

Fishery Management Report No. 01-07

**Area Management Report for the Recreational
Fisheries of the Upper Copper/Upper Susitna River
Management Area, 1999**

by

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and

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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 | | | confidence interval | C.I. |
| Liter | L | | | correlation coefficient | R (multiple) |
| meter | m | east | E | correlation coefficient | r (simple) |
| metric ton | mt | north | N | covariance | cov |
| milliliter | ml | south | S | degree (angular or temperature) | $^\circ$ |
| millimeter | mm | west | W | degrees of freedom | df |
| | | Copyright | © | divided by | ÷ or / (in equations) |
| | | Corporate suffixes: | | equals | = |
| Weights and measures (English) | | Company | Co. | expected value | E |
| cubic feet per second | ft ³ /s | Corporation | Corp. | fork length | FL |
| foot | ft | Incorporated | Inc. | greater than | > |
| gallon | gal | Limited | Ltd. | greater than or equal to | ≥ |
| inch | in | et alii (and other people) | et al. | harvest per unit effort | HPUE |
| mile | mi | et cetera (and so forth) | etc. | less than | < |
| ounce | oz | exempli gratia (for example) | e.g., | less than or equal to | ≤ |
| pound | lb | id est (that is) | i.e., | logarithm (natural) | ln |
| quart | qt | latitude or longitude | lat. or long. | logarithm (base 10) | log |
| yard | yd | monetary symbols (U.S.) | \$, ¢ | logarithm (specify base) | log ₂ , etc. |
| Spell out acre and ton. | | months (tables and figures): first three letters | Jan, ..., Dec | mid-eye-to-fork | MEF |
| | | number (before a number) | # (e.g., #10) | minute (angular) | ' |
| Time and temperature | | pounds (after a number) | # (e.g., 10#) | multiplied by | x |
| day | d | registered trademark | ® | not significant | NS |
| degrees Celsius | °C | trademark | ™ | null hypothesis | H_0 |
| degrees Fahrenheit | °F | United States (adjective) | U.S. | percent | % |
| hour (spell out for 24-hour clock) | h | United States of America (noun) | USA | probability | P |
| minute | min | U.S. state and District of Columbia abbreviations | use two-letter abbreviations (e.g., AK, DC) | probability of a type I error (rejection of the null hypothesis when true) | α |
| second | s | | | probability of a type II error (acceptance of the null hypothesis when false) | β |
| Spell out year, month, and week. | | | | second (angular) | " |
| | | | | standard deviation | SD |
| Physics and chemistry | | | | standard error | SE |
| all atomic symbols | | | | standard length | SL |
| alternating current | AC | | | total length | TL |
| ampere | A | | | variance | Var |
| calorie | cal | | | | |
| direct current | DC | | | | |
| hertz | Hz | | | | |
| horsepower | hp | | | | |
| hydrogen ion activity | pH | | | | |
| parts per million | ppm | | | | |
| parts per thousand | ppt, ‰ | | | | |
| volts | V | | | | |
| watts | W | | | | |

FISHERY MANAGEMENT REPORT NO. 01-XX

**AREA MANAGEMENT REPORT FOR THE RECREATIONAL
FISHERIES OF THE UPPER COPPER/UPPER SUSITNA RIVER
MANAGEMENT AREA, 1999**

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

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

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

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

This area management report provides information regarding the Upper Copper/Upper Susitna Management Area (UCUSMA) and its fisheries for 1999, with preliminary information from the 2000 season. Following the introduction, which includes an overview of the region, this report is organized into two primary sections: management area overview, and fisheries. The fisheries section describes the major fisheries within the UCUSMA. Each fishery contains a background and historical perspective, recent fishery performance, management objectives, fishery management, fishery outlook, recent board of fisheries actions, current issues, and ongoing and recommended research and management activities.

INTRODUCTION

The Alaska Board of Fisheries (BOF) divides the state into ten regulatory areas for the purpose of organizing the sport fishing regulatory system by drainage and fishery. These areas (different from regional management areas) are described in Title 5 of the Alaska Administrative Code (5 AAC). Sport Fish Division of the Alaska Department of Fish and Game (ADF&G) divides the

state into three administrative Regions with boundaries roughly corresponding to groups of the BOF regulatory areas (Figure 1). Region I is Southeast Alaska. Region II covers portions of Southcentral Alaska, Kodiak, Southwestern Alaska, and the Aleutian Islands. Region III includes three of the BOF regulatory areas. They are the upper Copper and upper Susitna regulatory area, the Arctic-Yukon-Kuskokwim regulatory area, and the Tanana River drainage. Prior to 2000, a portion of the Arctic-Yukon-Kuskokwim regulatory area was excluded from Region III and included in Region II; this was the lower Kuskokwim drainage from the Aniak River downstream and Kuskokwim Bay.

Region III is the largest region, encompassing the majority of the landmass of the state of Alaska (Figure 1). The region contains over 1,357,080 km² (526,000 mi²) of land, some of the state's largest river systems (the Yukon, the Kuskokwim, the Colville, Noatak, and upper Copper and upper Susitna River drainage's), thousands of lakes and thousands of miles of coastline and streams. Regional coastline boundaries extend from Sheldon Point in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean. Region III as a whole is very sparsely populated, with the most densely populated center located in the Tanana River Valley. Fairbanks (population about 31,000) is the largest community.

For administrative purposes Sport Fish Division has divided Region III into six 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 upstream of Paimiut except the Tanana River drainage, and the Kuskokwim River drainage upstream from the Aniak River).
- (3) The Upper Copper/Upper Susitna Management Area (the Copper River drainage upstream of Canyon Creek and Haley Creek, and the Susitna River drainage above the Oshetna River).
- (4) The Upper Tanana River Management Area (the Tanana River drainage upstream from Banner Creek and the Little Delta River).
- (5) The Lower Tanana River Management Area (the Tanana River drainage downstream from Banner Creek and the Little Delta River).
- (6) The Lower Yukon/Kuskokwim Management Area (the Yukon River drainage downstream of Paimiut and the Kuskokwim River drainage downstream of and including the Aniak River drainage and Kuskokwim Bay). This management area was created and added to Region III in 2000.

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

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 fishery conservation plans for the State of Alaska. Board members are appointed by the Governor and must be confirmed by the legislature. Board members are appointed for three years.

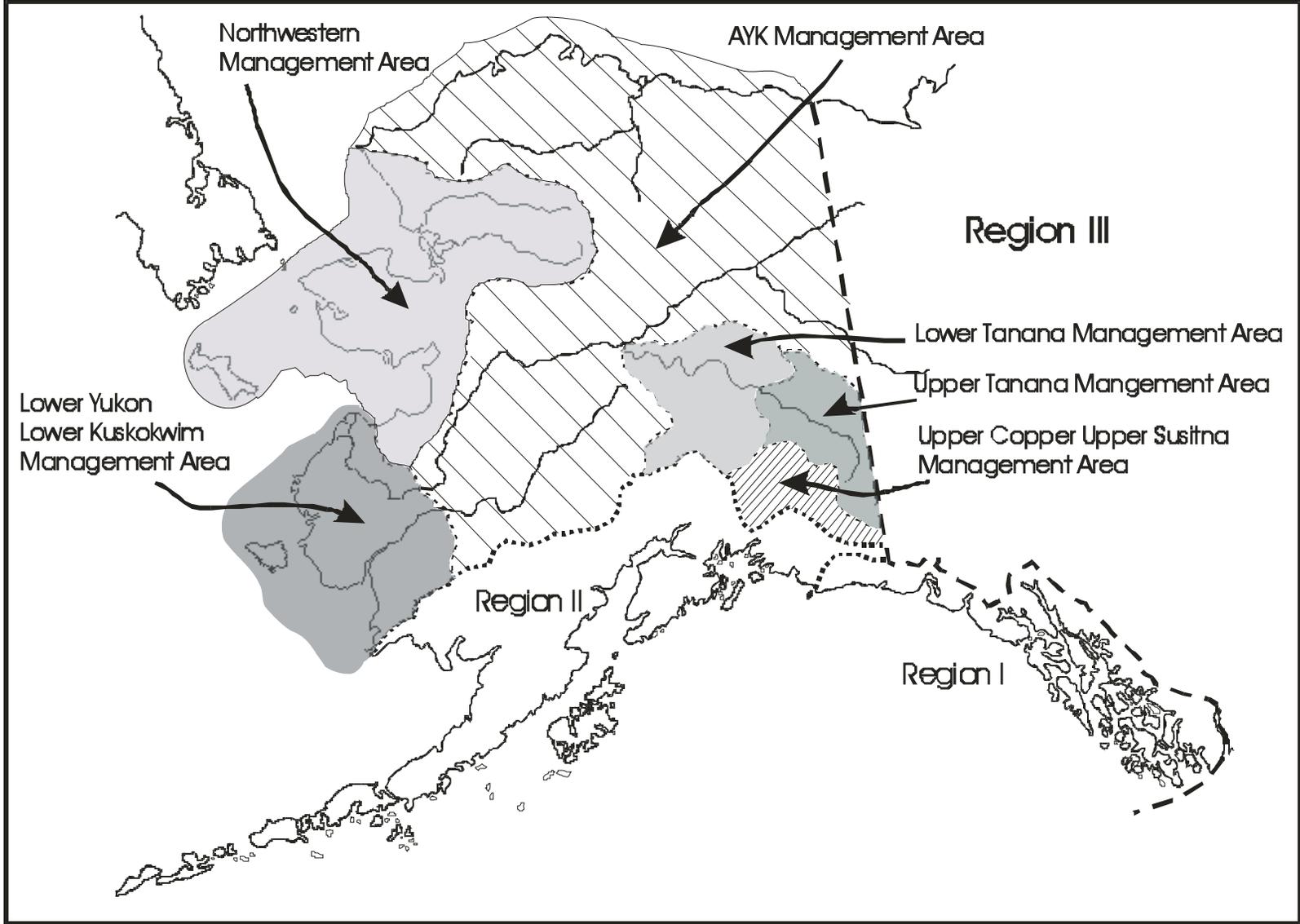


Figure 1.-Map of the sport fish regions in Alaska and the six Region III management areas.

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

ADVISORY COMMITTEES

Local fish and game advisory committees have been established throughout the state to assist the boards of fish and game in assessing fisheries and wildlife issues and proposed regulation changes. Advisory committee members are individuals from the local public who are nominated and voted on by all present during an advisory committee meeting. Most active committees in urban areas meet in the fall and winter on a monthly basis; rural committees have generally only one fall and one spring meeting due to funding constraints. Advisory meetings allow opportunity for direct public interaction with department staff that answer questions and provide clarification concerning proposed regulatory changes. The boards support section within the Division of Administration provides administrative and logistical support for the BOF and Fish and Game Advisory Committees. During 2000, the department had direct support responsibilities for 56 advisory committees in the state.

ADF&G EMERGENCY ORDER AUTHORITY

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, they deal with the situation until it is resolved or the BOF can formally take up the issue. Emergency orders are also the mechanism by which "in-season" management of fisheries is accomplished. In-season management is usually in accordance with a fisheries management plan approved by the BOF.

FEDERAL REGIONAL ADVISORY COUNCILS

Under ANILCA (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 Alaska residents. 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 and waters. The constitution of the state of Alaska has not been amended and on October 1, 1999 the federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the federal lands.

REGION III SPORT FISH DIVISION RESEARCH AND MANAGEMENT STAFFING

The Region III Sport Fish Division staff biologists are organized into a research group and a management group. The management group consists of a management supervisor, an area biologist for each of the six management areas, one or more assistant area management biologists, and two stocked water biologists. The area biologists evaluate fisheries and propose

and implement management strategies through plans and regulation in order to meet divisional goals. A critical part of these positions is interaction with the BOF, advisory committees, and the general public. The stocked waters biologists plan and implement the regional stocking program for recreational fisheries. 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 group consists of a research supervisor, research biologists (eight in 2000), and various field technicians. 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.

STATEWIDE HARVEST SURVEY

Sport fishing effort and harvest of sport fish species in Alaska has been estimated and reported annually since 1977 using a mail survey (Mills 1979-1994; Howe et al. 1995-2000). In recent years, two types of questionnaires were mailed to a stratified random sample of households containing at least one individual who purchased a sport fishing license (resident or non-resident) or possess a valid permanent fishing license. Information gathered from the surveys includes participation (number of anglers, trips, and days fished), number of fish caught and number harvested by species and site. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaskan waters as well as the sport harvest. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. The survey is designed to provide estimates of effort, harvest, and catch on a site-by-site basis. It was not designed to provide estimates of effort directed towards a single species and species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the report. The survey results for each year are not available until the following year; hence the results for 1999 are generally not available until fall 2000. Additionally, creel surveys have been selectively used to verify the mail survey for fisheries of interest, or for fisheries that require more detailed information or inseason management.

The following guidelines (Mills and Howe 1992) have been provided to evaluate the utility of statewide survey estimates, which is dependent on the number of responses for a given site:

- Other than to document that sport fishing occurred, estimates based on fewer than 12 responses should not be used,
- Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends,
- Estimates based on 30 or more responses are generally usable.

In general, estimates from smaller fisheries with low participation are less precise than those of larger fisheries with high participation.

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The upper Copper River-upper Susitna River sport fish management area consists of all waters and drainages of the Copper River upstream from a line crossing the Copper River between the south bank of the mouth of Haley Creek and the south bank of the mouth of Canyon Creek in Wood Canyon, and all waters and drainages of the upper Susitna River upstream from the confluence of the Oshetna River (Figure 2). Located within the UCUSMA are the communities of Glennallen, Gulkana, Gakona, Chitina, McCarthy, Kenny Lake, Copper Center, Paxson, Mentasta, and Slana. Three of the state's major highways (Edgerton, Glenn and Richardson), together with numerous secondary roads and trails, provide good access to most of the area's sport fisheries. Float-equipped aircraft are commonly used during the summer to access the area's many remote lake and stream fisheries not accessible by road. Snowmachines are the popular mode of travel to remote fisheries in the winter. Principal land managers in the UCUSMA are the National Park Service (Wrangell-St. Elias National Park), Bureau of Land Management (Gulkana Wild River), Ahtna Incorporated, and the Alaska Department of Natural Resources.

Regulations governing the sport fisheries in the UCUSMA are found in Chapter 52 of Title 5 of the Alaska Administrative Code (AAC) and regulations regarding the personal use fisheries are found in Chapter 77, subsistence fisheries regulations are found in Chapter 01. Effort and harvest statistics for UCUSMA fisheries are reported in the statewide harvest survey (SWHS) by Mills (1979-1994) and Howe et al. (1995-2000), under the heading "Glennallen Area" (Area I). The SWHS is an annual postal survey of license holders conducted to estimate sport fishing participation (effort), harvest and catch statewide by fisheries, areas, regions, and species.

Management and research of UCUSMA sport and personal use fisheries are directed from the Fairbanks and Glennallen area offices of the Alaska Department of Fish and Game. In 1997, management responsibility of the UCUSMA was transferred from the Region II, headquartered in Anchorage, to the Region III, headquartered in Fairbanks. The area management biologist and assistant area management biologist are stationed in Glennallen. A permanent full-time field office assistant is also stationed in Glennallen. This assistant is shared with the Division of Wildlife Conservation. Research biologists based in Fairbanks conduct several research projects within the area. The professional staff is assisted by numerous seasonal technicians and biologists (based in Glennallen and Fairbanks) whose employment ranges from 2 to 10 months. Expertise on experimental design is provided to the area staff by the Division of Sport Fish, Research and Technical Services staff stationed in Fairbanks and Anchorage.

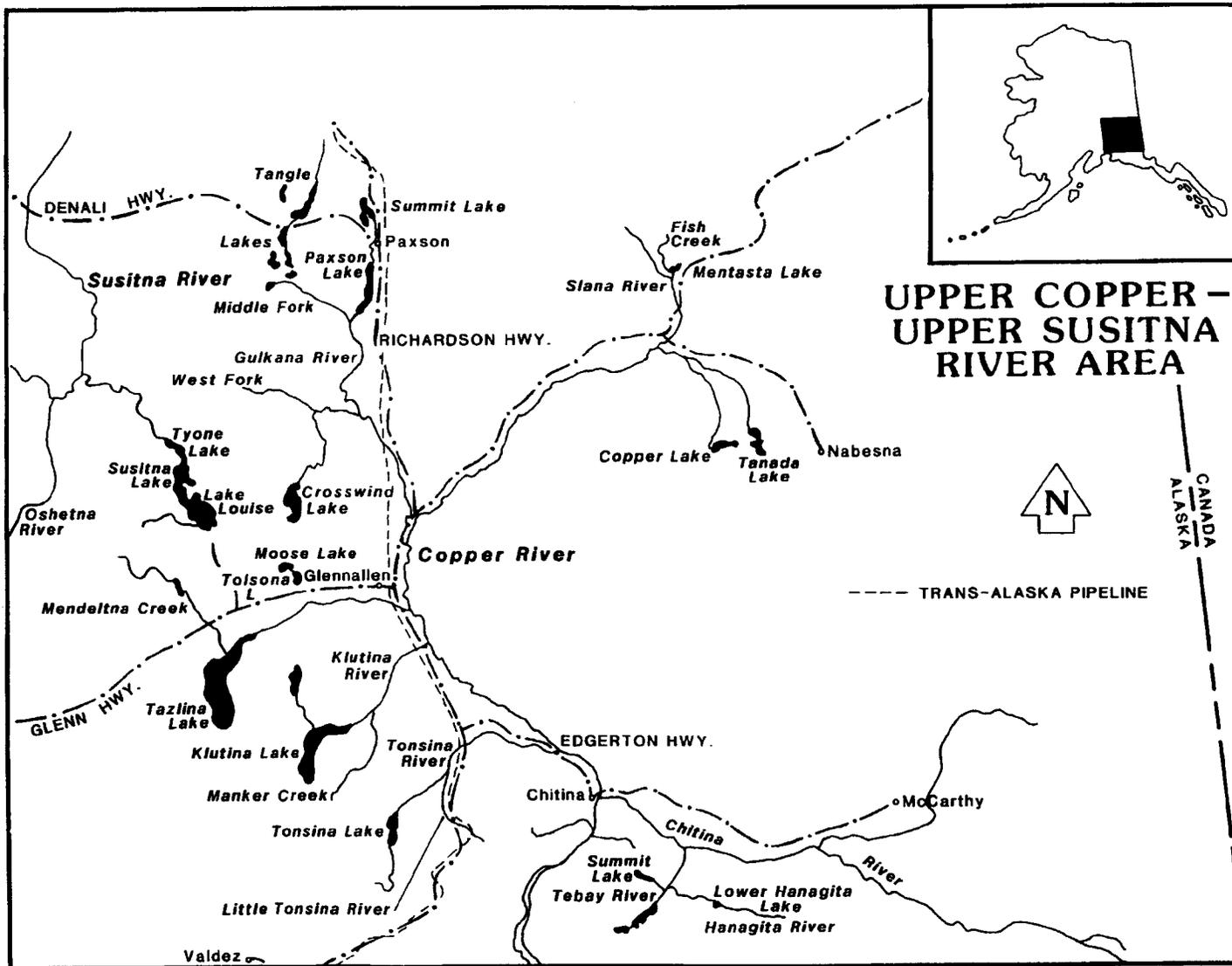


Figure 2.-The Upper Copper/Upper Susitna Management Area (UCUSMA).

FISHERIES RESOURCES

The UCUSMA offers a unique blend of freshwater fishing opportunities to sport anglers, personal use, and subsistence participants. Three species of Pacific salmon (chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, and sockeye *O. nerka*) are available to anglers fishing upper Copper River drainage waters. The upper Susitna River drainage has no anadromous salmon. A velocity barrier in Devil's Canyon prevents upstream migration in the Susitna River. Anglers can also target coho salmon stocked in several landlocked lakes of the UCUSMA.

Popular fisheries also occur on the area's resident stocks of Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, Dolly Varden *Salvelinus malma*, rainbow and steelhead trout *O. mykiss*, and lake trout *Salvelinus namaycush*. Smaller fisheries occur on the area's resident stocks of whitefish *Coregonus* and *Prosopium* spp.

Currently, thirty lakes in the UCUSMA are stocked with Arctic grayling, rainbow trout, coho salmon, and Arctic char *S. alpinus*. The stocked fish are reared at state-owned hatcheries on Fort Richardson and Elmendorf Air Force Base in Anchorage. The stocked-lake fisheries provide additional and diversified angling opportunity and reduce harvest pressure on wild fish stocks.

A sockeye salmon hatchery operated by Prince William Sound Aquaculture Corporation (PWSAC) is located in the upper Gulkana River near the community of Paxson. Egg-takes are conducted near the hatchery and overwinter incubation is accomplished at the hatchery. Fry are subsequently released at Crosswind, Paxson and Summit lakes. The returning adults are harvested by the commercial, subsistence, personal use and sport fisheries.

OTHER USER GROUPS

Returns of salmon to the Copper River support commercial fisheries in the Copper River District. From 1994 through 1998, an average of 1,815,506 sockeye salmon and 57,696 chinook salmon were commercially harvested in the Copper River District (Sharp et al. 2000, Table 1). Within this period, both sockeye (1997) and chinook (1998) harvests were the highest on record.

A personal use and a subsistence salmon fishery have been established by the Board of Fisheries (BOF) in the upper Copper River. The Division of Commercial Fisheries has lead management authority for the subsistence fishery while the Division of Sport Fish has the lead management responsibility for the personal use fishery.

From 1994 through 1998, an average of over 177,411 salmon was harvested annually in these fisheries (Table 2). Sockeye salmon have comprised about 95% of the total catch. These fisheries are described in detail in a separate section of this report, and thus will not be described further here.

ALASKA BOARD OF FISHERIES ACTIVITIES

The development of regulations for fisheries in the UCUSMA occurs within the established Alaska Board of Fisheries (BOF) process. The public provides their input concerning regulation changes and allocation by various means including testifying directly to the BOF, by participating in local fish and game advisory committee meetings, or by becoming members of local fish and game advisory committees.

Table 1.-Commercial harvests of chinook and sockeye salmon in the Copper River District, 1977-2000.

| Year | Chinook Harvest | Sockeye Harvest |
|------------------------------|------------------------|------------------------|
| 1977-1988 ^a | 32,545 | 633,351 |
| 1989 | 30,863 | 1,025,923 |
| 1990 | 21,702 | 844,778 |
| 1991 | 34,787 | 1,206,811 |
| 1992 | 39,810 | 970,938 |
| 1993 | 29,727 | 1,398,234 |
| 1994 | 47,061 | 1,152,220 |
| 1995 | 65,675 | 1,271,822 |
| 1996 | 55,646 | 2,356,365 |
| 1997 | 51,273 | 2,955,431 |
| 1998 | 68,827 | 1,341,692 |
| 1999 | 62,337 | 1,682,559 |
| 2000 | 32,030 | 883,645 |
| 1989-1998^a | 44,537 | 1,452,421 |
| 1994-1998^a | 57,696 | 1,815,506 |

^a Average value for the years during the period.

Table 2.-Reported subsistence and personal use harvests of chinook, sockeye, and coho salmon in the Copper River, 1977-2000.

| Year | Chinook | Sockeye | Coho | Total |
|------------------------------|--------------|----------------|--------------|----------------|
| 1977-1988 ^a | 2,970 | 54,638 | 796 | 58,404 |
| 1989 | 2,913 | 80,557 | 890 | 84,360 |
| 1990 | 3,221 | 94,001 | 1,544 | 98,766 |
| 1991 | 5,164 | 111,788 | 3,477 | 120,429 |
| 1992 | 4,705 | 127,670 | 1,817 | 134,192 |
| 1993 | 4,037 | 138,211 | 1,428 | 143,676 |
| 1994 | 5,423 | 153,049 | 1,958 | 160,430 |
| 1995 | 6,330 | 125,573 | 5,547 | 137,450 |
| 1996 | 4,881 | 141,337 | 3,817 | 150,035 |
| 1997 | 7,798 | 224,499 | 334 | 232,631 |
| 1998 | 8,334 | 195,567 | 2,607 | 206,508 |
| 1999 | 8,807 | 209,917 | 3,160 | 221,884 |
| 2000 ^b | 6,764 | 137,660 | 3,551 | 147,975 |
| 1989-1998^a | 5,281 | 139,225 | 2,342 | 146,848 |
| 1994-1998^a | 6,553 | 168,005 | 2,853 | 177,411 |

^a Average value for the years during the period.

^b Preliminary estimates.

Advisory Committees

Advisory committees have been established throughout Alaska to assist the BOF in assessing the effects of fisheries issues and proposed regulations on communities local to the resource under consideration. Most active committees meet at least once each year, usually in the fall prior to scheduled BOF meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow the public to interact with the staff involved with resource issues of local concern. Within the UCUSMA there are three advisory committees that serve resource users of the area, these are the Tok Cutoff/Nabesna Road, Copper Basin, and Paxson advisory committees. In addition, the Copper River/Prince William Sound (Cordova), Fairbanks, Delta Junction and Anchorage advisory committees often comment on proposals concerning Copper River fisheries.

Recent Board of Fisheries Actions

Under the current operating schedule, the BOF meets on a 3-year cycle. Proposals regarding UCUSMA fisheries were heard during the 1996 BOF meeting in Cordova. Several major changes regarding the management of chinook salmon, resident species, and the personal use fisheries in the UCUSMA were passed by the BOF during this meeting (Taube 2000). Agenda change requests regarding the personal use fishery and Tonsina River sport fishing regulations were addressed at BOF meetings in Anchorage in spring 1998 and 1999, respectively.

In December 1999 at its meeting in Valdez, the BOF addressed 29 proposals regarding UCUSMA sport and personal use fisheries. Changes as a result of BOF rulings are summarized below. Under personal use/subsistence regulations the BOF ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina subdistrict of the upper Copper River. This subdistrict encompassed the existing Copper River personal use salmon dipnet fishery. As a result of this decision, the Copper River personal use salmon dipnet fishery was repealed and a Chitina subdistrict subsistence fishery was established. The regulations for the Chitina subdistrict subsistence fishery are similar to the Copper River personal use salmon dipnet Fishery regulations with three exceptions. These include: 1) annual bag limits will continue to be 30 salmon for a household of two or more, and 15 salmon for a household of one, of which only one fish can be a chinook salmon. The BOF determined that reducing the bag limit of chinook salmon from four in the personal use fishery to one in the subsistence fishery, provided for a reasonable opportunity to harvest a chinook salmon, but would also maintain chinook salmon harvests at historic levels; 2) based upon recent harvests the board determined that 100,000–150,000 salmon were necessary for subsistence needs to be met for the Chitina subdistrict fishery. This number included contributions of hatchery fish, and after this contribution was subtracted, resulted in the 85,000 – 130,000 wild stock harvest level; and 3) as a subsistence fishery, there is no regulatory requirement for possessing a valid sport fishing license to participate in the fishery.

There were three sport fish regulation changes specific to chinook salmon, Copper River drainage wide, included; 1) a reduction of the seasonal bag limit from five to four, 2) allow for sport fish guiding on Tuesdays, and 3) guides are permitted to fish while guiding however they cannot retain a chinook salmon while guiding. In addition, the BOF gave additional inseason authority to managers of the Copper River commercial and sport fisheries to reduce chinook harvests when chinook salmon returns are low or are delayed due to environmental conditions.

Specific to the Gulkana River chinook salmon sport fishery there was a change in the regulation for the area downstream of the Richardson Highway bridge to the Copper River. This change

clarified the existing regulation for the period June 1 to July 31, when only single-hook artificial flies are permitted by specifying hook size and distance that additional weight may be from the fly. The new regulation states that the hook gap may not exceed $\frac{3}{4}$ inch between point and shank and weight may only be used 18 inches or more ahead of the fly. The board also passed a proposal that provides protection for rainbow trout and steelhead on the Gulkana River, but may have some impacts on chinook salmon anglers on the upper Gulkana River. The new regulation permits only unbaited, single-hook artificial lures in all flowing waters of the Gulkana River drainage with two exceptions: 1) the single-hook, artificial fly area from June 1 to July 31; and, 2) the mainstem Gulkana River upstream of the Richardson Highway bridge to an ADF&G marker 7 $\frac{1}{2}$ miles upstream of the confluence with the west fork from June 1 to July 19. This regulation permits bait in the main chinook salmon fishing area of the Gulkana River during the open season. This same protection was provided for rainbow trout and steelhead in the flowing waters of the upper Copper River drainage with the exception of Klutina River drainage and other Copper River tributaries as provided in the regulations. The Klutina River was excluded from this coverage to permit the use of bait for the popular chinook salmon and Dolly Varden fisheries that occur in that system.

