regulation to provide for the following:

Dune Lake: Daily bag and possession for rainbow trout is five fish. Only 1 may be over 18 inches.

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Appendix B.-Page 5 of 16.

WHAT WOULD THE PROPOSAL DO?

This proposal would reduce daily bag and possession limit and institute a size limit for rainbow trout in Dune Lake.

WHAT ARE THE CURRENT REGULATIONS?

Daily bag and possession limit for rainbow trout is ten. There is no size limit.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

More large rainbow trout would be available in Dune Lake, and the cyclical nature of the rainbow trout catch would be moderated.

BACKGROUND:

Dune Lake is a remote lake west of Nenana accessible by light aircraft equipped with skis or floats, or by snowmachines over a rough trail. It is stocked every other year with rainbow trout. Coho salmon and grayling are also stocked. Because rainbow trout grow to a large size in Dune Lake, it has become a popular fishing destination for guided and unguided anglers. Rainbow trout at lengths of 20 inches and greater have been consistently available in the past. Daily bag and possession limit is 10 rainbow trout, 10 coho salmon, and 5 grayling (no size limit). Catches and catch rates for rainbow trout are declining or becoming inconsistent. Angler reports indicate that large rainbow trout are less consistently abundant. The cause is likely a combination of increased angler effort and variable survival of stocking cohorts of rainbow trout, coupled with the alternate-year stocking strategy and changes in hatcheries and brood sources.

DEPARTMENT COMMENTS:

The Department SUPPORTS this proposal. Ample opportunity exists to catch and harvest a combination of species. Dune Lake has a reputation for producing large rainbow trout. The present stocking strategy is cost effective and functional, but the potential exists to increase one aspect of the quality of the fishery (more consistently available large rainbow trout) without significantly reducing the other aspects of quality (opportunity to catch and harvest). This regulatory strategy may become a model for similar stocked lakes in the Tanana Valley.

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PROPOSAL 5 AAC 70.020 (b) and 5 AAC70.022(d)(4) BAG AND POSSESSION LIMITS,WATERS, AND SPECIAL PROVISIONS: Amend these regulations to provide the following:

Whitefish daily bag and possession limit is 5 per day; no size limit within the Chatanika River; Least Ciscos may not be retained and must be released immediately. Whitefish may not be taken by spear or bow and arrow.

PROBLEM: An emergency order is in place closing the Chatanika River to the taking of all whitefish. This closure restricts the fall spear/bow and arrow fishery and all take by hook and line. This restriction exists to allow the stocks of least cisco and humpback whitefish to recover from a depressed state. The humpback whitefish stocks have recovered such that they could sustain a harvest, while the least ciscos have not. While a (non-selective) spearfishery is inappropriate, hook-and-line fishing for whitefish other than least ciscos would provide additional angling opportunity where very limited use currently exists.

WHAT WILL HAPPEN IF NOTHING IS DONE? Angler opportunity to fish for whitefish will remain limited in this drainage.

WHO IS LIKELY TO BENEFIT? Those who wish to attempt to catch whitefish with rod and reel.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? Re-open the spearfishery. This cannot happen until both humpback whitefish and least cisco stocks have recovered such that they can sustain spearfishing effort.

PROPOSED BY: Alaska Department of Fish and Game.

(HQ-00-F-186)

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Staff Comments:

Proposal No. 185, Page 135, 5 AAC 70.020(b). CODE KEY FOR BAG LIMITS, POSSESSION LIMITS AND SIZE LIMITS; and 5 AAC 70.022(d)(4) WATERS; SEASONS; BAG, POSSESSION AND SIZE LIMITS; AND SPECIAL PROVISIONS: Amend these regulations to provide the following:

Whitefish daily bag and possession limit is 5 per day; no size limit within the Chatanika River; least ciscos may not be retained and must be released immediately. Whitefish may not be taken by spear or bow and arrow.

WHAT WOULD THE PROPOSAL DO?