Only one change regarding sockeye salmon sport fishing was passed. From August 1 to December 31, the bag and possession limit for sockeye salmon increased from 3 to 6 fish on the West Fork Gulkana upstream of a department marker located $\frac{1}{2}$ mile upstream of the confluence with the mainstem Gulkana River.

There are several changes to the rainbow trout and steelhead regulations in the area. The bag and possession limit for rainbow trout and steelhead in **all lakes and flowing waters** of the upper Copper River and upper Susitna River drainage is two, unless stated otherwise for a given lake or stream (for example, the Gulkana River would remain catch and release for rainbow and steelhead trout). As stated above, only unbaited, single hook artificial lures may be used in all **flowing waters** of the upper Copper River drainage, with the exception of the Klutina River drainage and other tributaries specifically listed in the regulations. The entire Hanagita River drainage and the portion of the Tebay River downstream of its confluence with the Hanagita River became catch and release only for rainbow trout and steelhead. The final change to rainbow trout regulations involved Summit Lake in the Tebay River drainage. The bag and possession limit for rainbow trout is now 10 per day, with a maximum size limit of 12 inches. The open season is from July 1 to May 31.

Regarding burbot, there were two changes in the regulations for the upper Copper River drainage. The existing Copper River personal use burbot fishery was repealed. Burbot may be harvested on the Copper River mainstem with unattended setlines, with a bag and possession limit of two burbot per day. The total number of hooks used may not exceed two, and each hook is a single hook with a gap between point and shank larger than $\frac{3}{4}$ inch, and is set to rest on the river bottom. Each line must be identified with the angler's name and address and must be physically inspected at least once every 24-hours. The second change was a reduction in bag and possession limit for burbot at Moose and Tolsona lakes from five to two.

Only one change occurred in the Arctic grayling regulations for the upper Copper River drainage. The bag and possession limit for Arctic grayling on Mendeltna Creek was reduced from five to two, with a minimum size limit of 12 inches. The open season was set from June 1 to March 31, to offer protection during the spawning season.

Emergency Order Authority

To address conservation concerns and to implement BOF adopted management plans, the department has emergency order authority (5 AAC 75.003) to modify time, area, and bag/possession limit regulations. Emergency orders issued under this authority during 1999 are summarized in Table 3.

FEDERAL SUBSISTENCE

On October 1, 1999 the Federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the wild-designated portion of the Gulkana River, and Wrangell-St. Elias National Park. The upper Copper River subsistence salmon fishery is the fishery within the UCUSMA primarily effected by the change in management responsibilities. The development of regulations for subsistence fisheries under Federal management will be within the established Federal Subsistence Board (FSB) process. The public provides their input concerning regulation changes by testifying in Federal Subsistence Regional Advisory Council meetings or by becoming council members. Regional advisory councils have been established throughout Alaska to assist the FSB in determining local subsistence issues and providing recommendations on proposed fishing and hunting regulations on the fish and game populations under consideration. The UCUSMA fisheries fall under the purview of the Southcentral Regional Advisory Council. The council meets twice each year, usually in the fall and late winter, the most recent meeting was held September 20-22 in Mentasta. At this meeting, the implementation plan regarding Federal management of subsistence fisheries was outlined. Staff from the Division of Sport Fish and other divisions are invited to attend the council meetings and present data to the council regarding wildlife and fisheries issues within the councils responsibility.

STATEWIDE HARVEST SURVEY

Effort and harvest statistics for UCUSMA fisheries are reported in the SWHS by Mills (1979-1994) and Howe et al. (1995-2000), under the heading "Glennallen Area" (Area I). Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. The SWHS is an annual postal survey of license holders conducted to estimate sport fishing participation (effort), harvest and catch statewide by fisheries, areas, regions, and species.

ECONOMIC SURVEYS

The economic value of specific management changes regarding the chinook salmon fishery on the Gulkana River were examined via survey in 1993 (Layman et al. 1996). The four management options surveyed were: 1) status quo, no regulatory change; 2) doubling the harvest; 3) double the daily bag limit; 4) seasonal bag limit of five chinook. The results of the survey suggest that the seasonal bag limit provided the greatest net economic benefit, followed by option 2, option 3 and option 1. In 1994, a seasonal bag limit of five chinook salmon was adopted by the BOF for the upper Copper River drainages.

The estimated net economic value of the upper Copper River personal use and subsistence fisheries were calculated based upon the permit and harvest database from 1990 using the travel cost method (TCM; Jones 1998). The average value of the fishery to the participant per permit

Table 3.-Emergency orders issued for UCUSMA sport and personal use fisheries during 1999.

| Year | E. O. Number | Explanation |
|------|--------------|--|
| 1999 | 3-RS-01-99 | Establishes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River through August 31, 1999. The Chitina Subdistrict will be open from 8:00 A.M. Friday June 11 until 8:00 P.M. Saturday June 12, and will be closed from Sunday June 13 through Tuesday June 15, and potentially reopen 12:00 P.M. Wednesday June 16 until 8:00 P.M. Sunday June 20. |
| 1999 | 3-RS-02-99 | Changes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 14 - 20. The Chitina Subdistrict will be open from 8:00 A.M. Saturday June 19 until 8:00 P.M. Sunday June 20, and potentially reopen 12:00 P.M. Monday June 21 until 8:00 P.M. Sunday June 27. |
| 1999 | 3-RS-03-99 | Changes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 21 – 27. The Chitina Subdistrict will be open from 12 noon Wednesday June 23 until 8:00 P.M. Sunday June 27, and potentially reopen 8:00 A.M. Wednesday June 30 until 8:00 P.M. Monday July 5. |
| 1999 | 3-RS-05-99 | Changes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from June 28 – July 5. The Chitina Subdistrict will be open from 8:00 A.M. Wednesday June 30 until 8:00 P.M. Monday July 5, and potentially reopen 12 noon Wednesday July 7 until 8:00 P.M. Sunday July 11. |
| 1999 | 3-RS-06-99 | Changes the schedule for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River for the period from July 5 – 11. The Chitina Subdistrict will be open from 8:00 A.M. Wednesday June 30 and remain open until midnight August 31. |
| | | In addition, this emergency order establishes the weekly period when a supplemental permit for 10 additional sockeye salmon will be issued for the personal use dip net salmon fishery in the Chitina Subdistrict of the upper Copper River. Sonar counts at Miles Lake from June 21 – 27 exceeded the weekly escapement objective by over 53,800 fish. Based on migration timing studies, this surplus beyond escapement needs will be present within the Chitina Subdistrict from approximately July 12 – 18. Supplemental permits for the personal use fishery will be issued only at the Chitna Fish and Game office and valid from 8:00 A.M. July 12 to midnight July 18. |

in 1990 was estimated at approximately \$47, with 95% confidence limits of \$31 and \$114. Values varied dependent on the distance traveled to participate in the fisheries.

SPORT FISHING EFFORT

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

The following summary of sport angler effort in the UCUSMA is based on SWHS mail survey data (Mills 1979–1994, Howe et al. 1995–2000). From 1989 through 1998 sport anglers have expended an average of 68,302 angler-days fishing UCUSMA waters, an average of 2.9% of the annual statewide sport angling effort and about 24% of the annual AYK (Region III) sport angling effort over this period (Table 4). This is a 25% increase compared to the 1977–1988 average. Recreational angler effort was relatively stable until 1991 when it began to increase and peaked in 1995 when 102,951 angler-days were expended in the UCUSMA (Figure 3). The upper Copper River drainage has supported approximately 83% of the sport effort expended in the UCUSMA from 1989 through 1998 (Table 5). In this drainage, the Gulkana River drainage has supported the vast majority of the sport angling effort. The Klutina River is the other upper Copper River drainage that supports a popular sport fishery. The major sport fishery in the upper Susitna River drainage is in the Tyone River drainage and includes Lake Louise and Susitna and Tyone lakes.

During 1999, sport anglers fishing UCUSMA waters expended approximately 77,619 angler-days (Tables 4 and 5). Participation in 1999 was the highest since 1995, and is 12% higher than the recent 10-year average. The decline in participation during 1996–1998 in the UCUSMA reflects decline statewide in sport fisheries, particularly among resident license holders.

ESTABLISHED MANAGEMENT PLANS AND POLICIES

Some UCUSMA fisheries have been the focus of allocative conflicts. These conflicts have led the BOF to establish several management plans and policies to guide the area's fisheries. The goal of these plans is to allocate fish resources among users and to provide managers with guidelines to maintain a sustained yield of the area's fish stocks. The following management plans and policies have been adopted by the BOF for UCUSMA fish stocks and reflect actions taken by the BOF during the December 1999 meeting:

Copper River District Salmon Management Plan (5 AAC 24.360). This management plan contains spawning escapement goals for sockeye and other salmon, harvest guidelines for the subsistence and sport fisheries in the drainage, and hatchery brood stock and hatchery surplus goals. The goals are met through regulation of the commercial fishery at the mouth of the river, and are measured at the sonar counter near Miles Lake.

Copper River Chinook Salmon Fishery Management Plan (5 AAC 24.361). This management plan provides for an escapement range of chinook salmon in the Copper River drainage of 28,000 – 55,000. Management of the commercial and sport fisheries will reduce the potential harvest by 5% to achieve this escapement range. This reduction will be achieved in the commercial fishery through closure of statistical areas during statistical weeks 20 and 21 and in the sport fishery by reduction of the seasonal bag limit

Table 4.-Number of angler-days of sport fishing effort expended by recreational anglers fishing UCUSMA waters, 1977-1999.

| Year | UCUSMA Effort | Alaska Effort | % by UCUSMA | Region III Effort ^b | % by UCUSMA |
|------------------------------|------------------|------------------|----------------|-----------------------------------|----------------|
| 1977-1988 ^a | 51,118 | 1,704,878 | 2.9 | 228,965 | 22.3 |
| 1989 | 52,262 | 2,264,079 | 2.3 | 291,888 | 17.9 |
| 1990 | 50,791 | 2,453,284 | 2.1 | 296,420 | 17.1 |
| 1991 | 64,207 | 2,456,328 | 2.6 | 284,129 | 22.6 |
| 1992 | 72,052 | 2,540,374 | 2.8 | 253,904 | 28.4 |
| 1993 | 77,870 | 2,559,408 | 3.0 | 298,842 | 26.1 |
| 1994 | 85,520 | 2,719,911 | 3.1 | 295,507 | 28.9 |
| 1995 | 102,951 | 2,787,670 | 3.7 | 373,092 | 27.6 |
| 1996 | 64,407 | 2,006,528 | 3.2 | 265,573 | 24.3 |
| 1997 | 56,257 | 2,079,514 | 2.7 | 238,856 | 23.6 |
| 1998 | 56,706 | 1,856,976 | 3.1 | 227,841 | 24.9 |
| 1999 | 77,619 | 2,499,152 | 3.1 | 304,522 | 25.5 |
| 1989-1998^a | 68,302 | 2,372,407 | 2.9 | 282,605 | 24.2 |
| 1994-1998^a | 73,168 | 2,290,120 | 3.2 | 280,174 | 26.1 |

^a Average value for the years during the period.

^b Values for Region III effort prior to 1997 are AYK and Glennallen totals combined.

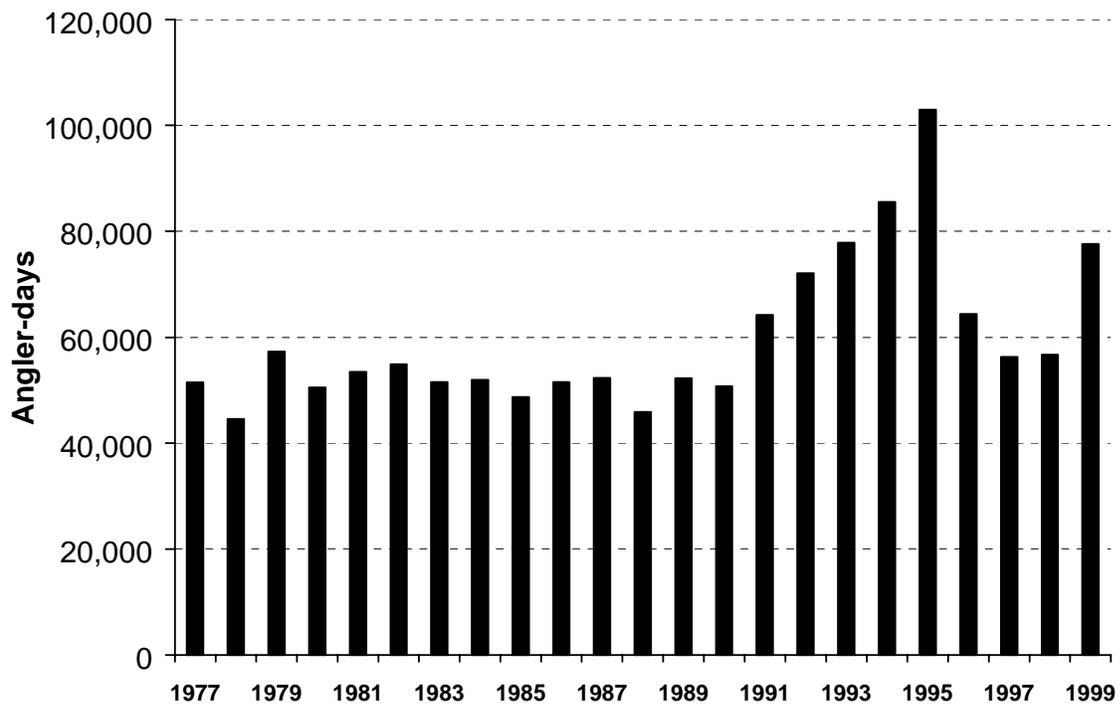


Figure 3.-Sport fish effort in the UCUSMA, 1977-1999.

Table 5.-Sport fishing effort (angler-days) in the UCUSMA by drainage, averaged for 1977 - 1988 and annually from 1989 - 1999.

| Areas | 1977-88 ^e | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^e | 1994-1998 ^e |
|------------------------------------|---------------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|------------------------|------------------------|
| Gulkana River Drainage | | | | | | | | | | | | | | |
| Lakes | 7,695 | 7,636 | 7,172 | 9,047 | 8,795 | 8,302 | 9,074 | 10,559 | 6,298 | 5,254 | 4,560 | 7,907 | 7,670 | 7,149 |
| Streams | 15,465 | 15,769 | 19,112 | 21,285 | 26,039 | 27,543 | 25,581 | 33,415 | 25,727 | 23,714 | 27,349 | 29,934 | 24,553 | 27,157 |
| Total | 23,160 | 23,405 | 26,284 | 30,332 | 34,834 | 35,845 | 34,655 | 43,974 | 32,025 | 28,967 | 31,909 | 37,841 | 32,223 | 34,306 |
| Upper Susitna Drainage | | | | | | | | | | | | | | |
| Lakes | 12,931 | 9,383 | 8,334 | 8,342 | 10,569 | 14,345 | 16,614 | 17,058 | 8,597 | 4,952 | 4,930 | 10,891 | 10,312 | 10,430 |
| Streams | 417 ^b | 330 | 992 | 1,376 | 1,408 | 2,491 | 2,027 | 3,716 | 1,212 | 994 | 533 | 963 | 1,508 | 1,696 |
| Total | | 9,713 | 9,326 | 9,718 | 11,977 | 16,836 | 18,641 | 20,774 | 9,809 | 5,946 | 5,463 | 11,854 | 11,820 | 12,127 |
| Klutina River Drainage | 4,336 ^b | 6,053 | 5,556 | 12,145 | 6,398 | 8,177 | 10,624 | 14,496 | 10,699 | 11,644 | 9,408 | 15,687 | 9,520 | 11,374 |
| Tazlina Drainage | 1,299 ^b | 1,564 | 2,082 | 2,295 | 3,507 | 3,112 | 3,837 | 4,165 | 1,842 | 1,630 | 1,797 | 1,846 | 2,583 | 2,654 |
| Tonsina Drainage | 981 ^b | 980 | 498 | 2,072 | 2,240 | 2,901 | 2,254 | 3,912 | 1,514 | 1,099 | 1,054 | 1,230 | 1,852 | 1,967 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 1,001 ^b | 1,728 | 980 | 950 | 476 | 1,271 | 1,419 | 1,711 | 713 | 382 | 626 | 959 | 1,026 | 970 |
| Copper River | | | | | | | | | | | | | | |
| Downstream of Klutina ^c | 623 | 1,641 | 537 | 216 | 1,255 | 728 | 1,778 | 1,402 | 695 | 922 | 795 | 403 | 997 | 1,118 |
| Stocked Lakes/Streams | 3,176 | 3,149 | 2,665 | 4,812 | 7,623 | 4,782 | 5,561 | 5,331 | 3,774 | 2,250 | 3,346 | 3,849 | 4,329 | 4,052 |
| Other Sites | | | | | | | | | | | | | | |
| Lakes | 1,697 ^b | 2,345 | 1,738 | 544 | 1,645 | 2,222 | 3,350 | 3,555 | 1,545 | 1,499 | 1,182 | 1,436 | 1,963 | 2,226 |
| Streams | 1,274 ^a | 1,684 | 1,125 | 1,123 | 2,097 | 1,996 | 3,401 | 3,631 | 1,475 | 1,005 | 972 | 2,514 | 1,851 | 2,097 |
| Total | 3,606 ^b | 4,029 | 2,863 | 1,667 | 3,742 | 4,218 | 6,751 | 7,186 | 3,020 | 2,504 | 2,154 | 3,950 | 3,813 | 4,323 |
| Area Total | 51,185^d | 52,262 | 50,791 | 64,207 | 72,052 | 77,870 | 85,520 | 102,951 | 64,407 | 56,257 | 56,706 | 77,619 | 68,302 | 73,168 |

^a Includes all flowing waters, data not broken out by specific area prior to 1983.

^b Includes 1983-1988 average only. Prior to 1983, harvest included in "other waters".

^c Not including the Tonsina drainage.

^d Average of the total annual area effort for the period from 1977-1988.

^e Average value for the years during the period.

from five to four chinook salmon. If additional conservation measures are necessary the department has the authority to further restrict the commercial fishery by additional closures of statistical areas during statistical weeks 20, 21, and 22. The department also has the authority to further restrict the sport fishery with any one or combination of the following: a) reduction of bag and possession limits; b) catch and release only designation; c) reduction of the seasonal limit; and d) modification of other method and means not specified above. This plan requests the department to submit a proposal at the 2002/2003 BOF meeting recommending changes to this plan that will result in improved management for high sustained yield.

Copper River Subsistence Salmon Fisheries Management Plan (5 AAC 01.647). This management plan ensures that adequate escapement of salmon pass the sonar in the lower Copper River and that subsistence needs are met. It establishes the subsistence gear and fishing periods in the Copper River District and the management strategy, fishing periods and harvest level in the Chitina Subdistrict subsistence fishery. It also establishes the open area, gear, season, bag and possession limits, and permit requirements for a subsistence fishery near the traditional fishing village of Batzulnetas along a portion Tanada Creek and its confluence with the Copper River.

Lake Burbot Management Plan (5 AAC 52.045). This management plan stipulates that the burbot fisheries in lakes of the UCUSMA be managed to ensure maximum sustainable harvests, and provides the department the authority to use emergency orders to reduce the time or areas open to fishing and/or prohibit set lines to accomplish this management objective.

Cook Inlet & Copper River Basin Rainbow/Steelhead Trout Management Policy. This management policy was adopted by the BOF to provide future Boards, fisheries managers, and the sport fishing public with: (1) management policies and implementation directives for area rainbow and steelhead trout fisheries; (2) a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management; and (3) recommended research objectives. This management policy was never adopted as regulation.

MAJOR ISSUES

The major issues associated with UCUSMA sport and personal use fisheries are summarized below:

Copper River Chinook Salmon: Under the *Copper River District Salmon Management Plan (5 AAC 24.360)*, the department is directed to manage the Copper River District commercial salmon fishery to attain a biological (spawning) escapement goal of 300,000 sockeye salmon and 17,500 other salmon (species not defined). In addition to the biological escapement goal, the commercial fishery is to be managed to achieve an inriver escapement goal of 60,000-75,000 salmon for the Glennallen Subdistrict subsistence fishery, 100,000-150,000 salmon for the Chitina Subdistrict subsistence fishery, and 15,000 salmon for the sport fishery, and an amount of sockeye salmon determined annually for the Gulkana hatchery brood and surplus stocks. Unfortunately, there is a lack of spawner-recruit data to assess the long-term productivity of the Copper River chinook salmon return or the validity of establishing a chinook salmon spawning escapement goal. In 1999, an estimate of upper Copper River chinook salmon

escapement was obtained from the radio-telemetry research study. This information, in addition to historic aerial survey indices, resulted in a spawning escapement range of 28,000 – 55,000 chinook salmon, which was adopted by the BOF at the 1999 meeting. To assure that harvest of Copper River chinook salmon does not exceed sustainable levels, the department has been directed by BOF to develop a revised *Copper River Chinook Salmon Fishery Management Plan* (5 AAC 24.361) by the 2002/2003 BOF meeting. Commercial harvests, the largest component of the annual harvest, have increased in the past five years as well as harvests in the area's subsistence and sport fisheries. The department considers the chinook salmon resources of the Copper River fully-utilized and as a result, the allocative nature of this issue will remain controversial.

Copper River Subsistence Salmon Fisheries: Since 1990, harvest and participation in the Glennallen and Chitina Subdistrict subsistence salmon fisheries have doubled. Both fisheries are managed under BOF-adopted management plans. Under these management plans, an escapement goal of 60,000–75,000 salmon for the Glennallen Subdistrict subsistence fishery and an escapement goal of 100,000 – 150,000 salmon for the Chitina Subdistrict subsistence fishery have been set. In 1999, harvests in the Chitina Subdistrict fishery (in 1999 as a personal use fishery, allocation was 100,000 salmon) and the Glennallen Subdistrict fishery (60 – 75,000 salmon) exceeded the harvest guidelines. Participation in both fisheries was the second highest on record. Continued strong returns of sockeye salmon to the Copper River during the past 4 years, as well as increased media attention, are partly responsible for the record participation. The repeal of the Chitina Subdistrict as a personal use fishery, added potentially an additional 10,000 subsistence users to the upper Copper River fisheries. This has caused alarm in the commercial fishery, since the Chitina Subdistrict harvest now has a subsistence priority over the commercial harvest allocation. The Native population is also at odds against this ruling, due to the fact that they do not consider the urban dipnetters “true” subsistence users.

Land Access: In 1998, Ahtna Native Corporation initiated an access fee program for native-owned uplands adjacent to the Klutina River upstream of the new Richardson Highway bridge. This encompassed nearly the entire river with the exception of the lower two river miles. There is a public easement (managed by the Bureau of Land Management (BLM)) that runs parallel to the river and provides access to Klutina Lake, but it provides little or no direct river access. Non-shareholders were required to pay a day use fee to access the river from the easement and also pay camping fees to camp at sites off the easement. This angered many of the sport fishing public that used the easement and Native lands to access the river and resulted in some users avoiding this access point. Ahtna Native Corporation initiated a similar access fee program at Gulkana River access points in 1999. On the Gulkana, Ahtna Native Corporation owns the majority of land downstream of Sourdough and the Gulkana River Scenic River corridor. Public access to the lower river is limited to one public easement (Mile 141 Richardson Highway pullout) and the Richardson Highway bridge right-of-way (ROW).

Burbot: The lakes of the UCUSMA have historically supported some of the largest sport fisheries for burbot in Alaska. Stock assessment work indicated that many of the larger burbot stocks in lakes were depressed due to overfishing in the early 1980s. Based on these findings, the BOF adopted a management plan for burbot stocks in UCUSMA

lakes. Under this management plan, the Board has adopted a more conservative management regime for UCUSMA burbot fisheries which allows previously overfished stocks to recover enough to permit sustainable fisheries, and which protects healthy stocks from overharvest. Part of the current regulatory regime is the elimination of unattended setlines from the fishery. Many local anglers are not supportive of this action and have submitted proposals to the Board to have unattended setlines reintroduced to the fishery. Currently, ADF&G staff does not support reintroduction of unattended setline use in lakes. This gear question will likely continue to remain an issue into the future. Lake Louise remains closed to burbot fishing due to depressed burbot stocks. Lake Louise will be reopened to burbot fishing when stock assessment work shows that the burbot stocks have recovered enough to permit a sustainable fishery. Local advisory committees are supportive of this closure. The department has allowed use of unattended setlines for the mainstem Copper River through a personal use burbot fishery. Stock assessment in Tolsona Lake during 1996 and 1997 indicated a decline in abundance to levels below any previous estimate, and resulted in an emergency order closure of this lake to burbot fishing in 1998. This population will be discussed in detail in a later section.

Lake Trout: Lakes in the UCUSMA have historically supported some of the largest sport fisheries for lake trout in Alaska, with lakes of the Tyone River drainage (Lake Louise and Susitna and Tyone lakes) and Gulkana River drainage (Paxson, Summit, and Crosswind lakes) having supported the largest fisheries. Concern was raised in the late 1980s that sport harvests in some of these lakes might have been exceeding sustainable levels. As a result, an 18 in minimum size limit was enacted for the above lakes to assure that fish could spawn at least once prior to being subject to harvest. Subsequent stock assessment work suggested that an 18 in size limit does not protect first-time spawners from harvest in these lakes. A 24-in minimum size limit for these lakes was implemented in 1994. The lake trout bag and possession limit was also reduced to one in some lakes. The local advisory committees supported these actions.

CURRENT MANAGEMENT AND RESEARCH ACTIVITIES

During 1999 several research and management projects were initiated or continued.

Research Projects

Chinook Salmon - On the Copper River mainstem, downstream of Haley Creek, the first year of a three-year study was conducted to determine inriver abundance, spawning distribution and migratory timing of chinook salmon in the upper Copper River (Evenson and Wuttig, 2000). This was accomplished through the capture of chinook salmon with dipnets which were then implanted with radio transmitters. Nine radio-telemetry tracking stations determined when fish entered and left the Chitina Subdistrict dip net fishery, and entered either four spawning tributaries (Gulkana, Tazlina, Klutina, and Tonsina river drainages), the upper Copper River (upstream of the Gakona River), or the Chitina River drainage. Tracking flights were conducted over the spawning tributaries to gain additional spawning distribution information not collected by the tracking stations. Abundance was estimated using chinook salmon captured during the sampling for radio transmitter implantation as the marking event and the harvest in the Chitina Subdistrict fishery as the recapture event. The resulting estimate of chinook salmon spawning escapement for the upper Copper River contributed to the BOF and the department establishing a

range for chinook spawning escapement in the revised *Copper River Chinook Salmon Fishery Management Plan*.

Arctic grayling - An Arctic grayling study was conducted in Mendeltna Creek in 1999 (Scanlon and Fish 2000). This was the second and final year of this project. Prior to this study, there had been no directed assessment of the Mendeltna Creek Arctic grayling population. Sampling was conducted in July 1999 to estimate abundance of Arctic grayling in an 8-mile section of Mendeltna Creek between the two major access points. Length and age composition of this population was also determined. Data collected during this study led to a department proposal reducing the daily bag limit to 2 fish and establishing a 12-in minimum length restriction to protect spawning Arctic grayling. This proposal was passed by the BOF at the December 1999 meeting.

Rainbow/Steelhead trout - Two rainbow/steelhead trout projects were conducted in 1999 in the UCUSMA (Fleming 2000). The first was conducted on the Gulkana River. Sampling occurred in May 1999 at the Middle Fork spawning areas to estimate abundance of spawners. Due to low numbers of fish and spawning timing, no estimate was obtained. The second project was conducted in June and July 1999 to estimate abundance and length and age composition of rainbow trout in Summit Lake (Tebay River drainage). Previously managed as a trophy rainbow trout fishery (1 trout over 32-in per day), angler reports indicated few large fish remained in the population. Sampling confirmed this, and resulted in a department and public proposal increasing harvests of rainbow trout to reduce the number of small stunted trout in the population and try to establish large fish in the population. The department is also considering further removal projects to reestablish large trout in the Summit Lake population.

Burbot - The burbot research program conducted stock assessment in 1999 on Tolsona Lake and Lake Louise (Taube et al. 2000). Tolsona Lake has been sampled annually since 1986 and was recently closed to sport fishing in spring 1998 due to population decline. Lake Louise was last sampled in 1996 and has been closed since 1991 due to overfishing. Estimates of abundance, CPUE and length composition were collected at Tolsona Lake, while estimates of CPUE and length composition were collected at Lake Louise. Sampling in Tolsona Lake and Lake Louise occurred in June. As a result of the burbot research program, the department submitted a proposal to reduce the daily bag and possession limit to two fish at Tolsona and Moose lakes (at Tolsona Lake when it reopens).

Management Projects

Chinook/Sockeye salmon - Two management projects were continued in 1999: 1) biological catch sampling of the Copper River Personal Use Fishery and 2) aerial surveys of the nine chinook salmon spawning escapement index streams. Sampling of the personal use fishery occurred from the opening of the fishery in June through the majority of the sockeye run ending in mid-late August. Length and age data of sockeye and chinook salmon harvested in the fishery were collected. All sockeye salmon sampled were examined for missing adipose fins that indicate the presence of a coded-wire tag implanted as the fry were released from the Gulkana River hatchery. The heads of these salmon are collected, scanned at the Coded-Wire Tag Lab in Juneau and the collected data are used to estimate hatchery contribution to the Copper River sockeye salmon run.

In 1998, aerial surveys were conducted beginning in June on the Gulkana River to provide an index of chinook salmon returns. Due to poor survey conditions and high water in 1999, no

surveys were flown on the Gulkana River until the regularly scheduled index flights. Aerial surveys on the nine index streams including the Gulkana River were flown in early August for comparison to historic survey indices as a measure of chinook salmon run strength. Due to poor survey conditions, the aerial surveys were flown outside of the preferred survey “window”.

ACCESS PROGRAMS

The Wallop-Breaux amendment to the Federal Aid in Sport Fish Restoration Act mandates that at least 12.5% of the federal funds collected from taxes on sport fishing equipment be used by the states for the development and maintenance of boating access facilities. A broad range of access facilities can be approved for funding if they are constructed to achieve a state fishery management objective. These facilities can include boat ramps and lifts, docking and marina facilities, breakwaters, fish cleaning stations, rest rooms, and parking areas. In spite of the large land base in the UCUSMA, access to sport fishing is restricted near most popular fisheries. The causes for limited access are several: much of the land in the area is private, few roads and trails exist, and suitable launches for boats are scarce. Various small access projects were completed in 1999 in the UCUSMA, which entailed improving existing trails and replacing or installing signs for local roadside lakes. Preliminary work was begun on a four-mile trail to Tolsona Mountain Lake, a remote stocked lake, which entailed locating the optimum site for the trail and determining land status.

INFORMATION AND EDUCATION

Information regarding regulations, publications, stocking and fishing reports, news releases and emergency orders for the UCUSMA can be found at the Department of Fish and Game website (www.state.ak.us/local/akpages/FISH.GAME). In addition, many of these publications as well as some additional publications regarding fishing opportunities in the UCUSMA can be found at the area ADF&G office in Glennallen and the regional ADF&G office in Fairbanks. Information regarding the Gulkana Wild River (BLM) and Wrangell-St. Elias National Park (USNPS) can be obtained from the respective agency offices in Glennallen and Copper Center. Ahtna Native Corporation has its headquarters located in Glennallen and can be visited for information regarding access to native lands. The Greater Copper Valley Chamber of Commerce can be a source for commercial operators located in the UCUSMA. A listing of the addresses and contact numbers for these information sources can be found in Appendix A.

SECTION II: FISHERIES

The following text discusses, by species, the major sport fisheries in the UCUSMA. Discussion of recent performance of the fishery will center around harvest and catch during the 1999 season, as the major source of data for most sport fisheries in the area is the SWHS (Howe et al. *In prep.*), which will not have 2000 results until the summer of 2001. However, observations or research data regarding the fisheries in 2000 will also be presented when available. A summary of the historical harvest and catch of fish in the UCUSMA by species is presented in Tables 6 and 7, respectively.

CHINOOK SALMON SPORT FISHERIES

In the UCUSMA, only the Copper River drainage supports anadromous runs of chinook salmon. No anadromous runs of chinook salmon return to the upper Susitna River drainage. Devil's Canyon is a velocity barrier, which prevents upstream salmon migration in this drainage.

Table 6.-Number of fish harvested, by species, by recreational anglers fishing UCUSMA waters, averaged for 1977 - 1988 and annually from 1989 - 1999.

| Year | Chinook Salmon | Sockeye Salmon | Coho Salmon | Steelhead Trout | Rainbow Trout | Dolly Varden | Lake Trout | Arctic Grayling | Burbot | Whitefish | Landlocked Salmon | Other Fish |
|------------------------------|-------------------|-------------------|----------------|--------------------|------------------|-----------------|---------------|--------------------|--------------|--------------|----------------------|---------------|
| 1977-88 ^a | 2,048 | 3,044 | 265 | 89 | 5,400 | 3,551 | 7,294 | 28,395 | 8,186 | 2,774 | 1,999 | 274 |
| 1989 | 2,356 | 4,509 | 18 | 84 | 5,835 | 3,979 | 7,147 | 16,629 | 3,396 | 2,991 | 281 | 0 |
| 1990 | 2,302 | 3,569 | 0 | 34 | 3,924 | 3,159 | 5,503 | 13,775 | 1,836 | 1,784 | 17 | 0 |
| 1991 | 4,884 | 5,511 | 69 | 114 | 6,868 | 2,140 | 4,864 | 13,278 | 793 | 717 | 111 | 47 |
| 1992 | 4,412 | 4,560 | 113 | 8 | 9,373 | 1,997 | 4,251 | 11,125 | 1,495 | 1,150 | 433 | 11 |
| 1993 | 8,217 | 5,288 | 249 | 0 | 7,245 | 3,173 | 4,569 | 12,504 | 1,694 | 815 | 56 | 9 |
| 1994 | 6,431 | 6,533 | 209 | 7 | 5,808 | 1,598 | 4,058 | 14,066 | 2,869 | 1,149 | 134 | 128 |
| 1995 | 6,709 | 6,068 | 160 | 10 | 4,671 | 1,695 | 2,934 | 14,289 | 995 | 898 | 42 | 30 |
| 1996 | 9,116 | 11,851 | 192 | 0 | 5,076 | 2,575 | 2,632 | 10,534 | 981 | 384 | 751 | 0 |
| 1997 | 8,346 | 12,293 | 96 | 0 | 2,812 | 1,092 | 1,923 | 8,583 | 1,358 | 134 | 331 | 56 |
| 1998 | 8,245 | 11,184 | 289 | 0 | 5,182 | 1,589 | 1,723 | 8,275 | 1,485 | 584 | 477 | 0 |
| 1999 | 6,742 | 11,101 | 24 | 8 | 3,842 | 2,390 | 2,135 | 8,245 | 1,861 | 317 | 232 | 0 |
| 1989-1998^a | 6,102 | 7,137 | 140 | 26 | 5,679 | 2,300 | 3,960 | 12,306 | 1,690 | 1,061 | 252 | 28 |
| 1994-1998^a | 7,769 | 9,586 | 189 | 3 | 4,710 | 1,710 | 2,654 | 11,149 | 1,538 | 630 | 347 | 43 |

^a Average value for the years during the period.

Table 7.-Number of fish caught, by species, by recreational anglers fishing UCUSMA waters, 1990-1999.

| Year | Chinook Salmon | Sockeye Salmon | Coho Salmon | Steelhead Trout | Rainbow Trout | Dolly Varden | Lake Trout | Arctic Grayling | Burbot | Whitefish | Landlocked Salmon | Other Fish |
|------------------------------|-------------------|-------------------|----------------|--------------------|------------------|-----------------|---------------|--------------------|--------------|--------------|----------------------|---------------|
| 1990 | 6,057 | 8,474 | 0 | 136 | 12,312 | 5,639 | 15,335 | 80,300 | 2,872 | 2,276 | 51 | 0 |
| 1991 | 10,079 | 10,243 | 120 | 140 | 14,705 | 8,620 | 10,444 | 55,055 | 838 | 1,566 | 389 | 47 |
| 1992 | 12,340 | 9,344 | 169 | 39 | 27,412 | 6,243 | 12,886 | 59,051 | 2,222 | 4,074 | 670 | 22 |
| 1993 | 21,767 | 10,813 | 354 | 102 | 23,300 | 7,903 | 17,728 | 80,497 | 2,471 | 2,670 | 145 | 53 |
| 1994 | 11,272 | 11,700 | 417 | 332 | 25,187 | 5,947 | 13,368 | 80,302 | 4,064 | 3,368 | 550 | 660 |
| 1995 | 14,178 | 10,383 | 254 | 51 | 16,979 | 3,129 | 10,937 | 67,000 | 2,375 | 1,826 | 109 | 70 |
| 1996 | 27,195 | 25,265 | 502 | 121 | 19,935 | 4,595 | 11,209 | 77,381 | 1,639 | 3,017 | 1,244 | 6 |
| 1997 | 27,760 | 26,724 | 304 | 126 | 20,867 | 3,439 | 9,101 | 69,463 | 2,646 | 1,075 | 1,095 | 81 |
| 1998 | 22,324 | 21,359 | 1,535 | 196 | 22,283 | 4,156 | 8,184 | 71,625 | 2,849 | 1,612 | 1,708 | 80 |
| 1999 | 18,034 | 20,782 | 73 | 264 | 14,809 | 6,971 | 14,184 | 64,166 | 3,173 | 907 | 309 | 58 |
| 1990-1998^a | 16,549 | 14,923 | 406 | 138 | 18,118 | 5,519 | 12,132 | 71,186 | 2,442 | 2,387 | 662 | 113 |

^a Average value for the years during the period.

Chinook salmon returning to the Copper River drainage begin passage through the Copper River Delta and enter the Copper River during early May. Inriver returns of all salmon are estimated by the sonar unit located at Miles Lake. The peak migration into the river is generally from mid-May to mid-June, with the return essentially complete by July 1. However, small numbers of chinook salmon continue to enter the Copper River through August. Chinook salmon make their way to spawning areas in Copper River tributaries primarily through June and July, with spawning beginning in mid-July and continuing through August.

Chinook salmon are broadly distributed throughout the Copper River basin, having been observed in approximately 40 tributaries. Aerial escapement surveys have been conducted in 35 of these systems, but only nine of these systems have been surveyed consistently since 1966 (Roberson and Whitmore 1991). In general, chinook salmon runs to these nine Copper River tributaries have been above historical averages since 1982 (Table 8). In 1992 and 1995 escapement surveys in both years were flown outside the peak dates and are considered tenuous at best (Figure 4). During 1995, heavy rains throughout the summer caused high siltation, which obscured visibility in the lower Gulkana River. Aerial surveys of the index streams east of the Gulkana were later than normal and may have missed the bulk of the chinook return. Many of the nine streams were not surveyed in 1993, so comparison to historical means during 1992, 1993, and 1995 is not advisable. During 1996 and 1997, chinook salmon counts of many index streams were at or near record levels. The count for index streams between 1996 and 1998 constituted the three highest index counts since 1977. In 1999, aerial surveys were conducted after the July 17 – 31 peak survey period due to cloud cover and rainy conditions. Due to low water conditions and ice in the lower Copper River in May, the chinook salmon return was delayed in 1999. As a result, the aerial surveys, though flown outside of the peak survey period, were thought to be a representative index of spawning escapement. Although the total aerial escapement index was less than the biological escapement goal (BEG) by approximately 500, returns to the Gulkana River and lower Copper River index streams were near average. The upper Copper River index stream counts were below the BEG and account for the early portion of the upper Copper River chinook salmon return. Unfortunately, assessment of chinook salmon spawning escapements through aerial survey evaluation of key index areas does *not* provide an estimate of the total spawning return. This is because not all spawning areas are surveyed and not all spawners are counted in surveyed areas.

Copper River chinook salmon stocks are harvested in a variety of fisheries including: (1) a commercial gillnet fishery on the Copper River delta, (2) a personal use dip net fishery (subsistence fishery in 2000) in the Copper River near Chitina, (3) a subsistence dip net and fishwheel fishery in the Copper River between the Chitina and Slana rivers confluence, and (4) sport fisheries that occur in various spawning tributaries. The total harvest of chinook salmon in these fisheries has been estimated since 1966 (Sharp et al. 2000, Roberson and Whitmore 1991). Since 1982, the total harvest of chinook salmon in these fisheries has ranged from 27,000 to over 85,000 (Table 9). The total chinook harvest in 1999 was the third highest on record. Unfortunately, the contribution to the catch by each spawning stock for these mixed stock fisheries cannot be quantified at present (Brady et al. 1991, Roberson and Whitmore 1991). Thus, it is not currently possible to assess the productivity of each stock using spawner-recruit databases.

Table 8.-Upper Copper River chinook salmon aerial escapement index counts, 1977-2000.

| Year | Gulkana R. | Copper R. Upstream of Gulkana ^a | | Tazlina Drainage ^a | | Klutina Drainage | | Tonsina Drainage ^a | | Total |
|------------------------------|--------------------|--|-----------------|-------------------------------|------------------|-------------------|-----------------|-------------------------------|-------------------|--------------------|
| | | E. Fork Chistochina R. | Indian River | Mendeltna Creek | Kiana Creek | St. Anne Creek | Manker Creek | Little Tonsina River | Grayling Creek | |
| 1977 | 1,090 | 132 | | 73 | 91 | 10 | 15 | 35 | | 1,446 |
| 1978 | 921 | 137 | 9 | 52 ^e | 125 ^e | 24 ^e | 20 ^e | 285 ^e | 92 ^e | 1,665 |
| 1979 | 1,380 | 810 | 29 | ⁰ ^e | 279 ^e | 16 ^e | 16 ^e | 285 ^e | 153 ^e | 2,968 |
| 1980 | 718 | 575 | 24 | 3 ^e | 247 | 8 | 35 ^e | 70 ^e | 66 ^e | 1,746 |
| 1981 | | 120 | | 51 | 191 | 19 | 33 | 191 | 107 | 712 |
| 1982 | 1,656 | 1,260 | 179 | 70 | 200 | 35 ^e | 49 ^e | 440 ^e | 127 ^e | 4,016 |
| 1983 | 931 | 575 | 41 | 12 | 166 | 87 | 141 | 330 | 287 | 2,570 |
| 1984 | 2,189 | 577 | 17 | 26 | 382 | 89 | 264 | 568 | 279 | 4,391 |
| 1985 | 321 | 360 | 14 | 26 ^e | 91 ^e | 15 ^e | 22 ^e | 203 ^e | 58 ^e | 1,110 |
| 1986 | 3,182 | 618 | | 76 | 328 | 182 | 251 | 424 | 224 | 5,285 |
| 1987 | 1,228 | 764 | 33 | 10 | 80 | 192 | 141 | 247 | 112 | 2,807 |
| 1988 | 967 | 684 | 0 | 17 | 249 | 62 | 115 | 75 | 161 | 2,330 |
| 1989 | 1,993 | 740 | 3 | 185 | 344 | 90 | 165 | 65 ^e | 72 | 3,657 |
| 1990 | 1,356 | 615 | 15 | 320 ^e | 411 ^e | 42 ^e | 41 | 57 | 49 | 2,906 |
| 1991 | 1,303 | 865 | 18 | 305 | 520 | 115 | 101 | 54 | 151 | 3,432 |
| 1992 | 656 | 88 | 1 | 83 ^e | 79 ^e | 12 | 14 ^e | 107 | 17 ^e | 1,057 |
| 1993 | 1,156 | ^c | ^c | 126 | 65 | ^c | ^c | ^c | ^c | 1,347 |
| 1994 | 1,682 | 508 | 47 | 121 | 430 | 250 | 75 | 4 ^e | 2 | 3,119 |
| 1995 | 720 ^d | 37 ^e | 2 ^e | 41 ^e | 110 ^e | 26 ^e | 8 | 25 ^e | 26 ^e | 995 |
| 1996 ^f | 2,321 | 2,050 ^e | 207 | 370 | 723 | 117 | 192 | 45 ^h | 164 | 6,189 |
| 1997 | 2,250 | 2,245 | 270 | 350 | 455 | 900 | 206 | 55 | 330 | 7,061 |
| 1998 | 1,407 | 740 | 48 | 280 | 700 | 515 | 828 | 60 | 527 | 5,105 |
| 1999 | 1,047 ^e | 82 ^e | 2 ^e | 38 ^e | 216 ^e | 486 ^e | 69 ^e | 93 ^e | 88 ^e | 2,121 ^e |
| 2000 | 1,160 | 580 | 62 | 125 | 155 ^e | 70 | 54 ^e | 26 ^e | 104 ^e | 2,336 |
| 1977-1988^g | 1,326 | 549 | 38 | 39 | 215 | 80 | 138 | 268 | 196 | 2,583 |
| 1989-1998^g | 1,484 | 886 | 77 | 249 | 432 | 286 | 204 | 61 | 218 | 3,512 |
| 1994-1998^g | 1,676 | 1,264 | 143 | 280 | 524 | 446 | 264 | 48 | 340 | 4,513 |
| BEG | 1,200 | 500 | - | 350 | | 250 | | 350 | | 2,650 |

^a Some data published in Brady et al. 1991, remainder is unpublished.

^b Estimated.

^c No aerial surveys conducted in 1993.

^d Visibility poor, carcass count only downstream of West Fork.

^e Surveys flown outside of July 17 - 31.

^f Counts determined by two surveyors. In years where more than one surveyor was used, counts from the most experienced surveyor are listed.

^g Averages exclude years when surveys were flown outside July 17-31, or counts were estimated.

^h More chinook were seen entering the system at later survey, but not counted.

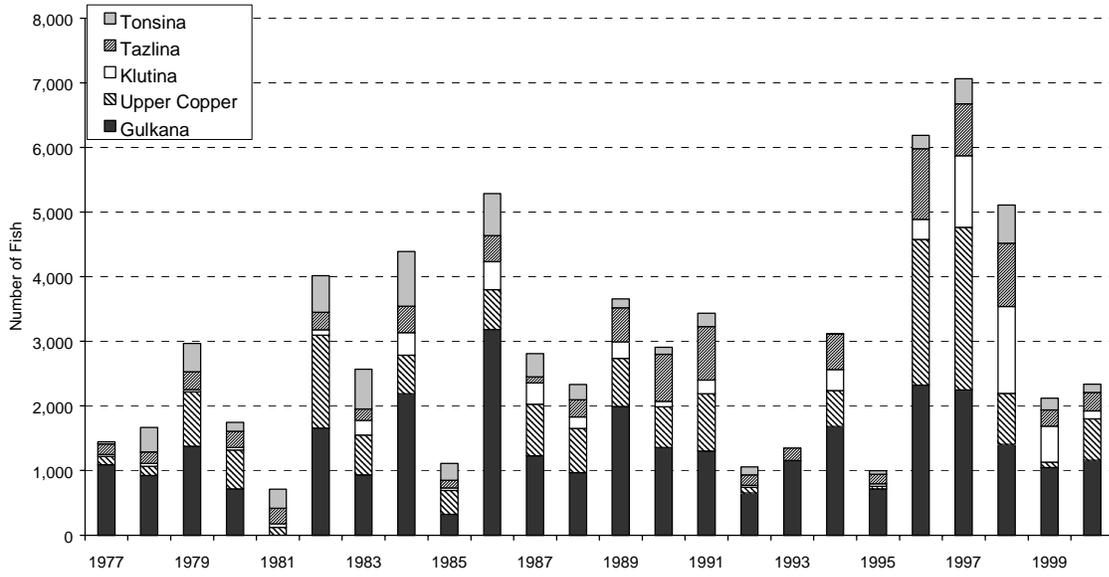


Figure 4.-Upper River chinook salmon aerial survey index escapement counts by drainage, 1977-2000.

Table 9.-Copper River chinook salmon harvest and escapement index estimates, 1977-2000.

| Year | Commercial Harvest ^a | Sport Harvest | Subsistence Harvest ^b | Personal Use Harvest ^b | Total Harvest | Aerial Escapement Index |
|------------------------------|---------------------------------|--------------------|----------------------------------|-----------------------------------|---------------|-------------------------|
| 1977 | 21,722 | 532 | 2,555 | ^c | 24,809 | 1,514 |
| 1978 | 29,062 | 641 | 2,239 | ^c | 31,942 | 1,665 |
| 1979 | 17,678 | 2,948 | 3,416 | ^c | 24,042 | 2,973 |
| 1980 | 8,454 | 2,101 | 3,035 | ^c | 13,590 | 1,746 |
| 1981 | 20,178 | 1,717 | 2,410 | ^c | 24,305 | 1,486 |
| 1982 | 47,362 | 1,802 | 2,764 | ^c | 51,928 | 4,013 |
| 1983 | 52,500 | 2,579 | 5,950 | ^c | 61,029 | 2,570 |
| 1984 | 38,957 | 2,787 | 509 | 1,760 | 44,013 | 4,367 |
| 1985 | 42,214 | 1,939 | 629 | 1,329 | 46,111 | 1,066 |
| 1986 | 40,670 | 3,663 | 686 | 2,367 | 47,386 | 5,313 |
| 1987 | 41,001 | 2,301 | 813 | 2,968 | 47,083 | 2,803 |
| 1988 | 30,741 | 1,562 | 992 | 2,994 | 36,289 | 2,370 |
| 1989 | 30,863 | 2,356 | 787 | 2,251 | 36,257 | 3,683 |
| 1990 | 21,702 | 2,302 | 647 | 2,708 | 27,359 | 2,944 |
| 1991 | 34,787 | 4,884 | 1,328 | 4,056 | 45,017 | 3,533 |
| 1992 | 39,810 | 4,412 | 1,449 | 3,405 | 49,068 | 1,057 |
| 1993 | 29,727 | 8,217 | 1,434 | 2,846 | 42,224 | 1,347 |
| 1994 | 47,061 | 6,431 | 1,989 | 3,743 | 59,224 | 3,116 |
| 1995 | 65,675 | 6,709 | 1,892 | 4,707 | 78,983 | 985 |
| 1996 | 55,646 | 9,116 | 1,482 | 3,584 | 69,828 | 5,983 |
| 1997 | 51,273 | 8,346 | 2,583 | 5,447 | 67,649 | 7,061 |
| 1998 | 68,827 | 8,245 | 1,842 | 6,723 | 85,637 | 5,420 |
| 1999 | 62,337 | 6,742 | 3,049 | 5,913 | 78,247 | 2,086 |
| 2000 | 32,030 | 5,500 ^d | 4,963 ^e | 3,068 ^e | 45,561 | 2,336 |
| 1977-1988^f | 32,545 | 2,048 | 2,167 | 2,284 | 37,711 | 2,657 |
| 1989-1998^f | 44,537 | 6,102 | 1,543 | 3,947 | 56,125 | 3,513 |
| 1994-1998^f | 57,696 | 7,769 | 1,958 | 4,841 | 72,264 | 4,513 |

^a Morstad et al. 1999.

^b These figures are expanded to reflect unreported permits. See Table 2 for reported harvests.

^c Copper River Personal Use Fishery was created by the Board of Fisheries in 1984.

^d Estimated.

^e Preliminary.

^f Average value for the years during the period.

The Copper River Delta District commercial fishery management strategy provides for two, 24-hour periods per week commencing during the second or third week of May, with adjustments in the fishing schedule being made through emergency order. Early season management, when chinook salmon are of consequence in the fishery, is based on actual catches compared to anticipated catches. Under the *Copper Chinook Salmon Fishery Management Plan*, by emergency order, the department has the authority to open and close the season within the inside statistical areas of the Copper River District, during the first two weeks of the fishing season. Since 1994, chinook salmon harvest in the Copper River District Delta commercial fishery has averaged over 57,000 fish (Table 9, Figure 5), with harvests remaining relatively stable through 1993. Since then, record or near record harvests have occurred each year.

Subsistence and personal use harvests of Copper River chinook salmon have averaged approximately 6,799 fish since 1994, with harvests having generally increased in recent years (Table 9). The Glennallen Subdistrict subsistence fishery occurs from June 1 through September 30 in the mainstem Copper River from the upstream edge of the Chitina-McCarthy Highway bridge upstream to Slana. Fishwheels and dip nets are legal gear. Permits are a requirement of this fishery. The maximum harvest limit for a household of one person is 200 fish and for a household of two or more is 500 fish. There is no limit as to the number of chinook salmon within the annual permit limit for people using fishwheels, while a five chinook salmon limit is imposed on subsistence fishermen using dip nets. Chinook salmon are present in the fishery on June 1 and, on average, 80% of the chinook salmon harvest is taken by July 12 (Roberson and Whitmore 1991).

The Chitina Subdistrict personal use fishery is restricted to mainstem waters of the Copper River from the downstream edge of the Chitina-McCarthy Highway bridge, downstream to a department marker located approximately 200 yards upstream of Haley Creek. The season is from June 1 through September 30. Fishing periods are established by emergency order. A schedule of fishery openings is published prior to the season. The schedule is designed to allow a total harvest of 100,000 sockeye salmon, based on the weekly forecasted return. Adjustments to the schedule are made inseason based on actual sonar counts compared to projected counts; fishing times are increased or decreased if actual counts are greater or less than projected counts. Participants in this fishery must be residents of Alaska and have a current sport fishing license. Permits are a requirement of this fishery, daily harvest by species must be recorded and permits must be returned to the department office in Chitina following each fishing trip.

Permits limit households of one individual to 15 salmon of which no more than four can be chinook salmon and households of more than one person to 30 salmon of which no more than four can be chinook salmon. Chinook salmon are present in the catch when the fishery is opened. On average, 80% of the chinook salmon harvest is taken by July 1 and 95% by July 17 (Roberson and Whitmore 1991).

The average sport harvest of chinook salmon from Copper River tributaries more than doubled between 1977 - 1988 and 1989 - 1998, with the 1996 harvest of 9,116 being the highest on record (Table 10, Figure 6). Since 1989, the average harvest of chinook salmon by sport anglers fishing UCUSMA waters has been over 6,000 fish. Sport harvests of chinook salmon in the

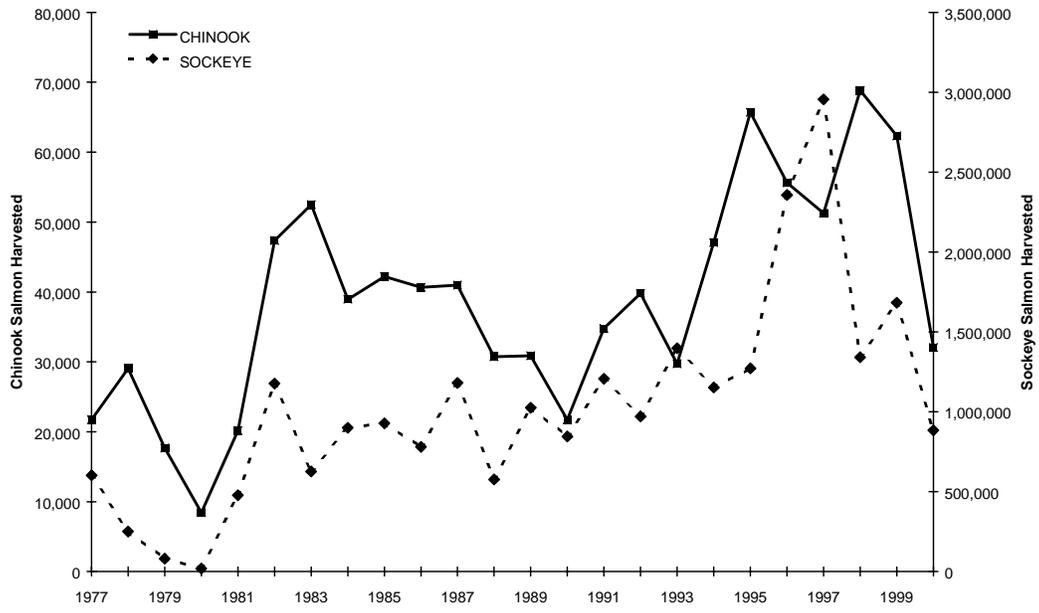


Figure 5.-Copper River District commercial harvest of chinook and sockeye salmon, 1977-2000.