This proposal would allow harvest of humpback whitefish, round whitefish, and broad whitefish, but not least ciscos, in the Chatanika River. Harvest would not be permitted by spear or bow-and-arrow. Daily bag and possession limit would be 5. It would not change seasons or closed areas.

WHAT ARE THE CURRENT REGULATIONS?

Daily bag and possession limit for whitefish is 15. They may be taken by spear or bow and arrow during September 1-April 30 and may be speared year-round by persons completely submerged. The Chatanika is closed to all whitefish fishing above a marker 1 mile upstream from the Elliot Highway Bridge from September 1 - April 30 and closed in the entire drainage from October 1 - April 30.

In addition, an emergency order is in place closing the Chatanika River and its tributaries to the taking of all whitefish.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

The opportunity to take all whitefish by hook-and-line except least ciscos would again be available in the Chatanika River and its tributaries.

BACKGROUND:

An emergency order is in place closing the Chatanika River to the taking of all whitefish. This closure restricts the fall spear/bow-and-arrow fishery and all take by hook-and-line. This restriction exists to allow the stocks of least cisco and humpback whitefish to recover from a depressed state. -

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The humpback whitefish stocks have recovered such that they could sustain a harvest, while the least ciscos have not. All whitefish may be harvested under existing regulations in the Tolovana River Drainage exclusive of the Chatanika River Drainage and in the rest of the Tanana River Drainage. There is a population of broad whitefish in Minto Flats. A few of them may be taken in the lower Chatanika under this regulation.

DEPARTMENT COMMENTS:

The department SUPPORTS this proposal. While a (non-selective) spear fishery is inappropriate, hook-and-line fishing for whitefish other than least ciscos would provide additional angling opportunity without threatening stocks. Few whitefish are taken by hook-and-line. The stocks should be able to support a hook-and-line fishery even if angler effort increases and anglers become somewhat more effective.

PROPOSAL 186 - 5 AAC 70.020 (b) and 5 AAC70.022(d) (4, 6, 9,18, 19, 20, 21, 23):
WATERS, SEASONS, AND SPECIAL PROVISIONS: Amend these regulations to open the following waters to grayling fishing the entire year, but restricted to catch and release for grayling fishing during the specified period(s):

- (4) CHATANIKA RIVER and its tributaries (in its entirety) - Catch and release April 1 - May 31.
- (6) CLEARWATER LAKE drainage - catch and release entire year.
- (9) DELTA CLEARWATER RIVER drainage, including the Clearwater Lake drainage - Catch and release entire year.
- (18) PILED RIVER SLOUGH and its tributaries upstream from its confluence with Moose Creek - Catch and release entire year.
- (19) RICHARDSON CLEARWATER RIVER drainage - Catch and release April 1 - May 31.
- (20) SALCHA RIVER and its tributaries (in its entirety) - Catch and release April 1 - May 31.
- (21) SHAW CREEK drainage - Catch and release April 1 - May 31.
- (23) TANANA RIVER drainage within a 2 - mile radius of its confluence with Shaw Creek. - Catch and release April 1 - May 31.

PROBLEM: The current codified regulations are confusing to both the public and enforcement personnel.

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WHAT WILL HAPPEN IF NOTHING IS DONE?. The regulations will continue to be contradictory, allowing catch and release for grayling during a closed season

WHO IS LIKELY TO BENEFIT? Law enforcement personnel using the codified regulations as the foundation of their efforts and those attempting to use the codified regulations as the foundation for the regulation books distributed to the public.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? Accomplishing this administratively, without BOF action. Not feasible because of the time frame through which these regulations were adopted and modified (periodically since 1987).