Table 10.-Harvest of chinook salmon by recreational anglers fishing UCUSMA waters, 1977-1999.

| Year | Copper River | Alaska | Percent | Region III | Percent |
|------------------------------|------------------|---------------|----------|---------------|-----------|
| | Drainage Harvest | Harvest | | Harvest | |
| 1977-1988 ^a | 2,048 | 48,703 | 4 | 4,222 | 49 |
| 1989 | 2,356 | 78,371 | 3 | 5,763 | 41 |
| 1990 | 2,302 | 59,911 | 4 | 4,107 | 56 |
| 1991 | 4,884 | 76,758 | 6 | 6,847 | 71 |
| 1992 | 4,412 | 91,629 | 5 | 6,092 | 72 |
| 1993 | 8,217 | 128,769 | 6 | 12,171 | 67 |
| 1994 | 6,431 | 109,545 | 6 | 11,460 | 56 |
| 1995 | 6,709 | 81,562 | 8 | 11,000 | 61 |
| 1996 | 9,116 | 84,731 | 11 | 16,193 | 56 |
| 1997 | 8,346 | 88,082 | 9 | 14,971 | 56 |
| 1998 | 8,245 | 70,534 | 12 | 12,890 | 64 |
| 1999 | 6,742 | 94,348 | 7 | 9,855 | 68 |
| 1989-1998^a | 6,102 | 86,989 | 7 | 10,149 | 60 |
| 1994-1998^a | 7,769 | 86,891 | 9 | 13,303 | 59 |

^a Average value for the years during the period.

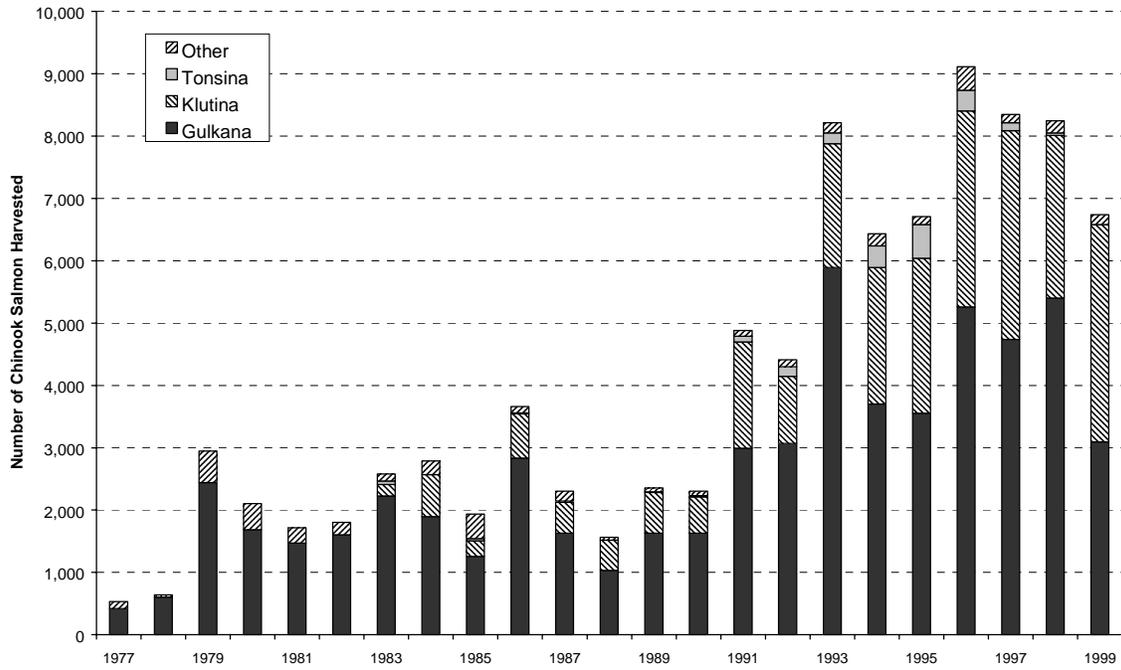


Figure 6.-Upper Copper River chinook salmon sport harvest by drainage, 1977-1999.

UCUSMA during 1999 accounted for 7% of the statewide, and 68% of the AYK region chinook sport harvests (Table 10). The fishery occurs in various tributaries to the Copper River with the largest fisheries occurring in the Gulkana and Klutina rivers (Table 11). Approximately 94% of the estimated sport harvest of chinook salmon taken from the Copper River drainage since 1994 has been taken from these two drainages. Since 1990, catch has averaged nearly 17,000 chinook salmon by sport anglers fishing the UCUSMA waters (Table 12). Approximately, 40% of the catch has been harvested over this same period. The Klutina River has a slightly higher rate of retention (44%) of chinook salmon than the Gulkana River (39%) on the average since 1990.

Since 1970, the sport harvest of chinook salmon over 20 inches in length in the sport fishery of the Copper River Basin has been limited by a bag and possession limit of one per day and one in possession. Further protection was afforded area chinook salmon stocks through spawning season closures beginning in 1989. Beginning in 1989, to reduce catch-and-release mortality, any chinook salmon removed from UCUSMA waters becomes part of the daily bag and possession limit of the person who hooked the fish. During 1991, sport chinook salmon fishing was closed in Fish, Indian, Bernard, Ahtel and Natat creeks and the Little Tonsina River. This action was taken in an effort to bolster escapements to these small clear water tributaries, which have showed decline in chinook salmon returns in recent years. Also during 1991, the portion of the Gulkana River 7.5 miles upstream of the confluence of the West Fork was designated as an area where only unbaited, single-hook artificial lures may be used. This action was taken as a conservation measure for rainbow trout and has had little or no effect on the chinook salmon fishery. In 1994, a seasonal bag limit of five chinook was instituted for the Copper River drainage. In 1997, following the 1996 BOF meeting, sport chinook salmon fishing was closed in Manker Creek, Klutina Lake and all flowing waters entering Klutina Lake, all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering Tonsina Lake, the Chokosna and Gilahina rivers and all clearwater tributaries of the Gakona River, Tazlina Lake and all flowing waters entering Tazlina Lake except ¼ mile radius around the mouth of Kiana Creek. In addition, the season closure date for chinook salmon was moved from August 10 to August 1 for the flowing waters downstream of the department markers located at mile 19.2 on the Klutina Lake Road. These measures were taken to protect spawning chinook salmon. To reduce harvests in the Tonsina River the use of bait was restricted and only unbaited, single hook, artificial lures were permitted. In addition the creation of the *Copper River Chinook Salmon Fishery Management Plan* (5 AAC 24.361) during the BOF meeting, resulted in a 5% reduction in the harvest potential of the commercial, personal use, and sport fisheries to provide for escapement levels at or above historic levels. This was to be achieved in the sport fishery through the prohibition of guiding in the flowing waters of the Copper River drainage on Tuesdays from May 15 to July 31. At the 1999 BOF meeting, this provision was deemed ineffective and as a result the chinook salmon seasonal bag limit was reduced from 5 to 4 in the Copper River drainage. This reduction was implemented to achieve the 5% reduction the guide restriction was unable to accomplish.

Under the *Copper River District Salmon Management Plan* (5 AAC 24.360), the department is directed to manage the commercial fishery to achieve an inriver goal of 15,000 salmon, annually, for the sport fishery in the Copper River tributaries. This sport harvest allocation has been exceeded since 1996, primarily due to the doubling of the sockeye sport harvest during those four years due to strong sockeye runs and an increased development in the sockeye fishery. Given the increase in the popularity of the sport chinook and sockeye salmon fishery in the Copper River basin, it is likely that the allocation will continue to be exceeded into the future

Table 11.-Harvest of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 – 1988 and annually from 1989-1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^c | 1994-1998 ^c |
|------------------------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------|------------------------|
| Gulkana River Drainage | | | | | | | | | | | | | | |
| Upper River | | 1,211 | 1,102 | 1,670 | 1,676 | 3,998 | 1,548 | 1,269 | 1,898 | 2,227 | 1,617 | 1,329 | 1,822 | 1,712 |
| Lower River | | 419 | 525 | 1,321 | 1,395 | 1,894 | 2,154 | 2,287 | 3,362 | 2,514 | 3,786 | 1,764 | 1,966 | 2,821 |
| Total | 1,580 | 1,630 | 1,627 | 2,991 | 3,071 | 5,892 | 3,702 | 3,556 | 5,260 | 4,741 | 5,403 | 3,093 | 3,788 | 4,533 |
| Klutina River Drainage | 466 ^a | 652 | 583 | 1,709 | 1,075 | 1,989 | 2,189 | 2,485 | 3,142 | 3,344 | 2,608 | 3,489 | 1,978 | 2,754 |
| Tonsina River Drainage | 21 | 11 | 23 | 89 | 152 | 172 | 349 | 539 | 331 | 131 | 39 | 0 | 184 | 278 |
| Tazlina Drainage | 16 ^a | 40 | 17 | 32 | 8 | 0 | 105 | 0 | 64 | 28 | 63 | 0 | 36 | 52 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 12 ^a | 0 | 17 | 0 | 43 | 57 | 16 | 0 | 0 | 0 | 0 | 25 | 13 | 3 |
| Downstream of Klutina ^b | 20 ^a | 11 | 0 | 25 | 55 | 64 | 20 | 0 | 64 | 22 | 15 | 11 | 28 | 24 |
| Other Waters | 335 | 12 | 35 | 38 | 8 | 43 | 50 | 129 | 255 | 80 | 117 | 124 | 77 | 126 |
| Area Total | 2,048^c | 2,356 | 2,302 | 4,884 | 4,412 | 8,217 | 6,431 | 6,709 | 9,116 | 8,346 | 8,245 | 6,742 | 6,102 | 7,769 |

^a Includes 1983-1988 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

^b Does not include Tonsina River drainage.

^c Average of total annual harvest for the years during the period.

Table 12.-Catch of chinook salmon by recreational anglers fishing in the UCUSMA by drainage, annually from 1990-1999.

| Areas | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1990-1998 ^b |
|------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------------------------|
| Gulkana River Drainage | | | | | | | | | | | |
| Upper River | 2,728 | 3,956 | 4,635 | 10,592 | 3,121 | 3,009 | 5,979 | 10,738 | 4,338 | 4,158 | 5,455 |
| Lower River | 1,055 | 2,731 | 3,419 | 4,994 | 3,407 | 4,839 | 11,836 | 7,385 | 11,115 | 4,876 | 5,642 |
| Total | 3,783 | 6,687 | 8,054 | 15,586 | 6,528 | 7,848 | 17,815 | 18,123 | 15,453 | 9,034 | 11,097 |
| Klutina River Drainage | 1,493 | 3,036 | 3,822 | 4,934 | 3,807 | 5,081 | 7,407 | 8,677 | 5,815 | 8,637 | 4,897 |
| Tonsina River Drainage | 35 | 146 | 222 | 614 | 698 | 1,102 | 832 | 395 | 193 | 0 | 471 |
| Tazlina Drainage | 146 | 134 | 8 | 0 | 144 | 0 | 74 | 94 | 101 | 104 | 78 |
| Copper River | | | | | | | | | | | |
| Upstream of Gulkana | 17 | 0 | 50 | 293 | 45 | 75 | 277 | 232 | 59 | 125 | 116 |
| Downstream of Klutina ^a | 0 | 25 | 160 | 176 | 29 | 9 | 246 | 22 | 60 | 22 | 81 |
| Other Waters | 583 | 51 | 24 | 164 | 21 | 63 | 544 | 217 | 183 | 112 | 206 |
| Area Total | 6,057 | 10,079 | 12,340 | 21,767 | 11,272 | 14,178 | 27,195 | 27,760 | 22,324 | 18,034 | 16,997 |

^a Does not include Tonsina River drainage.

^b Average of total annual catch for the years during the period.

unless actions are taken to reduce harvest or the inriver escapement goal is raised to accommodate the growth in the fishery.

Conflicts among users and concerns over chinook salmon resources have been a contentious issue in previous Board of Fisheries meetings, and will likely continue to be in future meetings. The department is moving forward in improving escapement estimates in index spawning streams through conducting surveys during peak counting periods, as well as estimating contribution of spawning streams to total chinook escapement through radio-telemetry studies. In addition, future studies may include enumeration of escapement in the Gulkana River and clearwater spawning tributaries of the Klutina River to provide data for development of the Copper River Chinook Fishery Management plan for the BOF meeting in 2002/2003. In the past, Copper River chinook salmon stocks have been considered healthy (Roberson and Whitmore 1991). Increasing harvests over the past decade have been supported by above average returns (Table 9). Strong returns of chinook salmon are unlikely to continue indefinitely, while participation in upriver fisheries is likely to increase. To more accurately assess chinook salmon abundance, research was initiated during 1995 to estimate the timing and contribution of chinook salmon stocks from major tributaries to the Copper River. Following initial feasibility studies in 1995 and 1996, capture and coded wire tagging of juvenile chinook salmon began in 1997 in the Gulkana, Klutina, and Tonsina rivers; continued in 1998 with tagging on the Gulkana, Tonsina and Chistochina rivers; and finished in 1999 with tagging on the Gulkana, Klutina and Chistochina rivers (Sarafin 2000). Recovery of tagged chinook salmon will occur in the commercial fishery beginning 2001. A weir was operated successfully in the Gulkana River from June 11 to July 31 in 1996, a total of 11,684 chinook and 183,461 sockeye were enumerated (LaFlamme 1997). In 1999 and 2000, a radio-telemetry study was conducted on the Copper River that deployed radio-transmitters in chinook salmon captured downstream of Haley Creek (Evenson and Wuttig 2000). The radio-tagged chinook salmon were tracked via remote tracking stations located at the lower and upper ends of the personal use fishery, the mouths of the Chitina, Tonsina, Klutina, Tazlina, and Gulkana rivers, and upstream of the Gulkana River on the mainstem Copper River. These stations recorded the signal of tagged chinook salmon that passed stations equipped with two antennas, to determine if the salmon were moving into the tributary or continuing up the Copper River. From this data, distribution of chinook salmon in the spawning tributaries of the Copper River was determined, as well as timing of entry into the spawning streams and through the personal use fishery. A mark-recapture experiment was conducted through marking all chinook capture during the radio-transmitter deployment and recapture of the marked fish in the Chitina Subdistrict personal use fishery (subsistence fishery in 2000). Total spawning escapement for the upper Copper River in 1999 was estimated at 16,386 chinook salmon.

Gulkana River Chinook Salmon Sport Fishery

Background and Historic Perspective

The Gulkana River drainage has historically supported the largest sport fishery for chinook salmon in the UCUSMA. This drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana (Figure 7). The section of the Gulkana River upstream from Sourdough has been designated by the U.S. Congress as “wild” under the Wild and Scenic Rivers Act of 1968. Access to the river is available from various secondary roads and trails off the Richardson Highway, which parallel much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the

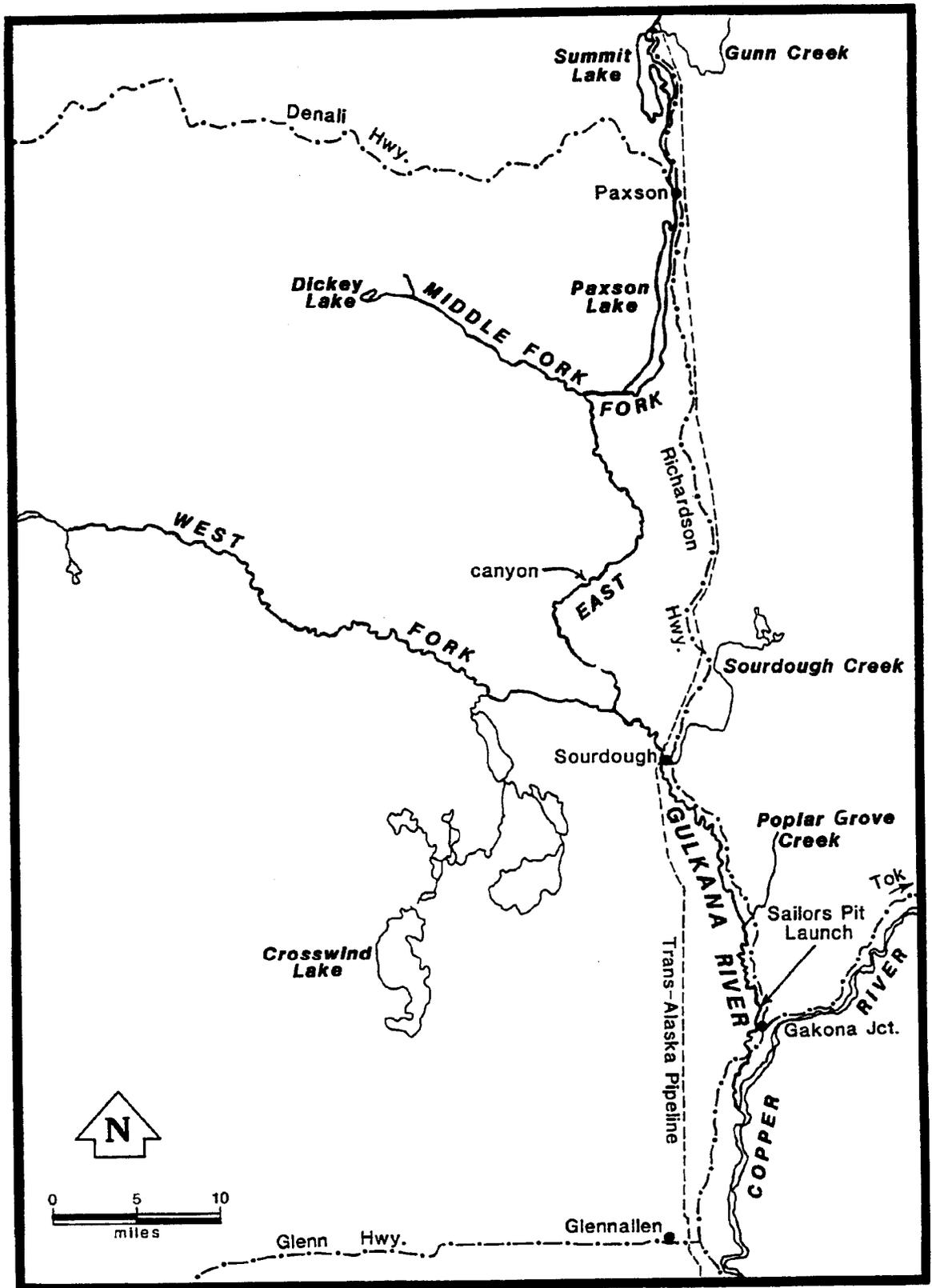


Figure 7.-Map depicting the Gulkana River drainage.

Richardson Highway bridge. Powerboat operators generally launch at Sourdough and use the river from approximately 2 miles below Sourdough upstream to the confluence of the West Fork. More recently powerboat operators have begun launching from the Richardson Highway bridge and fishing the 5-mile reach of the river above the bridge. Powerboat operators access the mouth of the Gulkana River using powerboats launched from Gakona and the Richardson Highway bridge.

Chinook salmon typically begin entering the Gulkana River in early to mid-June. The sport fishery typically peaks during late June, but limited fishing for chinook salmon continues until the season closes in mid July. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork. Under current regulations, anglers fishing the Gulkana River are allowed one chinook salmon over 20 inches daily and in possession and a total of five per year (reduced to four in 2000). All waters above the Middle Fork confluence with the mainstem Gulkana River are closed to fishing for chinook salmon year-round to protect spawning fish. The rest of the river is open to chinook salmon fishing from January 1 through July 19. The closure date is intended to offer protection to spawning fish. The Gulkana River from the Richardson Highway bridge downstream to a department marker 500 yards downstream of its confluence with the Copper River is an area where only single-hook, artificial flies may be used from June 1 through July 31. In all waters of the Gulkana River drainage upstream of a marker 7.5 miles upstream of the West Fork confluence with the mainstem only unbaited, artificial lures (changed to single hook, artificial lures in 2000) may be used. This regulation is intended to protect rainbow trout stocks that inhabit this area.

The primary source of information regarding the sport fishery is the statewide mail survey (Mills 1979-1994, Howe et al. 1995-2000.). Based on this survey, the sport harvest of chinook salmon in the Gulkana River averaged 3,787 fish annually from 1989-1998, and 4,532 fish annually from 1994-1998 (Table 13). The 1999 harvest of 3,093 chinook salmon was the lowest since 1992 and accounted for 46% of the sport harvest of chinook salmon in the UCUSMA. Sport fishing effort on the Gulkana River averaged 32,223 angler-days annually from 1989-1998, and 34,306 angler-days from 1994-1998 (Table 5). Due to the nature of the mail survey, effort is not assigned to individual species, but observations suggest that the majority of effort is directed toward chinook salmon. Sport fishing effort in 1999 was the highest since 1995 and the second highest on record. The increase in effort in 1999 may be due in part to the increased fishing effort statewide. The majority of effort and harvest of chinook salmon occurs from the Richardson Highway bridge upstream to the confluence of the West Fork.

A roving creel survey was conducted in 1989 to estimate the catch and harvest of and effort directed toward chinook salmon. Results of this survey (Potterville and Webster 1990) indicated that sport anglers expended 29,103 angler-hours to catch 2,398 chinook salmon. Sixty-one percent (1,461 fish) of the catch was estimated to be harvested. This estimate of harvest is close to that estimated from the mail survey (1,630 fish), indicating that the mail survey appears to accurately estimate the harvest of chinook salmon in this fishery. Approximately 50% of the harvest was estimated to have occurred on weekends. The majority of the sport harvest occurred in the 5-mile reach directly upstream of the Richardson Highway bridge and the 10-mile reach near the Bureau of Land Management campground and boat launch at Sourdough. Few anglers fished the single-hook, artificial fly-fishing-only area and, although many anglers floated the upper river, the harvest of chinook salmon was minimal in this reach due to the July 19 spawning season closure.

Table 13.-Sport harvest and spawning escapement indices of chinook salmon in the Gulkana River drainage, averaged for 1977 – 1988 and annually from 1989-1999.

| Year | Sport Harvest | Observed Spawning Escapement |
|------------------------------|---------------|------------------------------|
| 1977-1988 ^b | 1,580 | 1,326 |
| 1989 | 1,630 | 1,993 |
| 1990 | 1,627 | 1,356 |
| 1991 | 2,991 | 1,303 |
| 1992 | 3,071 | 656 |
| 1993 | 5,892 | 1,156 |
| 1994 | 3,702 | 1,682 |
| 1995 | 3,556 | 720 ^a |
| 1996 | 5,260 | 2,321 |
| 1997 | 4,741 | 2,250 |
| 1998 | 5,403 | 1,407 |
| 1999 | 3,093 | 1,047 |
| 1989-1998^b | 3,787 | 1,484 |
| 1994-1998^b | 4,532 | 1,676 |

^a Visibility poor, carcass count only downstream of West Fork.

^b Average value for the years during the period

A second access-point creel survey was conducted in 1996. Results of this survey (LaFlamme 1997) indicated that 35,080 angler-hours were expended to catch 4,920 chinook salmon, 50% (2,441 chinook) of the catch was harvested. The estimated catch and harvest reported in the 1996 mail survey was 17,815 and 5,260, respectively. The large discrepancy in estimates between creel and mail survey, 44% and 72% less for harvest and catch, was attributed to access sites used by anglers that were not surveyed in the onsite creel survey, resulting in biased harvest and catch estimates. As in 1989, the majority of harvest occurred at the Richardson Highway bridge and Sourdough access points. Anglers that were guided or used bait had higher catch and harvest rates. Shore anglers caught as many chinook salmon as boat anglers, but harvested more and expended greater effort to catch a chinook salmon.

The spawning escapement of chinook salmon in the Gulkana River upstream of the West Fork has been documented since 1966 by aerial surveys of index sites in the drainage (Brady et al. 1991, Roberson and Whitmore 1991). From 1977 to 1999, escapement counts have generally increased (Table 13). Average escapement from 1977 to 1988 was 1,329; while from 1989 to 1998 escapement averaged 1,484. The average escapement for 1994 through 1998 is 1,676. High and low escapements during this 23-year period range from 3,182 fish in 1996 to 321 fish in 1985 (Table 8). With the exceptions of a low escapement during 1985 and 1992 and high escapement during 1996 and 1997, escapements have remained relatively stable since 1977 (Figure 8).

As part of a drainage-wide chinook salmon research project, a weir was operated on the Gulkana River in 1996 to provide a count of chinook escapement. The access-point creel survey was conducted concurrently to estimate the harvest of chinook salmon. Based on the final weir counts and creel survey harvest estimates, the estimated total inriver run in 1996 was 13,840 and estimated spawning escapement was 11,399 (LaFlamme 1997). The aerial survey spawning escapement count in 1996 was 2,321.

Recent Fishery Performance

During 1999, sport anglers fishing the Gulkana River drainage (Table 13) harvested 3,093 chinook salmon. This was 18% less than the 1989 – 1998 average and 32% less than the 1994 – 1998 average. Whereas, the fishing effort of 37,841 angler-days in 1999 was 15% and 9% higher for the respective averages (Table 5). Observed chinook salmon spawning escapement during 1999 (1,047) was the lowest since 1995 (Table 8). Spawning escapement was also 29% and 38% for the 1989 – 1998 and 1994 – 1998 averages, respectively.

Since 1991 there has been a significant increase in the use of powerboats from the Richardson Highway bridge upstream for about 5 miles. Also, a notable increase in the number of guides specializing in guiding anglers targeting chinook salmon has occurred on the lower river (below the West Fork confluence) over the past several years. Prior to the 1986 season, only one individual specialized in guiding anglers targeting chinook salmon on this section of the river. During the 1987 and 1988 seasons, a minimum of eight guides operated on the lower portions of the river, while the number increased to at least ten guides during 1989 and 1990. At least 12 guides (registered with BLM) were operating on the lower Gulkana in 2000 (K. J. Mushovic, BLM, personal communication). This does not include guides that only operate downstream of the Gulkana Wild River. Available data indicate that guided anglers are more successful than unguided anglers.

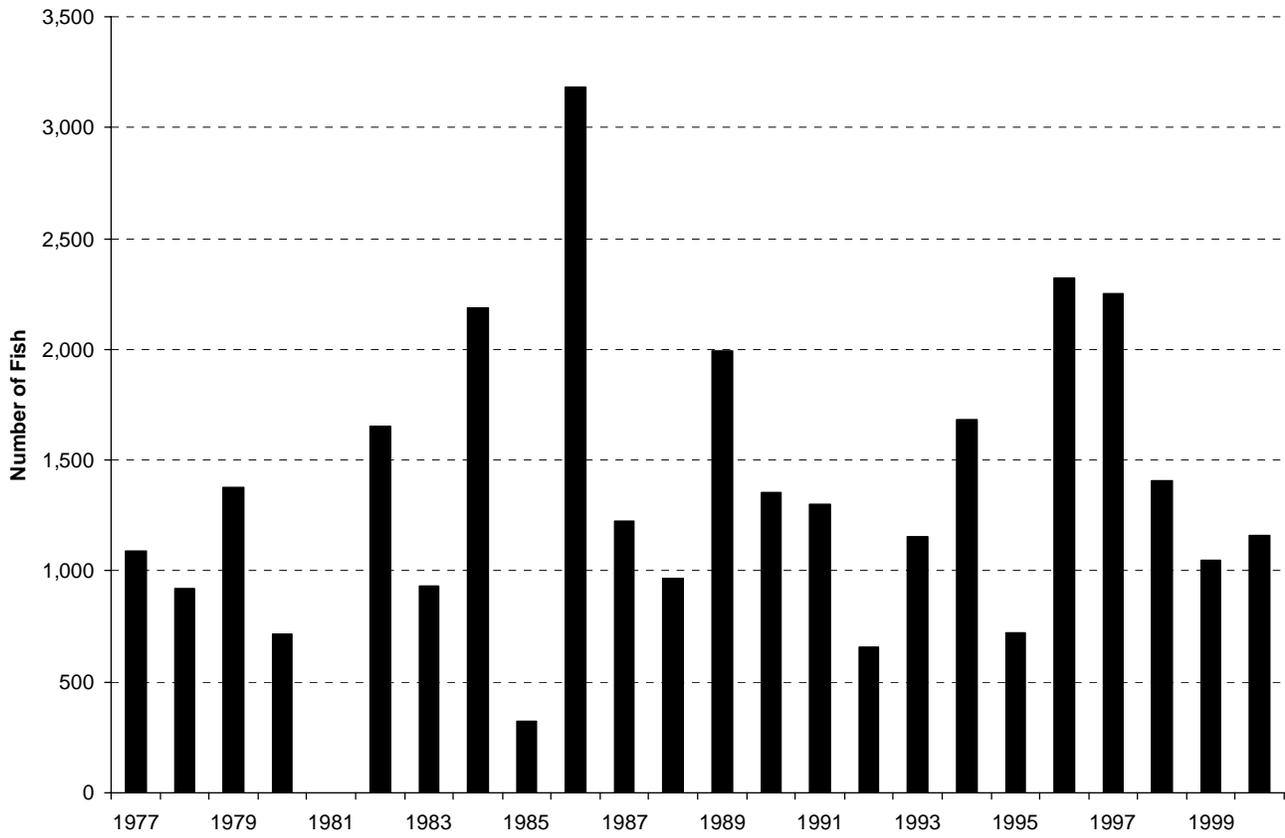


Figure 8.-Gulkana River chinook salmon aerial survey index escapement counts, 1977-2000.

Management Objectives

The underlying goal of past and current management has been to ensure sustained yield. An annual spawning escapement objective of 1,200 fish has been established, based on enumeration of spawning fish by aerial surveys. During years in which water clarity has been good enough to conduct aerial surveys, no action has been taken to restrict the fishery if spawning escapement counts of 1,000 fish are achieved in the area between the mouth of the Gulkana River and the confluence with the West Fork during the week following the Fourth of July weekend. Unfortunately, water clarity often results in poor aerial survey indices during this period and no restrictive measures have been taken. The *Copper River Chinook Salmon Fishery Management Plan* was developed to provide for chinook salmon escapement at or above average historic levels (escapement objective range of 28,000 – 55,000 chinook salmon was established by the BOF for 2000). This was to be achieved through a five-percent reduction in harvests of chinook salmon in the commercial, personal use, and sport fisheries. In two of the past four years (1997 – 2000) since the plan was implemented, escapement counts have been above the 1977-1988 averages of 1,326 chinook salmon and exceeded the escapement objective of 1,200.

Fishery Management

In 1999, cool temperatures, early low water and late ice breakup in the lower Copper River appeared to delay the return of chinook salmon to the Copper River. Significant chinook salmon catches were not reported in the Gulkana River until mid-June, approximately two weeks later than normal. Rain in the upper Gulkana and West Fork resulted in high water and siltation in the lower river and reduced fishing success during most of the fishing season. Anglers that reported success were fishing primarily above the West Fork. Based upon river observations there were only approximately 10 – 14 days of favorable fishing conditions for chinook in 1999. In 1999, Ahtna Heritage Foundation sponsored a chinook salmon fishing derby with prize money of \$10,000, \$3,500, and \$1,500 respectively for the largest three chinook salmon registered. This likely contributed to the increased effort on the Gulkana River in 1999, but with poor fishing conditions, the high fishing effort had little impact and the harvest remained relatively low. No aerial surveys were flown in June, due to river and weather conditions.

Due to poor river conditions, no June aerial surveys were flown on the Gulkana River in 1999. The spawning escapement aerial survey was flown outside the optimum period due to weather conditions and resulted in a spawning escapement index below the historic escapement objective of 1,200. Had the survey been flown within the optimum period, it is believed that the escapement objective would have been met.

In 1999, Ahtna Native Corporation began an access fee program for access to the Gulkana River across corporation lands (\$5 per day per person, or a \$20 individual seasonal or \$50 seasonal family pass). Access to the Gulkana River downstream of Sourdough was limited to the Richardson Highway bridge and the easement trail at mile 141 Richardson Highway if no access fee was paid. If a day or seasonal use fee was paid, access to the river included the uplands adjacent to the river and access points at Sailors Pit and Poplar Grove. A private campground that provided river access upstream of Sailors Pit for less than the Ahtna fee shifted effort from Sailors Pit to the campground. The fee program also shifted effort from Sailors Pit to the Richardson Highway bridge ROW and overall fishing effort was not reduced as a result of the access fee. Initial concern of increased harvest of chinook due to the derby was not realized, due to lack of participation in the access fee program and poor fishing conditions on the Gulkana

River in 1999. Access to the lower Gulkana will continue to be an issue, as will increasing harvests of chinook salmon, though effort appears to be stable.

In 2000, cool temperatures and low water conditions in the lower Copper River again appeared to delay the return of chinook salmon. Commercial harvests of chinook salmon on the Copper River Delta were substantially less than what was projected. Following the first three commercial fishery openings, through May 22, actual chinook salmon harvest was lagging projected harvests by 9,000. There was no commercial opening on May 26, due to lagging sonar numbers. The next three commercial openings resulted in a total harvest of 10,137 chinook salmon. From these harvest levels it appeared the chinook salmon returns were less than anticipated. This was corroborated by catch per unit effort data in the upriver chinook salmon radio-telemetry study. These data indicated that the front portion of the upper Copper River chinook salmon run during 2000 was above that for 1999. This is likely due to the commercial fishery being restricted; the inside statistical areas were closed during the first two openings. Catch rates in the research study declined and tracked below the 1999 estimates, which indicated a below average late run. Therefore, to provide additional chinook salmon for the drainage wide spawning escapement objective of 28,000 – 55,000 chinook salmon, a reduction of chinook salmon sport harvest was warranted. An emergency order restricting the seasonal bag limit from 4 to 2 chinook salmon 20 inches or more in length in the upper Copper River drainage was issued to go into effect on June 26. This measure was believed to conserve 2,000-3,000 chinook salmon for the drainage-wide escapement. Whether this measure was successful will not be determined until the 2000 sport harvest and the escapement estimates are calculated.

High water conditions, as a result of rain and late snow melt, existed on the Gulkana River during most of the 2000 fishing season. This did not seem to hamper fishing success, as it has in the past. Anecdotal reports by sport anglers indicated that the chinook return was better than 1999, though effort on the river appeared to be reduced. Ahtna Heritage Foundation again sponsored a chinook salmon derby, though prize money was reduced to \$3,500, \$2,000, and \$1,000 for the three largest fish. Overall, fishing effort on the Gulkana River appeared to be less than recent years, particularly on the lower Gulkana River. Fewer anglers may have targeted the Gulkana River in 2000 due to high water in the Gulkana River and good chinook salmon returns to the Susitna River drainage and a strong late chinook return on the Kenai River. Ahtna Heritage Foundation currently has no plans for future fishing derbies.

Fishery Outlook

It is anticipated that effort and harvests of chinook in the Gulkana River will remain at current levels in the near future. The increased effort and harvests that resulted in the early 1990's may have been a result of restrictions on the Cook Inlet fisheries (Kenai, Susitna catch-and-release and closures). As these restrictions have been lifted effort on the Gulkana River has declined in recent years. The recent data indicates a potential for overharvest of the Gulkana River chinook stocks, if river conditions such as water clarity and water level are conducive to fishing success. The Copper River drainage harvest trends and aerial survey indices indicate strong chinook salmon returns in recent years, but based upon returns in 1999 and 2000, it is realistic to assume runs will decrease over the next several years.

Recent Board of Fisheries Actions

In 1994, a seasonal bag limit of five chinook salmon was imposed on the UCUSMA fisheries and guides were restricted from fishing while accompanying paid clients. Both restrictions were implemented to reduce the harvest potential on chinook salmon stocks in the area that are

considered fully utilized. In 1996, as part of the *Copper River Chinook Salmon Fishery Management Plan*, guides were restricted from operating in the flowing waters of the Copper River drainage on Tuesdays. No other proposals were passed during the 1996 BOF meeting regarding chinook salmon sport fishing in the Gulkana River.

During the 1999 BOF meeting, the Board passed two proposals specific to the Gulkana River, one specific to chinook salmon, the other impacting chinook salmon anglers on the upper Gulkana River. The regulation concerning chinook salmon clarified the single-hook, artificial fly regulation, for the area downstream of the Richardson Highway bridge. The regulation now has a specific hook size (3/4-in or less) and distance that weight can be used in front of the hook (18"). The second regulation, designed to protect rainbow and steelhead trout, permits only unbaited, single-hook artificial lures in the Gulkana River, with the exception of the single-hook, artificial fly area from June 1 to July 31 and the mainstem Gulkana River upstream of the Richardson Highway bridge to an ADF&G marker 7 ½ miles upstream of the confluence with the West Fork from June 1 to July 19. This regulation permits bait in the main chinook salmon fishing area of the Gulkana River during the open season. Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four.

Current Issues

Increased use by float and powerboat operators on the Gulkana River is intensifying conflicts between users. Float-boat operators' fish primarily from the bank casting and drifting lures through the holes while powerboats hover in the holes and back troll. Additionally, reports have been made by float-boat operators that powerboats have bumped into them. The Bureau of Land Management initiated the process of updating the management plan for the Wild portion of the Gulkana River upstream of Sourdough in 1998. A private consulting firm was awarded the contract and gathered management recommendations through a process called Limits of Acceptable Change. Prior to the final recommendations being completed, the consulting firm discontinued its work and the project was reassigned to another contractor. No completion date of the plan has been announced at this time. There were two proposals submitted for the 1999 BOF meeting regarding motorized use on the Gulkana River. Neither of these were addressed, as they fell outside the purview of the BOF.

The majority of the land adjacent to the Gulkana River downstream of Sourdough is owned by the Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing because it felt its customary and traditional lifestyle has been jeopardized by elimination of the rural preference in the subsistence law. Ahtna Corporation, in conjunction with the Department of Transportation, is planning the development of a public use area on its lands near the Richardson Highway bridge, a popular fishing and camping site where land ownership is in dispute. As previously mentioned, an access fee was initiated in 1999 for access to the Gulkana River across Corporation lands. Many anglers voiced dissatisfaction with the fee and shifted their efforts to the non-fee areas (Richardson Highway bridge and upstream of Sourdough). Some of this animosity toward the fee may have resulted in less participation in the fishing derby sponsored by Ahtna Heritage Foundation. Overall, effort has not been reduced due to the access fee program.

The allocation of Copper River drainage chinook salmon between personal use, sport, and commercial uses remains a controversial issue. The *Copper River Chinook Salmon Management Plan* was developed during the BOF meeting in 1996. The plan has an "insurance plan" that

reduces harvest by commercial, personal use, and sport fisheries to allow more chinook on the spawning grounds. The plan was written with a sunset clause of December 31, 2002 to allow the department to further research the Copper River chinook populations. There were several proposals submitted for the 1999 BOF meeting that addressed the modification or repeal of the current management plan. As a result, the management plan was modified, but still contains the sunset clause and direction to the department to develop a management plan that provides for high sustained yield.

Ongoing and Recommended Research and Management Activities

The department has determined that the mail survey accurately estimates the harvest of chinook salmon in this drainage, therefore we do not recommend that creel surveys be conducted on an annual basis.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, indicators of relative spawning abundance due to their dependence on survey conditions, surveyor, and the residence of fish in the survey area. In 1996, a weir was operated in the Gulkana to count returning adult chinook salmon and verify aerial counts. The weir project was discontinued after one year and does not provide a reliable expansion factor with a single data point.

Coded wire tagging of chinook smolt was begun in 1997 with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the run timing of different Copper River chinook stocks and whether one stock (the Gulkana River stock) can serve as a gauge of the abundance of other chinook stocks. Aerial surveys will be continued to index numbers of spawning salmon, and the results compared to future weir or tower counts. In 1999, a radio-telemetry study on the Copper River was initiated and resulted in an estimate of total upriver escapement, as well as migratory timing through the personal use fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000).

Recommended research projects are the completion of the coded-wire tag recovery and continuation of the radio-telemetry projects. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the proportion of contribution of spawning escapements in index streams (including the Gulkana River) to total escapement would clarify if the index streams were actually representative of the total return. The potential of using a weir or tower count on the Gulkana River for extrapolation to total Copper River drainage escapement estimate should be examined, based upon data collected from the radio-telemetry and CWT studies. Management projects should include continued aerial survey data collection and, if possible, establish aerial survey escapement count data for June for the Gulkana River.

Klutina River Chinook Salmon Sport Fishery

Background and Historical Perspective

The Klutina River supports the second largest sport fishery for chinook salmon in the UCUSMA. This semi-glacial river drops rapidly out of Klutina Lake to enter the Copper River at the community of Copper Center. Access to the river is available along the Richardson Highway and from the Klutina Lake Road (also called the Brenwick-Craig Road) which parallels the river. Shore anglers participate in the fishery adjacent to the Richardson Highway and the Klutina

River road. The distance between the Klutina River road and the river varies along the course of the road, with the road running along the ridge above the river. Much of the land between the road and the river belongs to the Ahtna Native Corporation and beginning in 1998, an access permit is required to be purchased prior to crossing Corporation lands. Fees in 1998 were \$5 per day per person for a day use access permit and \$10-\$30 per night for camping. Jet riverboats are used by experienced operators to access the upstream portions of the river. Jet boats are launched from private land adjacent to the highway or from a site along the new Richardson Highway bridge. The river has considerable stretches of whitewater and is considered to be very challenging to jet riverboat operators. The fast water of the Klutina River limits the number of resting pools for chinook salmon, therefore there are less than two dozen good fishing sites in the lower portion of the river accessible to most anglers.

Chinook salmon typically begin entering the Klutina River in late June, with the run continuing into August. The sport fishery typically peaks during the second week of July, but fishing for chinook salmon continues until the season closes on August 1. Peak spawning occurs from late July through August. Most spawning occurs upstream of a point adjacent to mile 19.2 on the Klutina Lake road.

Chinook salmon spawning season closures were established in the UCUSMA during the 1989 BOF meeting to allow chinook salmon to spawn unperturbed. On the Klutina River upstream of a department marker located adjacent to Mile 19.2 of the Klutina Lake road, chinook salmon may be taken only from January 1 through July 19. Downstream of this marker, the chinook salmon season is from January 1 through July 31. The current bag and possession limits governing the sport fishery for chinook salmon over 20 inches is one fish. The Copper River drainage-wide bag limit of five chinook salmon per year includes the Klutina River.

Sport harvest of chinook salmon from the Klutina River drainage has been estimated using the mail survey since 1983 (Mills 1979-1994), Howe et al. (1995-2000). Based on this survey, the sport harvest of chinook salmon from the Klutina River drainage averaged 1,978 fish from 1989 through 1998, ranging from a low of 583 fish in 1990 to a high of 3,489 fish in 1999 (Table 14, Figure 9). Harvests remained relatively stable from 1983 to 1990. From 1989 to 1998, sport effort on the Klutina River averaged approximately 9,520 angler-days, ranging from 5,556 in 1990 to 15,687 in 1999 (Table 5). Due to the nature of the mail survey, we do not know how much of this effort was directed toward chinook salmon versus other species. Observations in recent years, however, suggest that a majority of the recent effort is directed toward chinook salmon.

During 1988 and 1989, creel surveys of the sport fishery targeting chinook salmon in the Klutina River drainage were conducted. High water reduced effort and catch during a significant portion of the 1988 season, whereas river conditions remained favorable throughout the 1989 season. Results of the 1988 survey (Roth and Delaney 1989) indicated that sport anglers caught a total of 1,048 chinook salmon of which 43% were retained. The estimated harvest (450) was close to that reported in the mail survey for 1988 (483), indicating that the mail survey fairly accurately estimates sport harvest in this fishery. In 1989 the creel survey estimate was 1,587 chinook salmon caught of which 65% were retained (Potterville and Webster 1990). The estimated harvest (1,031 fish) was again reasonably close to that reported in the mail survey for 1989 (652 fish). The 1988 creel survey showed that guided boat anglers accounted for nearly 90% of the catch and 80% of the harvest of chinook salmon. During the 1989 survey, boat anglers

Table 14.-Sport harvest and spawning escapement indices of chinook salmon in the Klutina River drainage from 1983 to 1999.

| Year | Sport Harvest | Observed Spawning Escapement |
|------------------------------|---------------|------------------------------|
| 1983 | 189 | 228 |
| 1984 | 667 | 353 |
| 1985 | 249 | 37 |
| 1986 | 710 | 433 |
| 1987 | 495 | 333 |
| 1988 | 483 | 183 |
| 1989 | 652 | 255 |
| 1990 | 583 | 86 |
| 1991 | 1,709 | 237 |
| 1992 | 1,075 | 26 |
| 1993 | 1,989 | ^a |
| 1994 | 2,189 | 325 |
| 1995 | 2,485 | 34 |
| 1996 | 3,142 | 311 |
| 1997 | 3,344 | 1,106 |
| 1998 | 2,608 | 1,358 |
| 1999 | 3,489 | 555 |
| 1989-1998^b | 1,978 | 415 |
| 1994-1998^b | 2,754 | 627 |

^a No aerial survey conducted in 1993.

^b Average value for the years during the period.

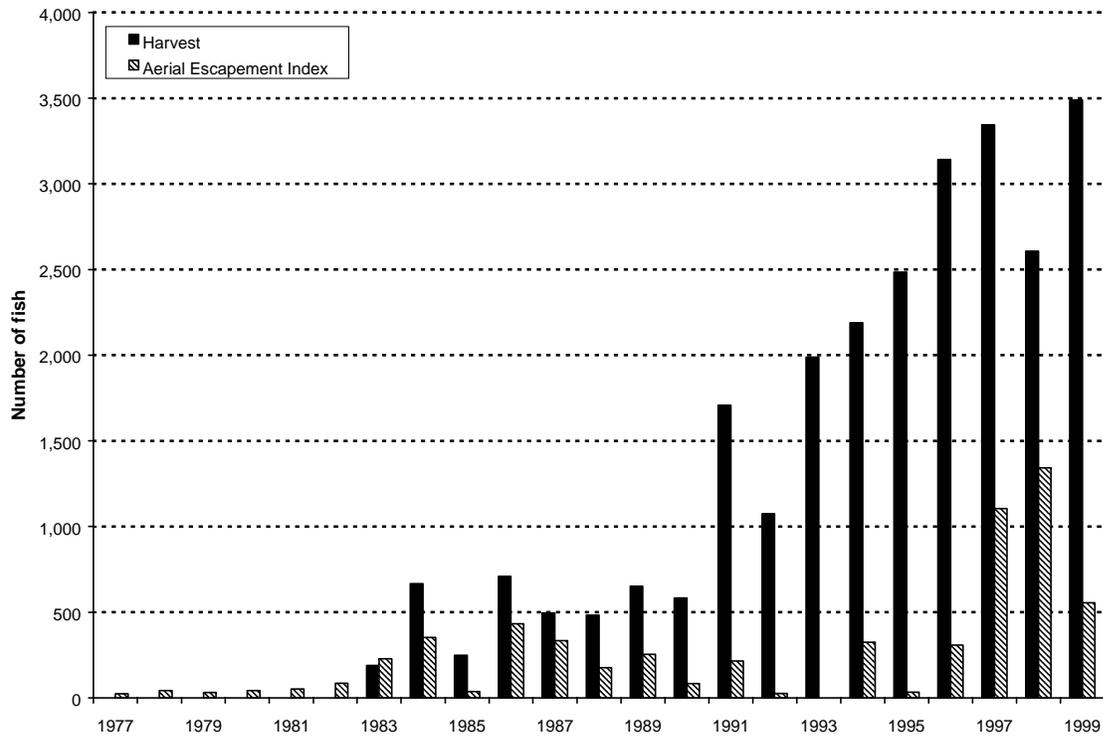


Figure 9.-Klutina River chinook salmon sport harvest, 1977-1999.

accounted for 88% of the estimated total catch and exhibited significantly higher catch (3.3 fish per hour) and harvest (2.1 fish per hour) rates than did shore anglers (0.5 and 0.4 fish per hour, respectively). The vast majority of boat anglers that participated in the fishery were guided and therefore insufficient data were available to determine if guided boat anglers had different catch or harvest rates than unguided boat anglers. Daily estimates of CPUE from the 1988 survey were used to estimate the timing of chinook salmon into the fishery. These data indicate that CPUE peaks during mid-July, with 50% of the run having entered the river by late July. Approximately 12 guides operated on the Klutina River during 1989 and 1990, all of which conducted boat trips. The vast majority of shore anglers fished downstream from the Richardson Highway bridge.

The spawning escapement of chinook salmon to the Klutina River has been documented by aerial surveys of St. Anne and Manker creeks since 1966 (Table 8). Spawning escapement has averaged 218 fish during 1977-1988, ranging from a high of 433 in 1986 to a low of 25 in 1977. Since 1987, observed escapements to this drainage have remained stable, the average escapement for 1989-1998 being 415 (Table 14). The observed escapements in 1997 and 1998 were the highest on record with an average in those two years of 1,233. No escapements surveys were flown on the Klutina River index areas in 1993. The 2-mile stretch of the river just below the lake is known to support chinook salmon spawning, but due to the turbid water conditions in this area, it is not possible to assess abundance of spawning fish.

Recent Fishery Performance

The 1999 sport harvest of 3,489 chinook salmon was the largest on record and accounted for about 52% of the estimated total sport harvest of chinook salmon in the UCUSMA. The harvest in 1999 exceeded the 1989 – 1998 average by 43%. The effort during the same period was 39% higher. Effort in 1999 was estimated at 15,687 angler-days, the highest on record. The aerial escapement count for index streams in the Klutina River drainage in 1999 was 555. The 1999 escapement of chinook salmon to index sites in the Klutina River drainage, was the third highest on record (Table 8) supporting evidence of a strong return to the Klutina River, which was reflected in the sport harvest. Evenson and Wuttig (2000) reported over 25% of radio-tagged chinook in 1999 were located in the Klutina River.

In 1999, as on the Gulkana River, the chinook return to the Klutina River was later than normal. Both guides and anglers reported low catch rates until mid-July, after which fishing success appeared to be typical for the second half of July. Ahtna Heritage Foundation initiated a chinook salmon derby with \$15,000 in prize money on the Klutina River in 1999. Unlike the Gulkana River chinook derby it appears effort increased on the Klutina River in part as a result of the derby. Another factor in increasing effort on the Klutina, was likely the poor fishing on the Gulkana River. Based upon anecdotal information from several guides there was an increase in the number of anglers transported to upriver fishing holes and, during July, a majority of the prime fishing areas were filled.

In 2000, high water conditions during late June and most of July severely limited sportfishing effort on the Klutina River. During much of this period, guides were not taking on clients. Due to the poor fishing conditions and limited fishing effort the Ahtna Heritage Foundation fishing derby was cancelled. Aside from mid-June and the last 10 days of July sport fishing effort on the Klutina River was non-existent. As a result, sport harvest is anticipated to be below the recent 10-year average of 1,978 chinook salmon. Guides and anglers were reporting excellent fishing and large numbers of chinook salmon in late July when sport fishing resumed.

Management Objectives

No specific fishery objectives have been established for this stock. An underlying goal of past and current management, however, has been to ensure sustained yield. Aerial survey index evaluation does not appear to represent the majority of spawning fish in this system and has been used as a post-season escapement index, with the realization that the majority of spawning occurs in the glacially occluded mainstem Klutina. In 1999, data gathered from the radio-telemetry study indicated 74% of radio-tagged chinook salmon entering the Klutina River remained in the mainstem. As additional years of data are collected, it can be determined whether the two escapement index streams are representative of the entire Klutina River escapement.

Fishery Management

In 1999, no inseason management assessment was conducted on the Klutina River. Harvest and catch data for the Klutina River chinook salmon stocks are obtained from the SWHS. In 1999, aerial surveys were flown on the index streams after the peak period, due to poor weather conditions. The escapement index was above the biological escapement objective of 250, but the majority of chinook salmon were observed in St. Anne Creek. The number of chinook observed in Manker Creek was less than the historic average. As in the Gulkana River, chinook returned later than normal to the Klutina River. Many guides and anglers did not report catches of chinook until after the first week of July. After mid-July, reports of catch rates appeared to be consistent with historic reports. There were some user conflicts on the Klutina River in 1999. Many guides reported abuse of the daily and seasonal bag limits by shore-based anglers fishing the mouth of the Klutina. In addition, several transporters were placing clients on upriver fishing holes before the guides took their clients upriver to fish, creating a conflict between transporters and guides. There are limited chinook holding areas on the Klutina River and it is anticipated that these conflicts will not diminish, particularly if effort increases.

At issue in 1998 was the seasonal closing date on the Copper River of July 19 and the lower Klutina River of July 31. The confluence of the Copper and Klutina rivers is a large holding area for chinook salmon and many shore based anglers now walk the mile downstream to access this site. Fish and Wildlife Protection officers made a concerted effort to patrol this area following the July 19 Copper River closure. Many anglers were confused in the interpretation of the regulations of where the Klutina River mouth and the Copper River mainstem actually occurred. To alleviate this confusion, in 1999 the department placed signage at the Klutina River mouth to delineate where anglers could fish after the Copper River closure.

In 2000, cool temperatures and low water conditions in the lower Copper River again appeared to delay the return of chinook salmon. Commercial harvests of chinook salmon on the Copper River Delta were substantially less than what was projected. Following the first three commercial fishery openings, through May 22, actual chinook salmon harvest was lagging projected harvests by 9,000. There was no commercial opening on May 26, due to lagging sonar numbers. The next three commercial openings resulted in a 10,137 chinook salmon harvest total. From these harvest levels it appeared the chinook salmon returns were less than anticipated. This was corroborated by catch per unit effort data in the upriver chinook salmon radio-telemetry study. This data indicated that the front portion of the upper Copper River chinook salmon run during 2000 was above that for 1999. This is likely due to the commercial fishery being restricted; the inside statistical areas were closed during the first two openings. Catch rates in the research study declined and tracked below the 1999 estimates, which indicated a below average

late run. Therefore, to provide additional chinook salmon for the drainage wide spawning escapement objective (28,000 – 55,000 chinook salmon), a reduction of chinook salmon sport harvest was warranted. An emergency order restricting the seasonal bag limit from 4 to 2 chinook salmon 20 inches or more in length in the upper Copper River drainage was issued to go into effect on June 26. This measure was believed to conserve 2,000-3,000 chinook salmon for the drainage-wide escapement. Whether this measure was successful will not be determined until the 2000 sport harvest and the escapement estimates are calculated.

In 2000, the aerial survey index stream counts were below average, which may have been influenced by the late timing of the flight on one of the streams due to poor survey conditions. Another factor influencing the counts may have been the high water in the index streams, which may have kept the chinook salmon destined for those streams in the mainstem Klutina River. Anecdotal reports indicated a strong return of chinook salmon, and data from the radio-telemetry study indicated that over 25% of radio-tagged chinook salmon entered the Klutina River in 2000. This suggests that the return of chinook salmon to the Klutina River may have been larger than the aerial surveys indicate. Though the reports of more chinook salmon in the river, may have been influenced by the reduced harvest due to high water and the high water forcing more chinook into holding areas giving the impression of a strong return.

Ahtna Native Corporation continued the access fee program for the Klutina River road in 1999 and 2000. There appeared to be fewer complaints regarding the fee in both 1999 and 2000 than in 1998, as users became accustomed to the program and the corporation publicized the program.