PROPOSED BY: Alaska Department of Fish and Game. (HQ-00-F-191)

Staff Comments:

Proposal No. 186, Page136, - 5 AAC 70.020(b) CODE KEY FOR BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS; and 5 AAC70.022(d) (4, 6, 9,18, 19, 20, 21, 23): WATERS, SEASONS, AND SPECIAL PROVISIONS. Amend these regulations to open the following waters to grayling fishing the entire year, but restricted to catch-and-release for during the specified period(s):

- (4) CHATANIKA RIVER and its tributaries (in its entirety) - Catch-and-release April 1 - May 31.
- (6) CLEARWATER LAKE drainage - Catch-and-release entire year.
- (9) DELTA CLEARWATER RIVER drainage, including the Clearwater Lake drainage - Catch-and-release entire year.
- (18) PILED RIVER SLOUGH and its tributaries upstream from its confluence with Moose Creek - Catch-and-release entire year.
- (19) RICHARDSON CLEARWATER RIVER drainage - Catch-and-release April 1 - May 31.
- (20) SALCHA RIVER and its tributaries (in its entirety) - Catch-and-release April 1 - May 31.
- (21) SHAW CREEK drainage - Catch-and-release April 1 - May 31.
- (23) TANANA RIVER drainage within a 2 - mile radius of its confluence with Shaw Creek. - Catch-and-release April 1 - May 31.

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WHAT WOULD THE PROPOSAL DO?

This proposal would align the regulations with the intent of the Department and the Board of Fisheries (BOF), eliminating language closing grayling fisheries but allowing catch-and-release and replacing it with language having the fisheries open but restricted to catch-and-release.

WHAT ARE THE CURRENT REGULATIONS?

The listed waters either have open seasons and special provisions allowing catch-and-release when they are not open (and thus closed) or are closed all year with special provisions allowing catch-and-release.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

The regulations would be clear, correct and enforceable. Fishing would go on as it presently does, with no impact on opportunity, catch rate, or harvest rate.

BACKGROUND:

This is a housekeeping proposal that will not impact grayling fishing.

Since 1987 ADF&G and the BOF have in concert established several regulations within the Tanana Drainage in which grayling fishing is open except during April and May (therefore "closed" during that period) but catch-and-release (C&R) is allowed during that period. Similarly, there are waters that are closed to grayling fishing the entire year, but C&R is allowed. When fishing is closed, taking (even for the purpose of C&R) is illegal (5 AAC 75.995 (6), (17) and AS 16.05.940). The Chena River grayling fishery (not listed above or requiring change) is correctly regulated as open the entire year, but C&R only. This is the model for this proposal.

DEPARTMENT COMMENTS:

The Department SUPPORTS this proposal. It will eliminate contradictions within the regulations.

PROPOSAL 187- 5 AAC70.022(d) (15) WATERS, SEASONS, AND BAG LIMITS: Amend these regulations to read:

Harding Lake is closed to the taking of northern pike.

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PROBLEM: The northern pike population in Harding Lake has declined to a level that cannot sustain a sport fishery. As adults are harvested, existing recruitment levels are not nor have they been recently sustaining the population. These recruitment failures are a result of a lowering of the lake level which has desiccated both spawning and rearing areas. When the northern pike population recovers to an abundance in excess of 1,700 adults, a consumptive fishery will be restored.

WHAT WILL HAPPEN IF NOTHING IS DONE? Further declines in the northern pike population, extending the time frame for population recovery that would support a sustainable harvest level.

WHO IS LIKELY TO BENEFIT? All who wish to conserve the Harding Lake northern pike population.

WHO IS LIKELY TO SUFFER? No one.

OTHER SOLUTIONS CONSIDERED? Leaving the fishery open to catch and release only. Angler pressure and consequent catch and release mortality will excessively slow the recovery of the population. Catch rates will be low and declining.

PROPOSED BY: Alaska Department of Fish and Game. (HQ-00-F-192)

Staff Comments:

Proposal No. 187, Page136, - 5 AAC70.022(d) (15). WATERS; SEASONS; BAG,POSSESSION, AND SIZE LIMITS; AND SPECIAL PROVISIONS. Amend this regulation to read:

Harding Lake is closed to the taking of northern pike.