Fishery Outlook

It is anticipated that the increasing trend in effort and harvest of chinook in the Klutina River will stabilize in the near future. The higher levels of effort and harvest that resulted in the early 1990's may have been a result of restrictions on the Cook Inlet fisheries (such as catch and release restrictions and closures for the Kenai and Susitna rivers). As these restrictions have been lifted, effort has declined slightly in recent years for the Klutina River. The recent data indicates the potential for overharvest of the Klutina River chinook stocks, particularly if fishing conditions on the Gulkana River are poor and effort is shifted to the Klutina River where water conditions do not impact chinook salmon fishing as significantly as the Gulkana River (with the exception of the 2000 fishing season). The Copper River drainage harvest trends and aerial survey indices indicate strong chinook salmon returns in recent years, but based upon returns in 1999 and 2000, it is realistic to assume runs will decrease over the next several years.

Recent Board of Fisheries Actions

During the 1996 BOF meeting, as part of the *Copper River Chinook Salmon Fishery Management Plan*, guides were restricted from operating in the flowing waters of the Copper River drainage on Tuesdays. Other actions during the 1996 BOF meeting included closure of sport chinook salmon fishing in Manker Creek, Klutina Lake and all flowing waters entering Klutina Lake. In addition, the season date closure for chinook salmon was moved from August 10 to August 1 for the flowing waters downstream of the department markers located at mile 19.2 on the Klutina Lake road. These measures were taken to protect spawning chinook salmon. At the 1999 BOF meeting, no action was taken specific to the Klutina River chinook fishery. Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four.

Current Issues

The sport fishery for chinook salmon in the Klutina River has, in recent years, taken a higher proportion of chinook salmon returning to the upper Copper River (Table 11). This has resulted from an increase in the number of guides operating in the fishery, increased angler access to salmon holding areas, and a general increase in angler proficiency. Greater exploitation rates increase the risk of overharvest during years of low production and high angler effort. Further harvest increases may make further restrictions to the fishery necessary.

The majority of the land adjacent to the Klutina River upstream of the Richardson Highway is owned by Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. The corporation is not allowing free access for hunting or fishing purposes because it feels its customary and traditional lifestyle has been jeopardized by elimination of the rural preference in the state subsistence law. It has conducted an access fee program since 1998 to allow access to the upper Klutina River. If fees increase without increased access this may result in conflicts between fishery users and the corporation or increased congestion in areas of the Klutina River that are not corporation lands.

A large component of the guides, charter operators, and businesses on the Klutina River have formed a Klutina River Association. Ahtna Native Corporation has become involved with the association and will not issue a land access permit to a guide or operator unless they are a member of the Klutina River Association. This has caused some conflict amongst the various guides and operators on the Klutina River.

Princess Lodge purchased University of Alaska property on the Klutina River in 1999, and began construction in 2000. Opening of the lodge is planned for summer 2002. Undoubtedly the lodge and its clientele have the potential to dramatically increase fishing pressure not only on the Klutina River, but possibly the Gulkana River as well. Discussions between Princess and Ahtna Native Corporation (which has taken lead as liaison between Princess and area operators) have already occurred regarding the opportunity of fishing, rafting, flight seeing, and sightseeing packages that the lodge can offer to guests. The development of Wrangell-St. Elias National Park and future construction of the park visitor center (located in Copper Center) also has a potential for attracting tourists with sport fishing interests. If sport fishing effort does increase as a result, BOF action will need to be taken to maintain current harvest levels.

Increasing use of the swift Klutina River by powerboats and limited use by rafts creates a greater hazard to users. Many sections of the river are not wide enough to allow boats to pass and results in conflicts between the two user groups.

Ongoing and Recommended Research and Management Activities

The department has determined that the mail survey accurately estimates the harvest of chinook salmon in this drainage; therefore, we do not recommend that creel surveys be conducted on an annual basis. However, the nature of the chinook fishery has changed since the last creel survey was conducted (1989), effort has doubled and harvests have averaged three times higher. The fishery should be examined through a creel survey to determine if angler efficiency has increased, and if distribution of effort has shifted.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, indicators of relative spawning abundance rather than absolute abundance due to their dependence on survey conditions, surveyor, and the residence of fish in the survey area. Aerial survey index counts do not appear to evaluate the majority of spawning fish in this system. A

proportion of the spawning occurs in the glacial waters of the mainstem Klutina River. The radio-telemetry study has provided initial information regarding mainstem spawning, but additional data is needed to determine if the proportion is a consistent level each year. If this could be determined, the index stream counts would provide a better indication of total chinook escapement for the Klutina drainage.

Coded wire tagging of chinook salmon smolt was instituted in 1997 with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the relative run timing of different Copper River chinook stocks and whether one stock can serve as a gauge of the abundance of other chinook stocks. In 1999 and 2000, a radio-telemetry study on the Copper River resulted in an estimate of upriver escapement, as well as migratory timing through the personal use fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000).

Recommended research projects are the completion of the coded-wire tag recovery and continuation of the radio-telemetry projects. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the proportion of spawning escapements in index streams to total escapement would clarify if the index streams were representative of the total return. A portion of the chinook salmon hooked in the Klutina River is lost in the fast water before they can be landed. It is suspected that many of these fish may not survive to spawn. The hooking mortality of these fish needs to be evaluated.

Other Copper Basin Chinook Salmon Sport Fisheries

Background and Historical Perspective

Less than 10% of the harvest of chinook salmon in the UCUSMA occurs in systems other than the Gulkana and Klutina rivers. The majority of this harvest occurs in the Tonsina River. The glacial Tonsina River flows from Tonsina Lake into the Copper River downstream of the Klutina River confluence. The Tonsina River crosses under the Richardson Highway at mile 79 and the Edgerton Highway at mile 19. Shore anglers participate in the fishery adjacent to the Edgerton Highway; some angling is conducted by raft between the Richardson and Edgerton highways; and some angling is conducted by fly-in anglers fishing the outlet of the Tonsina River at Tonsina Lake. Chinook salmon run-timing to the Tonsina River drainage occurs in late-June through August, similar to that of the Klutina River.

The Tonsina River chinook salmon sport fishery harvest increased annually from 1988 to 1995 (Table 11, Figure 10). Harvests averaged 25 fish from 1977-1988 and 184 fish from 1989 – 1998. The recent 5-year average (1994-1998) is 278. Creel surveys or fishery monitoring of catch or catch rates have not been conducted on the Tonsina River due to low fishing effort and low chinook salmon catches within this drainage. Fish and Wildlife Protection and Department of Fish and Game personnel do, however, conduct enforcement monitoring of this fishery on a sporadic basis.

The spawning escapement of chinook salmon to the Tonsina River has been documented by aerial surveys of the Little Tonsina River and Greyling Creek since 1966 (Table 8, Figure 10). The spawning escapement to these index sites averaged 464 fish from 1977 to 1988, but the average index count for 1989 – 1998 declined to 279.

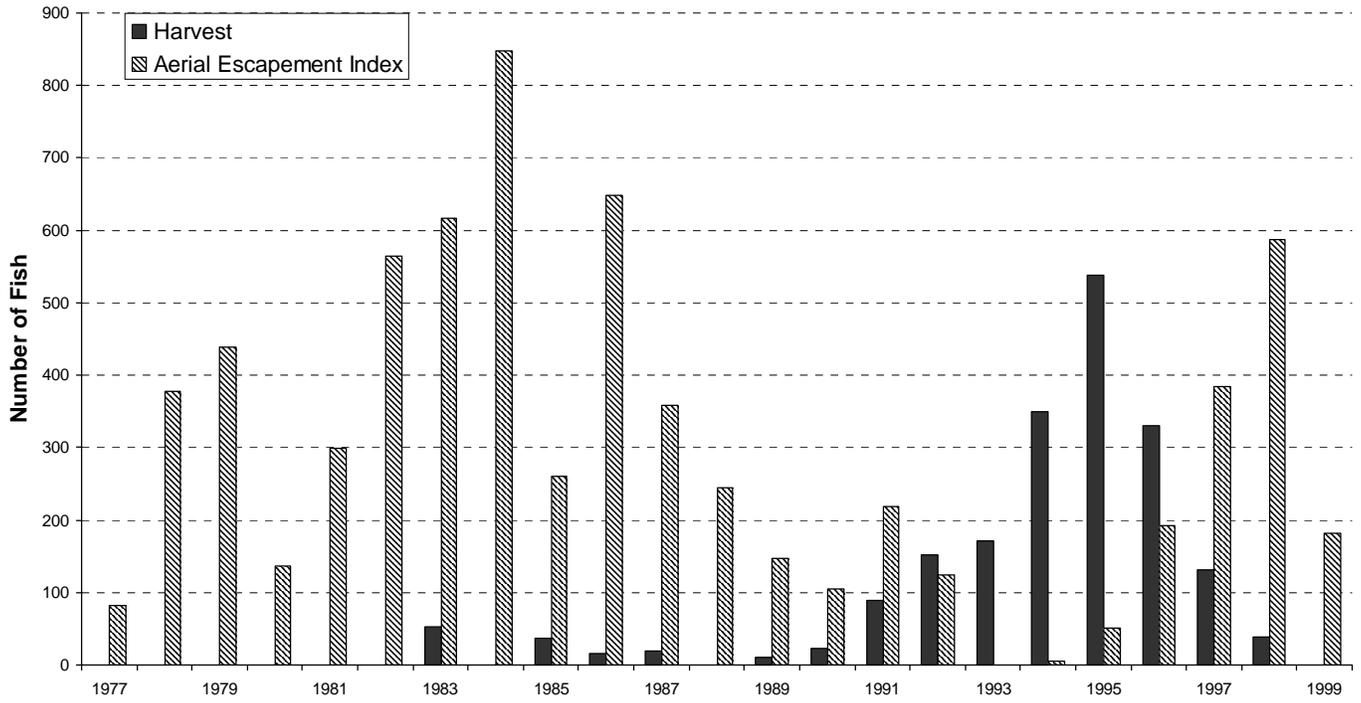


Figure 10.-Tonsina River chinook salmon sport harvest and aerial survey index escapement counts, 1977-1999.

Current regulations allow sport fishing for chinook salmon in the Tonsina River from January 1 through July 19. The July 19 closure date was established in 1989 to allow chinook salmon to spawn unimpeded. Current daily bag and possession limits for chinook salmon over 20 inches in this drainage river are one and one, respectively, with a seasonal bag limit of five for the Copper River drainage.

A limited fishery for chinook salmon also occurs on Kiana Creek in the Tazlina River drainage. The average escapement from 1977 to 1988 was 215 salmon and for 1989 through 1998 was 432 (Table 8). The returns to Kiana Creek in 1999 were below the 1989 – 1998 average, though the survey was conducted outside the optimum survey time due to poor survey conditions. Harvests in this fishery have averaged less than 60 fish since 1989.

Management and Fishery Objectives

No specific fishery objectives have been established for this stock. An underlying goal of past and current management, however, has been to ensure sustained yield. It is uncertain whether aerial survey index evaluation represents the majority of spawning fish in these systems and it has been used as a post-season escapement index with the realization that the majority of spawning may occur in the glacially-occluded mainstem of the Tonsina and Tazlina rivers. Data gathered from the radio-telemetry study has begun to provide information regarding the contribution to the upper Copper River chinook salmon stock these systems represent. As additional years of data are collected, it can be determined whether the two escapement index streams are representative of the entire system's escapement.

Recent Board of Fisheries Actions

During the 1996 BOF meeting, sport chinook salmon fishing was closed in all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering the lake. Additionally, the Chokosna and Gilahina rivers and all clearwater tributaries of the Gakona River, Tazlina Lake and all flowing waters entering Tazlina Lake except ¼ mile radius around the mouth of Kiana Creek.

The primary biological concern regarding the Tonsina River chinook salmon stock in recent years is the extremely low chinook salmon escapements in the Little Tonsina River. The trend in harvest does not match the trend in escapement within this drainage (Figure 10). The problem, therefore, is reduced production, overharvest within one of several other mixed-stock fisheries, or the result of illegal fishing activities within the Tonsina River drainage. In response to this concern, the use of bait was restricted and only unbaited, single hook, artificial lures were permitted following the 1996 BOF meeting. In addition, all tributaries to the Tonsina River, Tonsina Lake and all flowing waters entering Tonsina Lake were closed to sport fishing to protect spawning chinook salmon. As a result of these restrictions, harvest and effort in 1997 and 1998 were both below the ten-year average. At the March 1999 BOF meeting, the bait restriction was modified to allow bait to be used with a hook gap of 3/8 inch or less. This regulatory modification was made to permit fisheries for Dolly Varden and Arctic grayling in the Tonsina River using traditional gear to harvest these species, while still reducing the harvest of chinook salmon. During the December 1999 BOF meeting, Copper River drainage-wide revisions to the *Copper River Chinook Salmon Fishery Management Plan* included lifting guiding restrictions and reducing the seasonal bag limit from five to four.

Current Issues

Recent increases in harvests in the Copper River drainage may be attributed to poor chinook salmon returns on the Kenai and Susitna rivers. Media coverage of strong returns to the Copper River may also be responsible. In the near future, it is anticipated that effort will continue to remain at current levels or increase further, depending on the previously mentioned factors. The recent strong chinook salmon returns to the Copper River have prevented the overexploitation of chinook salmon stocks. If the Copper River experiences below normal chinook salmon returns, managers will need to take inseason action to prevent potential overexploitation.

Ongoing and Recommended Research and Management Activities

The level of responses to the SWHS for these systems (less than 20 in 1998) does not provide useable estimates of harvest, but do provide indications of harvest trends. If effort and harvest on these systems did increase significantly, it would be reflected in the SWHS. In these smaller chinook salmon fisheries (Tonsina River and Kiana Creek), harvests at current levels appear sustainable. Any increase in current harvests, may not be sustainable.

Managers depend on aerial surveys to index the escapement of chinook. These are, at best, indicators of relative spawning abundance, rather than absolute abundance estimates, due to their dependence on survey conditions, surveyor, and the residence time of fish in the survey area. Aerial survey index counts do not appear to evaluate the majority of spawning fish in this system. A proportion of the spawning occurs in the glacial waters of the mainstem Tonsina and Tazlina rivers, but what proportion is not known. If this could be determined, the index stream counts would provide a better indication of total chinook escapement for these drainages.

Coded wire tagging of chinook smolt was begun in 1997 on the Tonsina River with the purpose of determining the contribution of various stocks to the total chinook run in the Copper River. Coded wire tag returns in the commercial fishery will also indicate the run timing of different Copper River chinook stocks and whether one stock can serve as a gauge of the abundance of other chinook stocks. In 1999 and 2000, a radio-telemetry study on the Copper River has resulted in estimates of upriver escapement, as well as migratory timing through the personal use fishery, timing into the spawning tributaries, and distribution and proportion of chinook in spawning tributaries (Evenson and Wuttig 2000). Data from 1999 and 2000 indicates that returns to the Tonsina River may be larger than previously thought.

Recommended research projects are the completion of the coded-wire tag recovery and continuation of the radio-telemetry projects. Several additional years of radio-telemetry escapement abundance estimates would provide data to compare to aerial survey indices. In addition, estimates of the proportion of spawning escapements in index streams to total escapement would clarify if the index streams were representative of the total return.

SOCKEYE SALMON SPORT FISHERIES

In the UCUSMA, only the Copper River drainage supports wild and enhanced stocks of sockeye salmon. Wild stocks are widely distributed and are present in approximately 125 of the Copper River tributaries, while enhanced stocks are limited to the Gulkana River from production at the Gulkana Hatchery near Paxson. The abundance of sockeye salmon migrating into the Copper River has been estimated annually since 1978 by sonar at Miles Lake. Beginning in 1966, the escapement of sockeye salmon to the Copper River tributaries has been documented by aerial surveys of index sites to monitor spawner distribution in the drainage (Brady et al. 1991). This

aerial survey program was discontinued in 1993; however, a reduced program, which targeted high priority index sites, was reinstated during the 2000 season.

Throughout the past decade, the sockeye salmon sport fisheries of the UCUSMA have undergone a rapid expansion. Since 1996, the sockeye salmon sport harvest has exceeded 11,000 fish annually, compared to a previous high of 6,533 fish harvested in 1994 (Table 15). The primary sport fisheries occur in the Gulkana and Klutina rivers. Approximately 92% of the estimated sport harvest of sockeye salmon in the UCUSMA during 1994-1998 occurred in these two rivers. The sockeye salmon sport fishery on each of these two rivers have experienced substantial increases within recent years, which correspond to the strong returns of sockeye salmon to the Copper River during the late 1990's (Sharp et al. 2000).

In addition to direct harvests from the recreational fishery, sockeye salmon stocks of the Gulkana and Klutina rivers are subject to harvest from a series of other fisheries that target a mixture of Copper River stocks. Specifically, the Copper River District commercial drift-gillnet fishery and the Chitina and Glennallen Subdistrict subsistence fisheries. The management of these fisheries is based on the abundance of all Copper River drainage stocks, as counted past the Miles Lake sonar station. Under the *Copper River District Salmon Management Plan* (5 AAC 24.360), the department is directed to manage the commercial fishery to achieve an inriver goal of 15,000 salmon (all species) for sport fishery harvest, 160,000 to 225,000 sockeye salmon (including hatchery stocks) for the subsistence fisheries, 300,000 sockeye salmon for spawning escapement, and a amount determined annually for hatchery brood and surplus stocks. The direct impact from these downstream fisheries on specific stocks of this mixture is unknown.

Gulkana River Sockeye Salmon Sport Fishery

Background and Historic Perspective

The Gulkana River has historically supported the largest sockeye salmon recreational fishery in the UCUSMA (Table 15). The Gulkana River (Figure 7) originates in the Alaska Range and flows approximately 126 km south from its headwaters above Summit Lake to its confluence with the Copper River near the community of Gulkana. It is one of few clearwater, non-glacial rivers in the Copper Basin. In addition to the mainstem, this river system also consists of the Middle Fork and the West Fork, both of which join the mainstem from the West. The section of the Gulkana River from Paxson Lake downstream to Sourdough is designated by the U.S. Congress as "wild" under the Wild and Scenic Rivers Act of 1968. This section of the river flows through federal lands of the Bureau of Land Management. Much of the land encompassing the remainder of the lower river belongs to the Ahtna Native Corporation. In addition, areas of state and other private ownership are present. Access to the river is available from various secondary roads and trails from the Richardson Highway, which parallels much of the river. Shore angling occurs at each area of access. Anglers also use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Powerboats launch at developed ramps located at Paxson Lake and Sourdough and at an undeveloped site at the Richardson Highway bridge. Raft and canoe anglers frequent the river sections from Paxson Lake downstream to the Richardson Highway bridge. Sockeye salmon are one of various species of the drainage that are targeted by sport fishers. The return to this system is composed of both wild and hatchery stocks. The Gulkana Hatchery has been producing sockeye salmon since the early 1970's and in recent years has produced enhanced returns up to 800,000 adult

Table 15.-Harvest of sockeye salmon by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1988 and annually from 1989-1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^e | 1994-1998 ^e |
|---|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|------------------------|------------------------|
| Gulkana River Drainage^a | | | | | | | | | | | | | | |
| Upper River | 1,778 ^b | 2,835 | 2,145 | 1,767 | 1,873 | 2,498 | 1,619 | 1,489 | 2,745 | 2,097 | 2,910 | 2,050 | 2,198 | 2,172 |
| Lower River | | 222 | 552 | 599 | 255 | 547 | 884 | 920 | 4,673 | 2,469 | 3,460 | 2,142 | 1,458 | 2,481 |
| Total | 1,778^b | 3,057 | 2,697 | 2,366 | 2,128 | 3,045 | 2,503 | 2,409 | 7,418 | 4,566 | 6,370 | 4,192 | 3,656 | 4,653 |
| Klutina River Drainage | 865 ^c | 1,383 | 802 | 2,435 | 1,356 | 1,369 | 3,137 | 2,549 | 4,215 | 6,501 | 4,264 | 6,514 | 2,801 | 4,133 |
| Tazlina Drainage | 29 ^c | 9 | 0 | 60 | 0 | 9 | 95 | 0 | 25 | 0 | 58 | 30 | 26 | 36 |
| Tonsina Drainage | 8 ^c | 0 | 40 | 200 | 99 | 188 | 66 | 105 | 42 | 39 | 68 | 0 | 85 | 64 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 25 ^c | 9 | 0 | 0 | 90 | 403 | 37 | 115 | 0 | 0 | 0 | 32 | 65 | 30 |
| Downstream of Klutina ^d | 57 ^c | 51 | 30 | 240 | 649 | 0 | 93 | 284 | 17 | 201 | 11 | 65 | 158 | 121 |
| Other Sites | 775 | 0 | 0 | 210 | 49 | 180 | 61 | 0 | 134 | 965 | 413 | 268 | 201 | 315 |
| Area Total | 3,044^c | 4,509 | 3,569 | 5,511 | 4,560 | 5,288 | 6,533 | 6,068 | 11,851 | 12,293 | 11,184 | 11,101 | 7,137 | 9,586 |

^a In 1991, the river was closed to the harvest of rainbow trout.

^b Includes average of entire drainage.

^c Includes 1983-1986 average harvest only. Prior to 1983, this harvest was included in the listing for “Other waters” in the SWHS report.

^d Not including Tonsina drainage, but including undesignated Copper River mainstem harvests.

^e Average value for the years during the period.

salmon (Sharp et al. 2000). Sockeye salmon that are surplus to the broodstock requirements of the hatchery are believed to be a substantial component of those harvested in the sport fishery.

The sockeye salmon run timing to this system begins in early June and continues into September. The hatchery enhanced return has a run timing that overlaps the late wild stock component. Beyond basic run timing, life history and stock status information is limited. A weir was operated downstream of the West Fork in 1996 (LaFlamme 1997). Emphasis of the weir project was directed at chinook salmon and the escapement counts provide only a partial count for the season's sockeye salmon return. An estimated 183,461 sockeye salmon passed the weir from June 11 to July 31. The proportion of the total return that this count represents is unknown, as the weir was operated through only a portion of the sockeye salmon run period. Beginning in 1966, the escapement of sockeye salmon to the Gulkana River has been documented by aerial surveys of index sites to monitor spawner distribution in the drainage (Brady et al. 1991). This aerial survey program was discontinued in 1993; however, a reduced program that will target high priority index sites was reinstated during the 2000 season.

The primary source of information regarding the sport fishery is the SWHS (Mills 1979-1994, Howe et al. 1995-2000), which is performed each year with mail out questionnaires. Creel surveys were performed in 1988, 1989, and 1996 (Roth and Delaney 1989, Potterville and Webster 1990, and LaFlamme 1997). As with the weir, these surveys were directed primarily at chinook salmon. The 1988 and 1996 creel surveys did not report sockeye salmon data. The 1989 creel survey did include sockeye salmon, but was limited to the fishery downstream of the West Fork, and estimated a harvest of 327 sockeye (Potterville and Webster 1990). Due to the limited coverage of the creel survey for sockeye salmon, the estimated harvest cannot be compared to the SWHS estimates for 1989.

Recent Fishery Performance

Based on the SWHS, the estimated 1999 sport harvest of sockeye salmon from the Gulkana River was 4,192 fish. From 1989 to 1998, harvests averaged 3,656 sockeye salmon, annual harvest estimates ranged from 2,128 fish in 1992 to 7,418 fish in 1996 (Table 15). Estimates of the SWHS indicate a trend of increasing harvest, with substantial increases in annual harvests beginning in 1996. Sport effort in 1999 on the Gulkana River drainage was estimated at 37,841 angler days, which is above the 10-year average, 1989-1998, of approximately 32,223 angler-days annually (Table 5). However, due to the nature of the mail survey, it is unknown how much of this effort is directed towards sockeye salmon versus other species. Observations in recent years suggest that most of this effort is directed towards chinook salmon.

Management Objectives

Sockeye salmon fisheries in the Gulkana River are managed to: 1) ensure that the harvests do not threaten the sustained yield; 2) ensure that a diversity of public fishing opportunities and access is maintained; and 3) achieve public benefits from the fishery that outweigh the costs of associated management and research. Escapement objectives for this drainage have not yet been established.

Fishery Management

A management plan is in the process of being completed for the Gulkana River sockeye salmon recreational fishery. Sport fish harvests are monitored with the SWHS. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management

guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Gulkana River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

Fishery Outlook

It is anticipated that recent levels of effort and harvests of sockeye salmon in the Gulkana River will continue in the near future. The current regulations appear to be maintaining the stocks at historic levels.

Recent Board of Fisheries Actions

During the December 1999 BOF meeting, only one change regarding sockeye salmon was passed. From August 1 to December 31, the bag and possession limit was increased from 3 to 6 fish on the West Fork of the Gulkana River upstream of a department marker located ½ mile upstream of the confluence with the mainstem. This action was taken to provide additional opportunity to harvest surplus hatchery salmon.

Current Issues

Increased use by float and powerboat operators on the Gulkana River is intensifying conflicts between users. The Bureau of Land Management is in the process of updating the management plan for the Wild portion of the Gulkana River upstream of Sourdough.

The majority of lands adjacent to the Gulkana River downstream of Sourdough are owned by the Ahtna Native Corporation. Beginning in the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. In 1999, an access fee was initiated for use of their lands. Many anglers voiced dissatisfaction with the fee and shifted their efforts to the non-fee areas (Richardson Highway bridge and upstream of Sourdough). Ahtna Corporation, in conjunction with the Department of Transportation, is considering the development of a public use area on its lands near the Richardson Highway bridge, a popular fishing and camping site where land ownership is in dispute.

Ongoing and Recommended Research and Management Activities

Sport fish harvests will continue to be monitored with the SWHS. An aerial survey program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Gulkana River sockeye salmon stocks.

The management and research activities associated with the Gulkana River sockeye salmon sport fishery have not been extensive. Given the present lack of information, future research should be directed towards a better understanding of harvest, effort, and fishing patterns, in addition to specific life history of Gulkana River sockeye salmon. A proposal for the operation of a weir was considered in 1999 for Federal Subsistence funding, which would provide escapement estimates for the duration of the sockeye run, but was not funded. There are presently no plans in effect for sockeye salmon research.

Klutina River Sockeye Salmon Sport Fishery

Background and Historical Perspective

The Klutina River (Figure 2) supports one of two major sockeye salmon sport fisheries in the UCUSMA. This semi-glacial river drops rapidly out of Klutina Lake to enter the Copper River near the community of Copper Center. Access to the river is available along the Richardson Highway and from the Klutina Lake road, which parallels the river. The distance between the Klutina Lake Road and the river varies along the course of the road, with the road running along the ridge above the river.

Access to much of the Klutina River is complicated by private land ownership, which encompasses a large portion of the drainage. Much of the land between the road and the river belongs to the Ahtna Native Corporation. The Klutina Lake road is situated on a public access easement, which provides access to state land at the lake, but does not provide direct public access to the river itself. Presently, the Ahtna Native Corporation requires land use permits for river access and camping use of their lands.

The Klutina River provides opportunity for both shore and boat anglers. Shore anglers primarily limited to fishing the lower 1-mile of the river near Copper Center downstream of the Richardson Highway. Jet riverboats are used by experienced operators to access the upstream portions of the river. Launches are available on private land adjacent to the highway and from a site along the new Richardson Highway bridge. The river has considerable stretches of whitewater and is considered to be very challenging to jet riverboat operators. The four-wheel drive Klutina Lake road also provides a launch at the lake for whitewater rafters to access the river.

The sockeye salmon run timing to this system begins in mid-June and continues through August. Beyond basic run timing, the life history and stock status information for Klutina River sockeye salmon is very limited. Spawning activity is known to occur in various locations of the river, lake, and tributaries.

The primary source of information regarding the sport fishery is the SWHS (Mills 1979-1994, Howe et al. 1995-2000.), which is performed each year with mail out questionnaires. Creel surveys, which emphasized chinook salmon, were conducted in 1988 and 1989 (Roth and Delaney 1989 and Potterville and Webster 1990). Of these, only the 1989 survey provides information related to sockeye salmon, with an estimated catch of 361 (Potterville and Webster 1990). This creel survey was conducted only during the chinook salmon fishery and the estimated harvest is not directly comparable to the SWHS estimate.

Recent Fishery Performance

Based on the SWHS, the estimated 1999 sport harvest of sockeye salmon from the Klutina River was 6,514 fish (Table 15). This harvest, which is slightly above the 1997 harvest of 6,501 fish, is the largest on record. From 1989 to 1998, harvests averaged 2,801, annual harvest estimates during this period, have ranged from 802 fish in 1990 to 6,501 fish in 1997. The SWHS estimates indicate a trend of increasing harvest, with substantial increases in annual harvests beginning in 1996. Sport effort in 1999 on the Klutina River drainage was estimated at 15,687 angler days, again the largest on record, and well above the 10-year average, 1989-1998, of approximately 9,520 angler-days annually (Table 5). However, due to the nature of the mail survey, it is unknown how much of this effort is directed towards sockeye salmon versus other

species. Observations in recent years suggest that most of this effort is directed towards chinook salmon.

Management Objectives

Sockeye salmon fisheries in the Klutina River are managed to: 1) ensure that the harvests do not threaten the sustained yield; 2) ensure that a diversity of public fishing opportunities and access is maintained; and, 3) achieve public benefits from the fishery that outweigh the costs of associated management and research.

Fishery Management

A management plan is in the process of being completed for the Klutina River sockeye salmon recreational fishery. Sport fish harvests are monitored with the SWHS. Escapement objectives for this drainage have not been established. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Klutina River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

Fishery Outlook

It is anticipated that effort and harvests of sockeye salmon in the Klutina River will remain at recent levels in the near future. The current regulations appear to be maintaining the stocks at historic levels.

Recent Board of Fisheries Actions

No proposals regarding Klutina River sockeye salmon were submitted to the BOF during the December 1999 meeting.

Current Issues

The majority of the land adjacent to the Klutina River, upstream of the Richardson Highway, is owned by the Ahtna Native Corporation. Beginning during the 1991 season, this corporation prohibited trespass across its lands for the purpose of hunting or fishing. It has conducted an access fee program since 1998 to allow access to the upper Klutina River. If fees increase without increased access this may result in conflicts between fishery users and the corporation, or increased congestion in areas of the Klutina River that is not corporation lands. Increasing use of the swift Klutina River by powerboats and limited use by rafts creates a greater hazard to users. Many sections of the river are not wide enough to allow boats to pass and results in conflicts between the two user groups.

Ongoing and Recommended Research and Management Activities

Sport fish harvests will continue to be monitored with the SWHS. An aerial survey program was reinstated in 2000 for index escapement estimates on priority spawning areas of the drainage. Present sport, commercial, and subsistence harvests are thought to be sustainable. The present management guidelines of the commercial and subsistence fisheries are also thought to provide sustainability of the Klutina River sockeye salmon stocks. If future estimates indicate significant decreases in abundance or if harvests increase to the point that the ADF&G believes that sustained yields are threatened, then regulatory actions will be considered.

Given the present lack of information, future research should be directed towards a better understanding of harvest, effort, and fishing patterns, in addition to specific life history of Klutina River sockeye salmon. A creel survey would be an initial step in providing desired information.

COPPER RIVER PERSONAL USE AND SUBSISTENCE SALMON FISHERIES

Background and Historical Perspective

There is a long history of salmon harvest for consumption as food or use as bait in the Copper River drainage. Prior to white settlement, Ahtna natives took salmon, mostly chinook and sockeye, with funnel traps and spears in clearwater tributaries. Weirs, gillnets, and dip nets were used in the turbid mainstem Copper River and at its delta. Haley Creek was the site of one of the many traditional fishing camps along the Copper River. With white settlement, fishwheels were introduced to the Copper River. By 1920, fishwheels and dip nets took over as the means of capturing salmon for personal needs in this river. Also, the popularity of the fishery increased substantially with the introduction of this gear.

Historically, the taking of salmon for consumption as food or use as bait in the Copper River drainage was governed under subsistence regulations. In 1978, Alaska passed its first subsistence law. This legislation guaranteed the "customary and traditional use" of fish and game harvest in Alaska and gave this harvest a priority in terms of allocation. Under this law, the Board of Fisheries adopted the *Copper River Subsistence Salmon Fisheries Management Plan* (5 AAC 01.647). This management plan established seasons, open areas, legal gears, permit requirements, and bag limits for a subsistence salmon fishery in the Copper River. The plan also directed the department to manage the Copper River commercial salmon fishery to ensure that an adequate escapement reaches the spawning areas and to provide for subsistence harvest.

In 1980, with the passage of the Alaska National Interest Lands Conservation Act (ANILCA), the federal government mandated subsistence hunting and fishing preference for "rural" residents on federal lands. Subsequent rulings by the federal government stated that if the state failed to meet this requirement, the federal government would take over management of fish and game on all federal lands. To comply with this requirement and prevent federal takeover, the joint Boards of Fish and Game adopted a regulation in 1982 stating that only "rural" residents had "customary and traditional use" of fish and game and established eight criteria for identifying "customary and traditional uses." Under this plan, subsistence fishers were given one of four classes of permits depending upon their locality to the fishery, income, age, and past use. During times of low escapement, Copper River basin residents received priority over nonbasin residents. Due to growth in the fishery, the board eliminated nonbasin residents from the Copper River subsistence fishery based on analyses of the eight-point criteria in 1984.

This decision precluded many individuals from participating in the Copper River subsistence fisheries, thereby precluding them from harvesting fish for their personal use. This led the Board of Fisheries to establish a new category of fisheries, personal use fisheries (5 AAC 77.001), in 1982. These fisheries were created to provide Alaskans who became ineligible to harvest fish under new subsistence regulations the opportunity to harvest fish for consumption as food or use as bait. Personal use fisheries, like commercial and sport fisheries, were not given a "priority" in terms of allocation as were subsistence fisheries. In 1984 the Board of Fisheries created a

personal use salmon fishery in the Copper River drainage under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.590).

Personal use fisheries differ from sport fisheries in both their objective and management. Both fisheries provide Alaskans the opportunity to harvest fish for personal consumption (in either fishery fish cannot be sold or bartered), but personal use fisheries are managed to maximize harvest potential whereby sport fisheries are managed to provide diversity of opportunity and to maximize economic benefit to Alaska. Also, whereas anyone can participate in Alaska's sport fisheries (provided they have a license), only Alaska *residents* may participate in personal use fisheries. The personal use fishery is managed by the Division of Sport Fish. The Division of Commercial Fisheries manages the subsistence fishery.

Both the subsistence and personal use salmon fisheries in the Copper River drainage have undergone changes since their establishment. Currently, all Alaskans are eligible to participate in the subsistence fishery based on the McDowell decision in 1989. The subsistence fishery occurs upstream of the Chitina-McCarthy bridge to Slana and can be prosecuted with fishwheels and dip nets. The season is from June 1 through September 30, unless closed by emergency order. Only Alaska residents can participate in this subsistence fishery. A special permit, which is free, is required to participate in the fishery. The permit can only be obtained at Fish and Game offices in Glennallen, Tok or Chitina, and at the National Park Service office in Slana. Beginning in 1997, permits were also issued from the Chistochina Village and the Copper River Native Association (Copper Center) offices. Anglers must record their harvest on their permit and return the permit upon completing fishing. The limits are 30 salmon for a household of one, 60 salmon for a household of two, and 10 salmon for each additional person in a household of more than two people. Individuals may request additional salmon up to a maximum of 200 salmon and households may request up to 500 salmon. For people using dip nets, only 5 of the salmon may be chinook salmon. There is also a requirement that all anglers, upon landing a salmon while subsistence fishing, must immediately remove both tips of the tail from the salmon. A subsistence fishery is also allowed in a portion of Tanada Creek, near the traditional Native fishing site of Batzelnetas, with spears and dip nets.

As is the case for the subsistence fishery, only Alaska residents can currently participate in the Copper River personal use salmon fishery. This fishery is opened by emergency order. Both a valid Alaska sport fishing license and a special permit are required to participate in the personal use fishery. The permit costs \$10 and can be obtained at the Fish and Game offices in Chitina, Fairbanks and Glennallen (the fee was increased to \$25 in 2000 and permits were issued from Fish and Game offices in Anchorage, Palmer and Delta Junction as well). Anglers must record their harvest on their permit and return the permit upon completing fishing. The limits are 15 salmon for a single person and 30 salmon for a household of two or more, only four of which may be chinook salmon. Only dip nets may be used to harvest salmon. The entire mainstem Copper River between the downstream edge of the Chitina-McCarthy bridge and a department marker located about 200 yards upstream of Haley Creek (in Wood Canyon) is open to personal use fishing. The Board has mandated that Alaskans can participate in either the subsistence or personal use fishery in the Copper River drainage, but not both.

The Board of Fisheries has authorized the department to manage the commercial salmon fishery to provide the following inriver goal of salmon, measured at the Miles Lake Sonar (in 5 AAC 24.360):

| | |
|---------------------------------------|--------------------|
| Spawning escapement (sockeye salmon) | 300,000 |
| Spawning escapement (other salmon) | 17,500 |
| Subsistence harvest (salmon) | 60,000 – 75,000 |
| Personal use harvest (salmon) | 100,000 |
| Sport fishery harvest (salmon) | 15,000 |
| Hatchery brood stock (sockeye salmon) | Estimated annually |
| Hatchery surplus (sockeye salmon) | Estimated annually |
| TOTAL | Announced annually |

The subsistence guideline is adjusted annually in order to accommodate the anticipated subsistence harvest. The hatchery brood stock and hatchery surplus are also adjusted annually based on the anticipated return of wild and hatchery stocks.

Since 1997, the maximum harvest for the personal use fishery has been 100,000 salmon, excluding fish provided in excess of the inriver goal and not including any salmon harvested after August 31. When an escapement greater or less than the inriver goal actually pass the sonar counter, the board has remanded the department increase or decrease the fishing times by the corresponding percentage.

Harvests by the subsistence fishery have been estimated since 1965. From 1977 through 1988, harvests in the subsistence fishery averaged 49,777 salmon (Table 16). The fishery experienced rapid growth from 1980 through 1983, when a peak harvest of about 119,000 salmon were taken. Under the subsistence fishery management plan, harvests decreased substantially in 1984 to about 29,000 salmon. Since 1984, subsistence harvests have gradually increased, with the 1997 permits and harvest of 1,133 and 85,578, respectively, the highest since 1983 (Figure 11). The percentage of non-Copper River basin participants has increased from less than 20% prior to 1991 to an average of 57% from 1991-1999. This increase can be attributed to those participants from Anchorage (24%), Fairbanks (7%) and Mat-Su Borough (10%) communities that entered the fishery following the McDowell decision. Concern has been expressed regarding significant under-reporting of salmon harvest in this fishery, especially over the past decade. Trends in the number of permits issued to participate in this fishery closely resemble harvest trends (Table 16).

Table 16.-Number of permits issued and salmon harvests during the Glennallen Subdistrict subsistence salmon fishery in the Copper River, 1977-2000.

| Year | Number Permits Issued | Estimated Salmon Harvest | | | Total ^{b,c} |
|------------------|-----------------------|--------------------------|---------------|------------|----------------------|
| | | Chinook | Sockeye | Coho | |
| 1977 | 4,066 | 857 | 15,790 | 34 | 45,208 |
| 1978 | 3,705 | 453 | 6,406 | 188 | 28,715 |
| 1979 | 3,200 | 1,596 | 18,795 | 134 | 37,585 |
| 1980 | 3,203 | 845 | 15,811 | 105 | 35,100 |
| 1981 | 4,078 | 585 | 30,545 | 193 | 68,687 |
| 1982 | 6,090 | 681 | 39,968 | 292 | 109,726 |
| 1983 | 7,541 | 1,275 | 37,596 | 447 | 118,734 |
| 1984 | 475 | 509 | 27,941 | 167 | 28,631 |
| 1985 | - ^a | 629 | 30,666 | 294 | 31,614 |
| 1986 | 405 | 686 | 27,441 | 291 | 28,423 |
| 1987 | 445 | 813 | 33,106 | 161 | 34,142 |
| 1988 | 417 | 992 | 29,194 | 372 | 30,755 |
| 1989 | 386 | 787 | 28,360 | 69 | 29,308 |
| 1990 | 406 | 647 | 31,765 | 92 | 32,524 |
| 1991 | 712 | 1,328 | 39,599 | 232 | 41,205 |
| 1992 | 655 | 1,449 | 45,232 | 350 | 47,095 |
| 1993 | 773 | 1,434 | 53,252 | 77 | 54,854 |
| 1994 | 970 | 1,989 | 68,278 | 60 | 70,391 |
| 1995 | 858 | 1,892 | 52,516 | 882 | 55,323 |
| 1996 | 850 | 1,482 | 52,052 | 557 | 54,290 |
| 1997 | 1,133 | 2,583 | 82,807 | 187 | 85,744 |
| 1998 | 1,010 | 1,842 | 64,463 | 533 | 66,951 |
| 1999 | 1,102 | 3,278 | 77,369 | 1,121 | 82,119 |
| 2000 | 1,253 | 4,963 | 60,601 | 538 | 66,323 |
| 1977-1988 | 3,057 | 827 | 26,105 | 223 | 49,777 |
| 1989-1998 | 775 | 1,543 | 51,832 | 304 | 53,769 |
| 1994-1998 | 964 | 1,958 | 64,023 | 444 | 66,540 |

^a Data not available.

^b Total harvest includes steelhead and other species.

^c Total harvest prior to 1984 includes both harvest from the Chitina and Glennallen subdistricts.

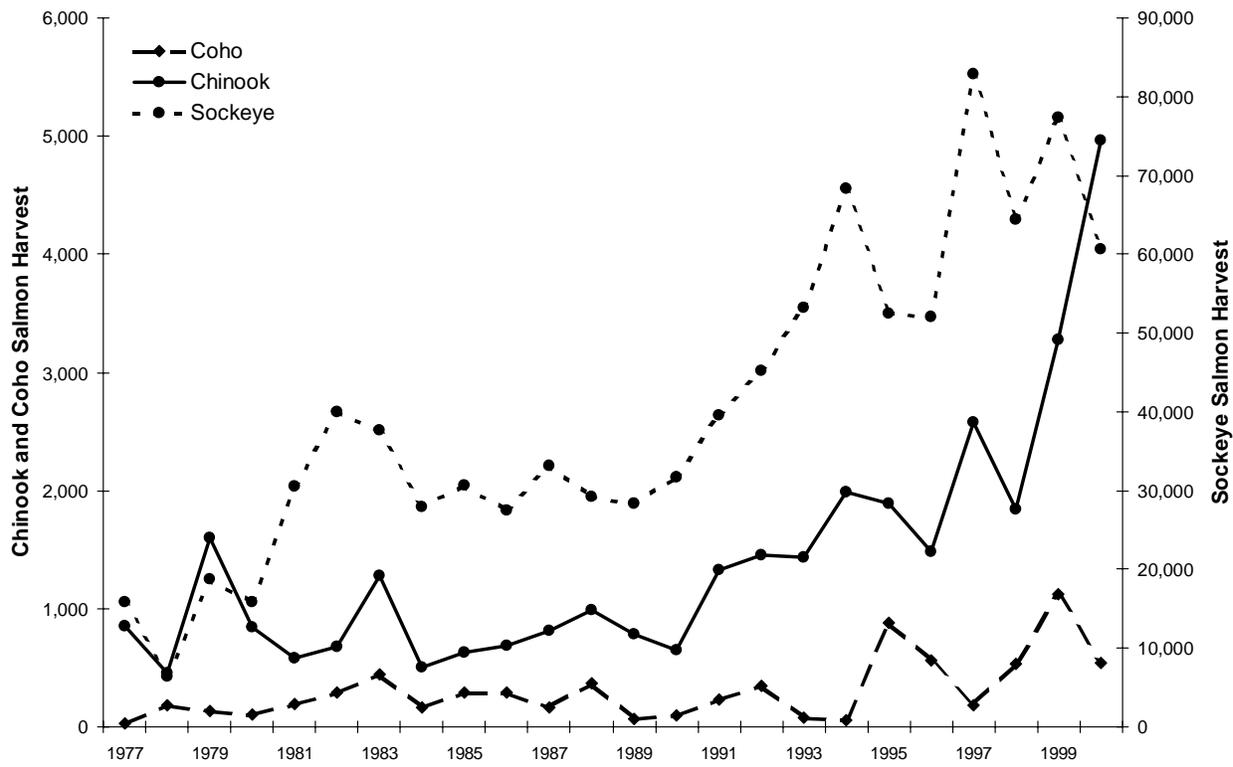


Figure 11.-Copper River Glennallen Subdistrict subsistence harvest by species, 1977-2000.

Harvests in the personal use fishery have been estimated since establishment in 1984 (Table 17). From 1984 through 1988, harvests remained relatively stable, averaging about 47,000 salmon annually. After 1988, harvests in the personal use fishery increased annually until 1998 (Figure 12). Trends in the number of permits issued to participate in this fishery closely resemble harvest trends (Table 17).

Harvests in both the subsistence and personal use fisheries are dominated by sockeye salmon (Table 2). Chinook salmon comprise the second largest harvest, while a nominal coho harvest also occurs. During the 1999 BOF meeting, the board ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina Subdistrict of the upper Copper River. This resulted in the Chitina Subdistrict personal use fishery changing to the Chitina Subdistrict subsistence fishery. Further details of this action will be discussed later in this section.

Recent Fishery Performance

The number of permits issued and salmon harvests in both the subsistence and personal use fisheries have increased in recent years. In 1999, the subsistence fishery participation increased slightly from 1998, with 1,102 permits issued and while harvest was the second highest since 1983 with 82,119 salmon (Table 16). The number of permits issued in 2000 was 1,253 with the harvest of an estimated 66,000, falling within the anticipated subsistence harvest range (60,000 – 75,000 salmon). In 1999, 9,943 personal use permits were issued and 149,779 salmon harvested, participation and harvest in the 1999 personal use fishery were the second highest since its inception in 1984 (Table 17). Both fisheries benefited from a strong return of sockeye salmon; nearly 851,000 salmon passed the Miles Lake sonar in 1999.

The number of participants in both fisheries is not anticipated to decline; preliminary estimates in 2000 for the personal use and subsistence fisheries are 8,151 and 1,253, respectively (Tables 16 and 17). The preliminary estimated harvest (expanded to account for 30% of the harvest reports which are unreturned) for the personal use fishery in 2000 is 113,072 salmon. The preliminary 2000 subsistence harvest estimate is 66,323 (expanded to account for 26% of the harvest reports which are unreturned). A total of 585,550 salmon passed the Miles Lake sonar in 2000. The large harvests in 1999 are most likely due to the strong sockeye and chinook salmon returns experienced. The reduced harvests in 2000 are a result of the poor return of sockeye salmon to the Copper River and reduced bag limit for chinook salmon.

Management Objectives

Both fisheries are managed under Board of Fisheries adopted management plans. The subsistence fishery is managed under the *Copper River Subsistence Salmon Management Plan* (5 AAC 01.647). The personal use fishery is managed under the *Copper River Personal Use Dip Net Salmon Fishery Management Plan* (5 AAC 77.590). Both plans stipulate management objectives and guidelines, with allocations for each fishery outlined in the *Copper River District Salmon Management Plan* (5 AAC 24.360).

The inseason management of the personal use fishery follows the objectives and guidelines in the *Copper River Personal Use Salmon Management Plan* (5 AAC 77.590). Prior to 1996, the BOF established weekly harvest quotas and also allocated 25% of any escapement in excess of the optimum escapement goal of 560,000 to the personal use fishery. The weekly fishing periods and limits established by emergency order are based on the projected inriver returns. Inriver returns are estimated by sonar located at Miles Lake. The management plan was revised during the

Table 17.-Number of permits issued and salmon harvested during the Chitina Subdistrict subsistence salmon fishery in the Copper River, 1984-2000.^a

| Year | Number Permits Issued | Estimated Salmon Harvest | | | |
|-------------------|-----------------------|--------------------------|----------------|--------------|--------------------|
| | | Chinook | Sockeye | Coho | Total ^d |
| 1984 | 5,415 | 1,760 | 48,236 | 717 | 50,734 |
| 1985 | --- ^b | 1,329 | 30,885 | 361 | 32,586 |
| 1986 | 4,031 | 2,367 | 41,054 | 538 | 44,047 |
| 1987 | 4,245 | 2,968 | 43,492 | 424 | 46,908 |
| 1988 | 4,251 | 2,994 | 42,331 | 504 | 45,855 |
| 1989 | 4,582 | 2,251 | 55,778 | 857 | 58,941 |
| 1990 | 5,689 | 2,708 | 66,432 | 1,511 | 70,812 |
| 1991 | 6,222 | 4,056 | 77,590 | 3,354 | 85,059 |
| 1992 | 6,385 | 3,405 | 86,724 | 1,517 | 91,683 |
| 1993 | 7,914 | 2,846 | 93,472 | 1,416 | 97,767 |
| 1994 | 7,061 | 3,743 | 94,024 | 1,981 | 99,822 |
| 1995 | 6,760 | 4,707 | 79,006 | 4,870 | 88,617 |
| 1996 | 7,198 | 3,584 | 95,007 | 3,381 | 102,108 |
| 1997 | 9,086 | 5,447 | 148,727 | 160 | 154,349 |
| 1998 | 10,006 | 6,723 | 137,161 | 2,145 | 146,075 |
| 1999 | 9,943 | 5,913 | 141,658 | 2,174 | 149,779 |
| 2000 ^c | 8,151 | 3,068 | 105,969 | 3,838 | 113,072 |
| 1989-1998 | 6,515 | 3,947 | 93,392 | 2,119 | 99,523 |
| 1994-1998 | 7,604 | 4,841 | 110,785 | 2,507 | 118,194 |

^a From 1984 to 1999 the Chitina Subdistrict was classified a personal use fishery.

^b Data not available.

^c Preliminary estimates.

^d Total estimate includes unidentified salmon.

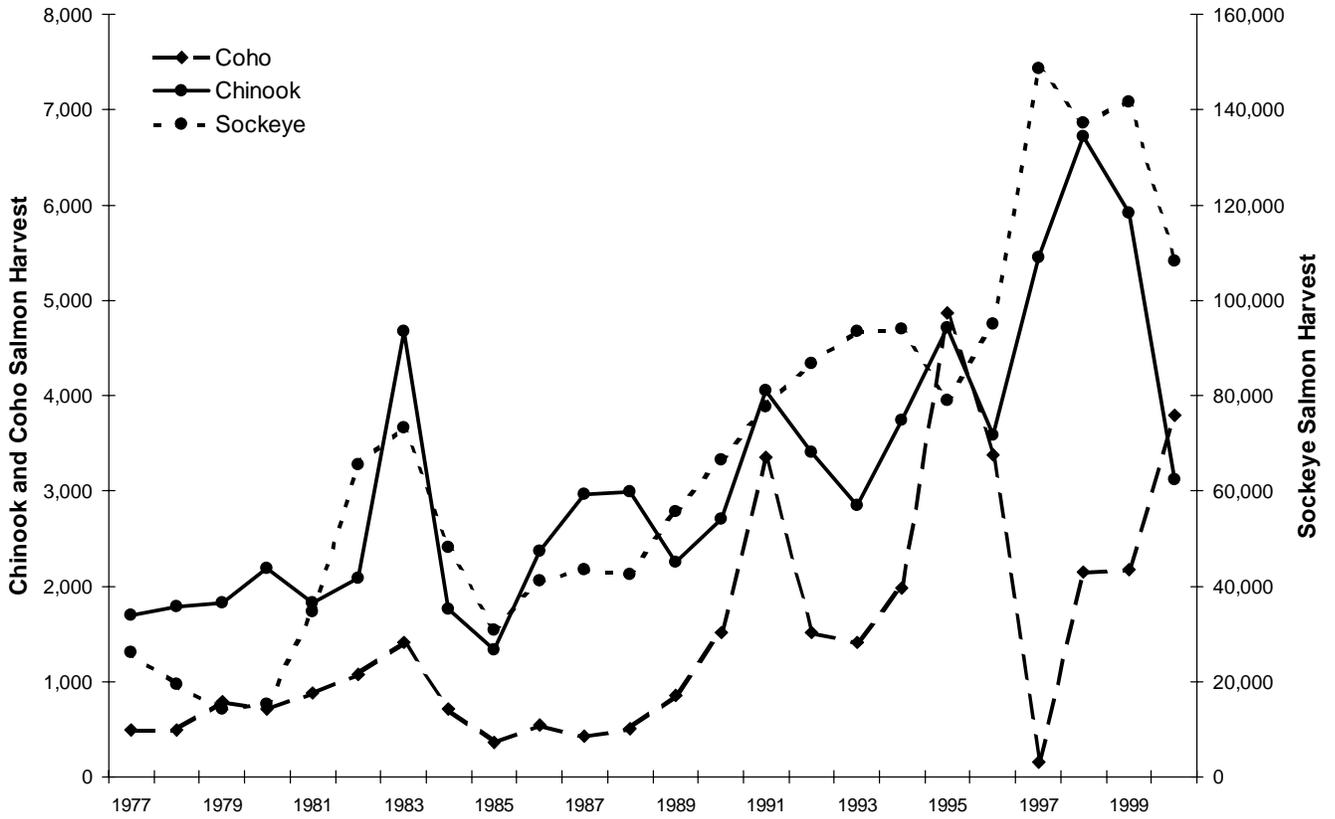


Figure 12.-Copper River Chitina Subdistrict harvest by species, 1977-2000.

1996 BOF meeting such that the harvest will be distributed throughout the season, based upon on the projected sonar counts. Adjustments will be made to the preseason schedule based on the actual sonar counts, by increasing or decreasing fishing time.

Fishery Management

In 1999, the personal use fishery was opened by emergency order on June 11 for a 36-hour fishing period. The *Copper River Personal Use Salmon Management Plan* requires the fishery to be opened between June 1 – 11. Due to low salmon numbers the second period beginning June 19 was also a 36-hour fishing period. The third period (June 23-27) was reduced to 104-hours, based upon actual sonar counts. Beginning June 11, actual counts past the Miles Lake sonar were double the projected counts and, in response to the weekly escapement objectives being met, the personal use fishery opened to continuous fishing on June 30. During the week of June 21 – 27, an excess of 50,000 salmon passed the Miles Lake sonar and resulted in a supplemental permit issued in the fishery the week of July 12 – 18 (an additional week of migration time was allowed due to higher water levels). Ninety-seven supplemental permits were issued during the week resulting in a harvest of 780 additional sockeye salmon. Harvests exceeded the weekly allocation seven of the first eight weeks of the fishing season, but only during the second and seventh weeks did the harvest exceed the available surplus (Table 18).

The 2000 Chitina Subdistrict Subsistence Fishery season was opened by emergency order on June 10 for a 12-hour fishing period. The *Copper River Subsistence Salmon Fisheries Management Plans* requires that the fishery be opened between June 1 – 11. Actual salmon numbers past the Miles Lake sonar during the week of May 16-21 were lagging projected counts by over 3,000 fish. This resulted in no fishing time during the first allowable fishing period of June 1 – 4. The second fishing period (June 5 – 11) was reduced from 36 to 12 hours due to a 23,000 fish deficit at the sonar from May 22 to 28. Salmon numbers past the sonar from May 29 to June 4 were above the projected salmon counts for this period by 3,600 fish, and the third fishing period (June 12-18) remained at 80 hours. The fourth period (June 19-25) was reduced from 132 to 80 hours based upon actual sonar counts lagging projected sonar counts by 39,000 fish. Actual sonar counts continued to lag behind projected sonar counts and the fifth period was reduced from 136 hours to 112. The following week projected counts were surpassed in excess of 50,000 salmon and the fishery was opened continuous and a supplemental period occurred during the sixth period. The fishery remained open through September 30, sonar counts remained at or below projected numbers and no other supplemental periods occurred.

Permits in 2000 were available from ADF&G offices in Anchorage, Fairbanks, Glennallen, and Palmer to provide additional service to the dipnetting public, reduce fishery operating costs, and prevent excessive delays (up to 3 hours) at the Chitina ADF&G office for participants to receive permits. This prevented any inseason estimation of weekly harvest and participation in 2000, but lack of this information did not influence management decisions.