WHAT WOULD THE PROPOSAL DO?

This proposal would close pike fishing in Harding Lake until the population recovers to a level which can sustain a fishery.

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WHAT ARE THE CURRENT REGULATIONS?

Open season is June 1 - March 31. Daily bag and possession limit is 5 northern pike, all must be over 26 inches. Harding Lake is closed to the taking of northern pike by spear, or bow and arrow.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

This proposal would close Harding Lake to the taking of northern pike. There would be no harvest or targeting of pike for catch-and-release. The emergency order presently implementing this would be repealed.

BACKGROUND:

The northern pike population in Harding Lake has declined to a level that cannot sustain a sport fishery. As adults are harvested, existing recruitment levels are not nor have they been recently sustaining the population. These recruitment failures are most likely a result of a lowering of the lake level which has de-watered both spawning and rearing areas. The majority of the vegetated, shallow flats critical to production of northern pike in Harding Lake are currently dry. The most recent (1999) estimated abundance of northern pike over 300 mm in length in Harding Lake was 600 fish. Harding Lake is heavily used by the public. While large lake trout, Arctic char, and burbot are available, anglers tend to gravitate toward northern pike because they are more visible and catchable in summer than the other species.

DEPARTMENT COMMENTS:

The Department SUPPORTS this proposal. The northern pike population cannot rebuild and will likely continue to decline if any effort is directed toward them. A management plan will be directed toward gradually easing restrictions and again allowing harvest as the population rebuilds.

PROPOSAL 188 - 5 AAC 70.020 (b) BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS and 5 AAC70.022(d) (15) WATERS, SEASONS, AND BAG LIMITS;

The daily bag and possession limit for lake trout in Harding Lake is one fish, 24 inch minimum length.

PROBLEM: The lake trout population in Harding Lake originated from a stocked population which is now naturally-reproducing, and augmented by low density-stocking. The abundance and catch --

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rates are low and harvested fish are generally large which is the value of this fishery. Prudence dictates that smaller fish be conserved for recruitment to the spawning stock and subsequently to the fishery.

WHAT WILL HAPPEN IF NOTHING IS DONE?. Catch rates and the quality of the fishery may decline.

WHO IS LIKELY TO BENEFIT?. Anglers who enjoy the fishery for the opportunity to catch large lake trout.

WHO IS LIKELY TO SUFFER?. No one.

OTHER SOLUTIONS CONSIDERED? Status quo until better abundance information can be gathered was rejected both for the low cost-effectiveness of assessing the small population and the likelihood that the result would not change and still be a restriction proposal as above.

PROPOSED BY: Alaska Department of Fish and Game. (HQ-00-F-193)

Staff Comments:

Proposal No. 188, Page137, - 5 AAC 70.020(b). CODE KEY FOR BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS; and 5 AAC 70.022(D)(15). WATERS; SEASONS; BAG,POSSESSION, AND SIZE LIMITS; AND SPECIAL PROVISIONS.
Amend these regulations as follows:

The daily bag and possession limit for lake trout in Harding Lake is one fish, 24 inch minimum length.

WHAT WOULD THE PROPOSAL DO?

This proposal would reduce the daily bag and possession limit and increase the size limit for lake trout in Harding Lake.

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WHAT ARE THE CURRENT REGULATIONS?

Open all year, daily bag and possession limit is 2 lake trout, minimum length must be 18 inches.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

Angling opportunity and catch and harvest rate would change little in the near term, but the fishery on this low density population would be more sustainable. The size limit would be consistent with that on other high use lake trout fisheries along the road system.

BACKGROUND:

The lake trout population in Harding Lake originated from a stocked population and is now naturally-reproducing. It has been augmented by low density-stocking. The recruitment, abundance, and catch rates are low. Spawning habitat and cover for young lake trout is limited, and only a small proportion of lake trout captured during research efforts are smaller, younger fish. Angler reports indicate that harvested fish are generally large (10 - 25 lbs.). The value of this fishery to anglers has become the opportunity to fish for large lake trout.

.DEPARTMENT COMMENTS:

The Department SUPPORTS this proposal. Because of the small population size and substantial angling effort that takes place at this lake, prudence dictates that smaller lake trout be conserved for recruitment to the spawning stock and subsequently to the fishery. Small numbers of lake trout have been stocked in Harding Lake recently to augment recruitment. However, the State Hatchery System will no longer produce lake trout, so the population will be sustained only by natural reproduction.

PROPOSAL 189 - 5 AAC 70.044. MINTO FLATS NORTHERN PIKE MANAGEMENT PLAN. (b)(1) Amend this regulation to read:

The maximum exploitation rate on northern pike in the lower Chatanika River and Minto Lakes/Goldstream Creek area by all users may not exceed 20 percent annually.

PROBLEM: The present plan caps exploitation rates for northern pike populations throughout all lakes and flowing waters of Minto Flats at 20%. Abundance information is only available for northern pike in the Minto Lakes and nearby Goldstream Creek, so the exploitation rate in this area

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is the only measure available (not the entire system). Annual harvest estimates for the lower Chatanika River and a portion of the Minto Flats can be used in development of the exploitation rate for the Minto Lakes population. Additionally, the current plan does not stipulate what management actions should take place if the exploitation rate exceeds 20%. If exploitation rates do exceed 20% in each of two consecutive years, northern pike population studies will be initiated and appropriate regulatory actions will be initiated.

WHAT WILL HAPPEN IF NOTHING IS DONE? No realistic basis for management will be available for Minto Flats northern pike.

WHO IS LIKELY TO BENEFIT?. All users of the Minto Flats northern pike population.

WHO IS LIKELY TO SUFFER?. No one.

OTHER SOLUTIONS CONSIDERED? Expansion of ADF&G research efforts in order to evaluate the entire Minto Flats northern pike population. Rejected because such a massive effort would not be cost effective.

PROPOSED BY: Alaska Department of Fish and Game. (HQ-00-F-195)

Staff Comments:

Proposal No. 189, Page137, 5 AAC 70.044. MINTO FLATS NORTHERN PIKE MANAGEMENT PLAN. (b)(1). Amend this regulation to include the following:

The maximum exploitation rate on northern pike in the lower Chatanika River and Minto Lakes/Goldstream Creek area by all users may not exceed 20 percent annually.

WHAT WOULD THE PROPOSAL DO?

This proposal would align the exploitation rate component of the Minto Flats Northern pike management plan with an index of abundance that can be measured by the Department.

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WHAT ARE THE CURRENT REGULATIONS?

(b) The Department shall manage the Minto Flats northern pike sport fishery as follows:

(1) the maximum exploitation rate of northern pike in the lakes and flowing waters of the Minto Flats by all users may not exceed 20 percent annually.

WHAT WOULD BE THE EFFECT IF THE PROPOSAL IS ADOPTED?

Management of the northern pike sport fishery would be based on a realistic goal incorporating population characteristics and catch and harvest rates within the area where the majority of the sport fishery takes place.

BACKGROUND:

The present plan caps exploitation rates for northern pike populations throughout all lakes and flowing waters of Minto Flats at 20%. Abundance information is only available for northern pike in the Minto Lakes and nearby Goldstream Creek, so the exploitation rate in this area (about one-third of Minto Flats) is the only measure available.

Additionally, the current plan does not stipulate what management actions should take place if the exploitation rate exceeds 20 percent.

DEPARTMENT COMMENTS:

The Department SUPPORTS this proposal. It will provide an index relevant to the majority of the sport fishing. Annual harvest estimates for the lower Chatanika River and a portion of Minto Flats will be combined with abundance estimates to develop exploitation estimates for the Minto Lakes population. If exploitation rates exceed 20% of the most recent abundance estimate in each of two consecutive years, northern pike population studies will be initiated and appropriate regulatory actions will be implemented.