Fishery Outlook

In recent years, the participation in the Chitina Subdistrict had leveled off at about 10,000. The changes in the Chitina Subdistrict fishery in 2000 have resulted in a slight decline in participation in the Chitina Subdistrict, but an increase in the Glennallen Subdistrict. Contract negotiation with Ahtna and Chitina Native Corporations is currently stalled due to multiple issues, not all directly involving the fishery. The \$25 fee will still be collected in 2001 as the fee is in regulation. It is anticipated that participation in the Chitina Subdistrict fishery will continue at the reduced level if salmon returns, access fees, and fishery management remain similar to

Table 18.-Projected versus actual salmon harvests in the Copper River Personal Use Fishery, 1999.

| Week Ending | Projected Sonar counts ^a | Actual sonar counts ^a | Available Surplus | Weekly allocation ^b | Estimated PU harvest | Difference |
|----------------------------|-------------------------------------|----------------------------------|-------------------|--------------------------------|----------------------|------------|
| June 6 | 9,470 | 960 | -8,510 | 128 | 0 | 128 |
| June 13 | 41,277 | 13,610 | -27,667 | 1,815 | 1,575 | 240 |
| June 20 | 80,824 | 17,464 | -63,360 | 2,329 | 4,485 | -2,156 |
| June 27 | 87,951 | 116,272 | 28,321 | 15,505 | 29,194 | -13,689 |
| July 4 | 62,519 | 110,004 | 47,485 | 14,669 | 19,209 | -4,540 |
| July 11 | 51,180 | 105,056 | 53,876 | 14,009 | 17,102 | -3,093 |
| July 18^c | 64,150 | 95,071 | 30,921 | 12,677 | 16,229 | -3,552 |
| July 25 | 98,212 | 86,211 | -12,001 | 11,496 | 15,996 | -4,500 |
| August 1 | 102,193 | 103,858 | 1,665 | 13,849 | 14,733 | - 884 |
| August 8 | 71,852 | 108,596 | 36,744 | 14,481 | 8,423 | 6,058 |
| August 15 | 45,825 | 77,175 | 31,350 | 10,291 | 6,018 | 4,273 |
| August 22 | 22,312 | 29,795 | 7,483 | 3,973 | 8,350 | -4,377 |
| Total | 737,765 | 864,072 | | 115,222 | 141,314 | |

^a Sonar counts are adjusted forward two weeks to correspond to the week fish would be available to the Personal Use fishery. Projected sonar counts represent the weekly escapement objectives.

^b Based on actual sonar counts, with the exception of the week ending August 22 of which 5 days are based on projected sonar counts.

^c Week ending in bold indicates weeks in which supplemental permits were issued.

2000. A strong sockeye return could result in an increase in participation in the Chitina Subdistrict to previous levels, though it is also anticipated the participation in the Glennallen Subdistrict will continue to increase as a result of the changes following the 1999 BOF meeting.

Harvests of sockeye salmon will be dependent upon salmon run strength, if the harvest range for the Chitina Subdistrict subsistence fishery is increased and escapement objectives are met, the fishery will likely have a greater period open to continuous fishing. There have been observations that many participants in the Cook Inlet personal use fishery also participate in the Copper River personal use fishery. Cook Inlet permits have been returned to the Chitina and Glennallen offices in past years. If the Cook Inlet fishery is poor, then there is potential for an increase of participation in the Copper River fishery from the Cook Inlet users.

Recent Board of Fisheries Actions

Due to changes in the distribution of fishing effort since the inception of the plan in 1984, a revised management plan was developed during the 1996 BOF meeting. The revised plan distributes the personal use harvest throughout the season based upon the daily projected sonar counts at the Miles Lake sonar. The maximum harvest level was increased from 60,000 to 100,000 salmon, not including any salmon in excess of the inriver goal or salmon taken after August 31. During the December 1997 BOF meeting an agenda change request was addressed by the board that would allow personal use permit holders to harvest additional fish in years of surplus escapement. A decision on this proposal was deferred until the February 1998 meeting to allow the advisory committee to review and comment on the amended proposal. At the February meeting, the BOF passed the proposal that allows personal use permit holders, who have filled their original limit, to be issued a supplemental permit for 10 additional fish in weeks when a harvestable surplus of 50,000 salmon or greater will be available in the Chitina Subdistrict.

Actual harvest numbers resulting from the issuance of supplement permits are relatively low. The supplemental period is also a likely attractant to participants who anticipate high catch rates owing to the escapement surplus; the potential increased effort and catch however, are currently immeasurable.

The “insurance policy” in the *Copper River Chinook Salmon Plan* resulted in a reduction of chinook bag limit from five to four salmon. Chinook harvests continue to increase following this bag limit reduction with record harvests of chinook from 1997 to 1999. This plan has been relatively ineffective in reducing chinook harvest due to increased participation in the fishery. Only 7,198 permits were issued in 1996, since then in excess of 9,000 permits have been issued each year. The increased participation is likely one of the reasons the chinook harvests have not declined.

During the 1999 BOF meeting, the board ruled in favor of a positive customary and traditional use finding for the salmon stocks of the Chitina Subdistrict of the upper Copper River. As a result of this decision, the Copper River Personal Use Salmon Dipnet Fishery was repealed and a Chitina Subdistrict subsistence fishery was established. The regulations for the Chitina Subdistrict subsistence fishery remained similar to the Copper River Personal Use Salmon Dipnet Fishery regulations with three exceptions. The three exceptions included an adjustment to the annual bag limit, a maximum harvest level of wild stock sockeye salmon of 85,000 – 130,000, and permit holders are no longer required to possess a sport fishing license. Annual bag limits will continued to be 30 salmon for a household of two or more, and 15 salmon for a

household of one, of which only one fish can be a chinook salmon. The Board of Fisheries determined that reducing the bag limit of chinook salmon from four in the personal use fishery to one in the subsistence fishery, provided for a reasonable opportunity to harvest a chinook salmon, but would also maintain chinook salmon harvests at historic levels. Based upon recent harvests the board determined that 100,000 – 150,000 salmon were necessary for subsistence needs to be met for the Chitina Subdistrict fishery. This number included contributions of hatchery fish, and after this contribution was subtracted, resulted in the 85,000 – 130,000 wild stock harvest level. As a result of this determination, there were two subsistence fisheries in the upper Copper River district in 2000.

Current Issues

As a result of the 1999 BOF action, the issue regarding allocations for the Chitina Subdistrict do not exist, as a subsistence fishery harvest increases, the BOF can adjust the amount set to meet subsistence needs in the *Copper River District Salmon Management Plan*. Following the 1999 meeting, members of the Copper River Native Association, Chitina and Ahtna Native corporations filed a petition to the board to reconsider the subsistence ruling. The BOF agreed to have a committee meet in March 2000 to listen to information regarding the Chitina Subdistrict ruling. Following the March meeting, the committee presented it's findings and recommendation to the BOF, which decided to not reconsider the ruling, since no new or compelling information was presented to the committee that would indicate a need to revisit the 1999 decision. There is still some resentment among the Native community towards urban participants in the Chitina Subdistrict regarding the subsistence classification and this may become an issue at the 2002/2003 BOF meeting.

At the 2000 BOF meeting a proposal was submitted to allow 100,000 salmon past the sonar before the commercial fishery could begin fishing. This proposal was submitted as an Agenda Change Request under a conservation issue regarding early return sockeye salmon. The BOF voted against the proposal, but additional concerns voiced by the proposal author regarding subsistence needs of the Chitina Subdistrict dipnetters not being met may be an ongoing issue. Issues for the Chitina Subdistrict are likely to include, uninterrupted fishing time and increased chinook and sockeye bag limits. Now that two subsistence fisheries exist, any disparity in regulations between the two fisheries is likely to become an issue.

The Chitina Village Council initiated a personal use chinook salmon derby in 1999. This derby did not begin until the fourth week of the fishery, after the majority of chinook had passed the fishery and did not result in an increase harvest of chinook. There was no derby sponsored by the Chitina Village Council in 2000. There are potential concerns regarding a subsistence fishery involved with a salmon derby, if future derbies are scheduled.

Another issue regarding this fishery relates to access. Much of the land in the area open to subsistence and personal use fishing is privately owned. In 1985 and 1986, the Chitina Native Corporation blocked the road to O'Brien Creek and charged a fee for access. In 1987 the state of Alaska negotiated a \$15,000 contract with the Chitina Native Corporation for access and to build and maintain outhouses and collect and remove garbage. The contract was renewed in 1988. The legislature refused to appropriate funds for access in 1989 after roadwork done on the road in the fall of 1988 eliminated areas where the road passed on private land. In response, the Chitina Native Corporation refused dipnetters access to O'Brien Creek during the 1989 season. The legislature again appropriated funds for access to O'Brien Creek in 1991. Also in 1991, at the urging of the Chitina Dipnetter's Association, the legislature instituted a \$10 fee for the

personal use fishery. The fee was to be used to develop a long-term lease. During 1994, a 5-year lease was negotiated with the Chitina Corporation. In 1995, a 4-year lease was negotiated with Ahtna Corporation for use of lands surrounding Haley Creek. Trespass on lands not included in the lease agreement remains an issue. During work group meetings in the fall and winter of 1995-1996, native groups from the Chitina area expressed discontent with the adequacy of the negotiated leases. The lease agreements both expired December 31, 1998. Meetings with both corporations occurred during 1998 and 1999 and resulted in a one-year extension of the existing contract and monthly meetings throughout the fishing season in 1999 to address current issues. These meetings have provided input for developing the new contracts and addressing issues in the previous contracts. Primary concerns from the corporations include operation of the commercial charter operators at O'Brien Creek, trespass on both east and west banks of Copper River where access was not provided by contract, and lack of enforcement for fishing and trespass violations. Negotiations for a new one-year contract were completed in early 2000. As a result the access fee was increased to \$25 for the 2000 season. This contract has not been renewed and contract negotiation with Ahtna and Chitina Native Corporations is currently stalled due to multiple issues, not all directly involving the fishery. The \$25 fee will still be collected in 2001 as the fee is in regulation.

On October 1, 1999 the Federal government assumed management responsibilities for subsistence fisheries on all non-navigable waters on public lands and navigable and non-navigable waters within and/or adjacent to the boundaries of the wild-designated portion of the Gulkana River, and Wrangell-St. Elias National Park. This includes the waters of the upper Copper River District. The Federal Register adopted the state regulations, but accepted proposals for changes to these regulations in 2000. The Federal Subsistence Board voted on these proposals and three proposals passed have direct implications with the upper Copper River District. These include: the modification of the subsistence fishery at Batzelnets to conform with the regulations stipulated in a federal court injunction; a positive customary and traditional use finding for the Chitina Subdistrict, and a season extension to the Glennallen Subdistrict fishery. As the federal and state regulations continue to diverge there is potential for conflicts between state (all Alaska residents) and federally qualified (rural residents) subsistence users, as the federal regulations are less restrictive. This has occurred between federal subsistence and state sport hunting, which has resulted in more restrictive state management as the federal hunts are liberalized.

The permitting process for the Chitina Subdistrict was changed in the 2000 season. Permit holders are no longer required to return permits at the end of each fishing trip. This has resulted in lower percentage of returns and less timely harvest information. In addition, the question regarding quality of reporting data, based upon the memory of participants remembering the date and harvest from six months prior. This could cause potentially high bias in abundance estimates of chinook salmon, based upon capture of chinook in the Chitina Subdistrict, if the estimates must be stratified by date. This also impacts calculation of hatchery salmon contribution to the fishery, as these estimates are based upon daily harvest in the fishery.

Ongoing and Recommended Research and Management

At present, the Division of Sport Fish conducts a program to issue permits, monitor the fishery, and estimate harvests for both upper Copper River District salmon fisheries. During 1995, a program was initiated to estimate the proportion and timing of sockeye salmon produced by the Gulkana Hatchery from coded wire tag (CWT) recoveries in the personal use fishery. In time,

this will allow managers to better target hatchery stocks while protecting wild fish. The chinook radio-telemetry study initiated by the department in 1999 has provided information regarding chinook passage through the fishery.

Continued refinement of the criteria for opening and closing the Chitina Subdistrict fishery is needed. The relationship between the sonar count and fish passage rate through the fishing area is poorly understood. Comparison of sonar counts to harvest rates was attempted with poor success. Time series analysis of the factors affecting fish passage is necessary. Difficulties in shifting effort from the early sockeye stocks continue and results in less fishing time in the early portion of the season as participation increases.

Annual review of the permitting process should be continued to insure quality harvest data that is cost effective.

ARCTIC GRAYLING SPORT FISHERIES

From 1977 through 1995, more grayling were harvested and caught by sport anglers fishing UCUSMA waters than any other fish (Tables 6 and 7). Harvests remained relatively stable from 1977 through 1987, averaging about 28,982 grayling. Since 1988, however, harvests have been lower, with the 1999 harvest of 8,245 grayling being the lowest on record (Table 19, Figure 13). This has been primarily the result of more restrictive regulations adopted to assure the sustained yield of the area's grayling stocks. The 1999 harvest accounted for about 29% and 22% of the AYK and statewide harvest of grayling, respectively.

The largest grayling fishery in the UCUSMA has historically occurred in the Gulkana River drainage (Table 20). From 1989 through 1998, this drainage accounted for about 36% of the grayling harvest from UCUSMA waters (Table 21). In recent years, harvests from the drainage have declined; 32% of the grayling harvest came from the drainage during the period 1994-1998. A discussion of the Arctic grayling fishery in the Gulkana River drainage follows this area-wide summary. Other UCUSMA drainages that have supported significant grayling fisheries include the Klutina and Tazlina drainages and various upper Susitna River drainage lakes and streams. Various lakes stocked with grayling catchables also provide fishing opportunity for this species.

To assure sustainable yield of grayling, daily bag and possession limits for grayling in all flowing waters in the UCUSMA were reduced from 15 daily and 30 in possession to 10 fish daily and in possession in 1988. In 1989, the bag and possession limit for grayling in rivers was further reduced to five grayling. For the Gulkana River, anglers were permitted five grayling but only one grayling per day over 14 inches. This action was taken to maintain historic size compositions in this drainage. The bag and possession limits in stocked lakes and those lakes without management concern remained at 10 per day and in possession. Under these regulations, most grayling stocks in the UCUSMA are currently considered healthy.

Mendeltna Creek is a small stream in the Tazlina drainage located west of Glennallen that drains into Tazlina Lake. Main access points are at the Glenn Highway wayside and a single lane gravel road (Oil Well Road) off the Lake Louise Road. Harvests increased significantly between 1992 and 1993, 255 to 867 grayling, and peaked in 1995 at 1,041 (Table 20). There is little baseline data on the grayling population in Mendeltna Creek, stock assessment began on this system in 1998 and resulted in an abundance estimate for July 1999 of 845 fish \geq 200 mm (approximately 8 in; Scanlon and Fish 2000). The harvest of 79 Arctic grayling in 1999 was the lowest since 1983.

Table 19.-Harvest of Arctic grayling by recreational anglers fishing UCUSMA waters, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Year | UCUS Harvest | Alaska Harvest | Percent | Region III Harvest | Percent |
|------------------------------|-----------------|-------------------|-----------|-----------------------|-----------|
| 1977-1988 ^a | 28,395 | 144,075 | 20 | 116,137 | 24 |
| 1989 | 16,629 | 105,353 | 16 | 88,266 | 19 |
| 1990 | 13,775 | 64,814 | 21 | 51,281 | 27 |
| 1991 | 13,278 | 82,831 | 16 | 65,632 | 20 |
| 1992 | 11,125 | 45,073 | 25 | 33,429 | 33 |
| 1993 | 12,504 | 49,721 | 25 | 38,363 | 33 |
| 1994 | 14,066 | 63,302 | 22 | 47,183 | 30 |
| 1995 | 14,289 | 46,168 | 31 | 37,574 | 38 |
| 1996 | 10,534 | 46,943 | 22 | 35,525 | 30 |
| 1997 | 8,583 | 45,844 | 19 | 33,968 | 25 |
| 1998 | 8,275 | 38,445 | 22 | 30,611 | 27 |
| 1999 | 8,245 | 37,252 | 22 | 28,275 | 29 |
| 1989-1998^a | 12,306 | 58,849 | 22 | 46,183 | 28 |
| 1994-1998^a | 11,149 | 48,140 | 23 | 36,972 | 30 |

^a Average value for the years during the period.

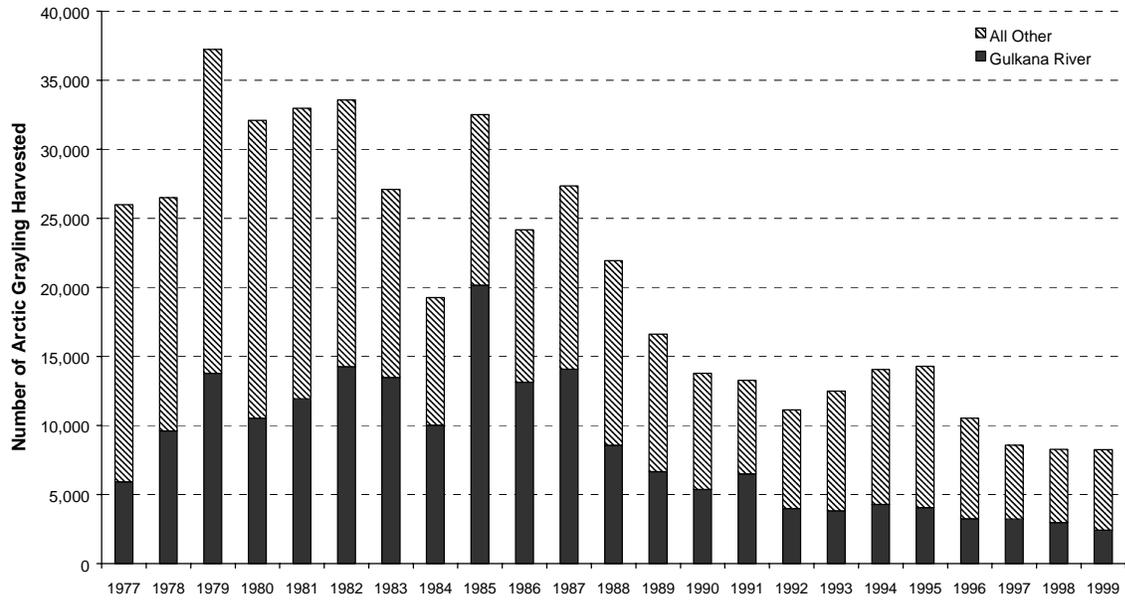


Figure 13.-Upper Copper/Upper Susitna Area Arctic grayling harvest, 1977-1999.

Table 20.-Harvest of Arctic grayling by recreational anglers fishing UCUSMA by drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Areas | 1977-1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^c | 1994-1998 ^c |
|-------------------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------|------------------------|
| Gulkana R. Drainage | | | | | | | | | | | | | | |
| Lakes | 3,359 | 1,520 | 1,461 | 1,977 | 902 | 1,483 | 1,545 | 1,241 | 904 | 738 | 499 | 625 | 1,227 | 985 |
| Upper River | 8,726 ^a | 4,746 | 3,429 | 4,355 | 2,901 | 2,231 | 2,357 | 2,347 | 2,167 | 1,922 | 1,822 | 1,154 | 2,828 | 2,123 |
| Lower River | | 394 | 493 | 171 | 188 | 114 | 384 | 483 | 192 | 568 | 654 | 647 | 364 | 456 |
| Total | 12,085 | 6,660 | 5,383 | 6,503 | 3,991 | 3,828 | 4,286 | 4,071 | 3,263 | 3,228 | 2,975 | 2,426 | 4,419 | 3,565 |
| Upper Susitna Drainage | | | | | | | | | | | | | | |
| Lake Louise | | 1,576 | 1,613 | 875 | 481 | 994 | 1,239 | 1,040 | 689 | 333 | 990 | 637 | 983 | 858 |
| Susitna/Tyone Lk | | 300 | 119 | 330 | 639 | 661 | 949 | 1,273 | 376 | 271 | 241 | 261 | 516 | 622 |
| Other Lakes | | 683 | 646 | 125 | 218 | 93 | 301 | 254 | 344 | 121 | 34 | 71 | 282 | 211 |
| Streams | | 497 | 866 | 693 | 706 | 1,082 | 1,157 | 1,485 | 1,103 | 681 | 228 | 624 | 850 | 931 |
| Total | 4,087^b | 3,056 | 3,244 | 2,023 | 2,044 | 2,830 | 3,646 | 4,052 | 2,512 | 1,406 | 1,493 | 1,593 | 2,631 | 2,622 |
| Klutina R. Drainage | | | | | | | | | | | | | | |
| | 1,143 ^c | 1,041 | 544 | 1,092 | 346 | 681 | 363 | 285 | 183 | 165 | 517 | 530 | 522 | 303 |
| Tazlina R. Drainage | | | | | | | | | | | | | | |
| Mendeltna Creek | 401 ^c | 272 | 170 | 102 | 255 | 867 | 906 | 1,041 | 570 | 462 | 579 | 79 | 522 | 712 |
| Other Lakes | 782 ^c | 122 | 374 | 353 | 347 | 206 | 734 | 733 | 764 | 431 | 743 | 205 | 481 | 681 |
| Other Streams | 391 ^c | 760 | 204 | 842 | 128 | 518 | 274 | 581 | 437 | 10 | 48 | 580 | 380 | 270 |
| Total | 1,574^c | 1,154 | 748 | 1,297 | 730 | 1,591 | 1,914 | 2,355 | 1,771 | 903 | 1,370 | 864 | 1,383 | 1,663 |
| Tonsina Drainage | | | | | | | | | | | | | | |
| | 534 ^c | 629 | 289 | 296 | 811 | 814 | 363 | 261 | 192 | 82 | 495 | 368 | 423 | 279 |

-continued-

Table 20.-Page 2 of 2.

| Areas | 1977-1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^e | 1994-1998 ^e |
|---|---------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|------------------------|------------------------|
| Copper R Upstream of Gulkana | | | | | | | | | | | | | | |
| Lakes | 703 ^c | 413 | 883 | 216 | 113 | 378 | 234 | 321 | 147 | 101 | 147 | 147 | 295 | 190 |
| Streams | 622 ^c | 375 | 119 | 466 | 30 | 356 | 125 | 210 | 158 | 101 | 197 | 77 | 214 | 158 |
| Total | 1,325^c | 788 | 1,002 | 682 | 143 | 734 | 359 | 531 | 305 | 202 | 344 | 224 | 509 | 348 |
| Copper R Downstream of Klutina^d | | | | | | | | | | | | | | |
| Lakes | 298 ^c | 666 | 136 | 11 | 15 | 317 | 82 | 166 | 121 | 148 | 150 | 67 | 181 | 133 |
| Streams | 126 ^c | 0 | 0 | 34 | 0 | 19 | 41 | 0 | 73 | 121 | 0 | 0 | 29 | 47 |
| Total | 424^c | 666 | 136 | 45 | 15 | 336 | 123 | 166 | 194 | 269 | 150 | 67 | 210 | 178 |
| Other Sites | | | | | | | | | | | | | | |
| Stocked Lakes | 539 ^c | 881 | 935 | 726 | 1,623 | 852 | 1,167 | 749 | 677 | 570 | 223 | 1,265 | 840 | 677 |
| Other Lakes | 1,087 ^c | 928 | 1,035 | 68 | 767 | 334 | 1,238 | 665 | 766 | 876 | 266 | 357 | 694 | 762 |
| Other Stream | 1,502 ^c | 826 | 459 | 591 | 655 | 504 | 664 | 1,154 | 671 | 882 | 323 | 551 | 673 | 739 |
| Total | 3,178^c | 2,635 | 2,429 | 1,385 | 3,045 | 1,690 | 3,069 | 2,568 | 2,114 | 2,328 | 812 | 2,173 | 2,208 | 2,178 |
| Area Total | 28,395^e | 16,629 | 13,775 | 13,278 | 11,125 | 12,504 | 14,066 | 14,289 | 10,534 | 8,583 | 8,275 | 8,245 | 12,306 | 11,149 |

^a Includes lower river estimated harvest.

^b Includes all upper Susitna lakes and streams.

^c Includes 1983-1986 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

^d Does not include the Tonsina River drainage.

^e Average value for the years during the period.

Table 21.-Harvest and catch of Arctic grayling by recreational anglers fishing the Gulkana River drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Year | Gulkana River Drainage Harvest | | | Percent total UCUS harvest | Number Caught | Percent Released |
|------------------------------|--------------------------------|--------------|--------------|----------------------------|---------------|------------------|
| | Rivers & Streams | Lakes | Total | | | |
| 1977-1988 ^a | 8,726 | 3,359 | 12,085 | 43 | N/A | N/A |
| 1989 | 5,140 | 1,520 | 6,660 | 40 | N/A | N/A |
| 1990 | 3,922 | 1,461 | 5,383 | 40 | 40,768 | 87 |
| 1991 | 4,526 | 1,977 | 6,503 | 49 | 34,827 | 81 |
| 1992 | 3,089 | 902 | 3,991 | 32 | 32,316 | 88 |
| 1993 | 2,345 | 1,483 | 3,828 | 31 | 45,865 | 92 |
| 1994 | 2,741 | 1,545 | 4,286 | 30 | 37,991 | 89 |
| 1995 | 2,830 | 1,241 | 4,071 | 28 | 29,102 | 86 |
| 1996 | 2,359 | 904 | 3,263 | 31 | 40,710 | 92 |
| 1997 | 2,490 | 738 | 3,228 | 38 | 43,575 | 93 |
| 1998 | 2,476 | 499 | 2,975 | 36 | 46,937 | 94 |
| 1999 | 1,801 | 625 | 2,426 | 29 | 39,198 | 94 |
| 1989-1998^a | 3,192 | 1,227 | 4,419 | 36 | 39,121 | 89 |
| 1994-1998^a | 2,579 | 985 | 3,565 | 32 | 39,663 | 91 |

^a Average value for the years during the period.

Management of the grayling population in Mendeltna Creek has been limited to evaluation of the SWHS. Arctic grayling populations can sustain exploitation rates of approximately 10%. Stock assessment conducted on Mendeltna Creek estimated the population at less than 900 grayling, with few fish greater than 12 inches (Scanlon and Roach 2000). At the current population level, only 80 grayling could be harvested annually. Based upon examination of the SWHS statistics, bag limits reductions would not reduce the harvest sufficiently to provide for sustainable yield. The department submitted a proposal for the 1999 BOF meeting to reduce the daily bag limit to 2 fish over 12 in total length. The open season was set from June 1 to March 31, to offer protection to the larger spawning grayling. The Board supported this proposal and the regulation went into effect for the 2000 season.

Little is known about the distribution of Arctic grayling in the UCUSMA. Many of the roadside-accessible streams are located in the Tazlina drainage. Tagging or telemetry studies could provide information regarding timing of grayling through the fisheries, spawning and rearing streams and distributions throughout the drainage.

Gulkana River Arctic Grayling Sport Fishery

Background and Historical Perspective

The Gulkana River drainage supports the largest grayling population in the UCUSMA. This clearwater drainage originates in the Alaska Range and flows south to join the Copper River near the community of Gulkana (Figure 7). Access to the river is available from various secondary roads and trails off the Richardson Highway, which parallels much of the river. Anglers use rafts, canoes, and powerboats to gain access to the more remote sections of the river. Raft and canoe anglers frequent the various sections of the river from Paxson Lake downstream to the Richardson Highway Bridge. Powerboat operators generally launch at Sourdough and use the river from approximately 2 miles below Sourdough upstream to the confluence of the West Fork. Recently powerboat operators have begun launching from the Richardson Highway bridge and fishing the 5-mile reach of the river above the bridge. The section of the Gulkana River upstream from Sourdough has been designated by the U.S. Congress as “wild” as part of the Wild and Scenic Rivers Act of 1968. The Gulkana River from the Richardson Highway bridge downstream to a department marker 500 yards downstream of its confluence with the Copper River is an area in which only single hook, artificial flies may be used from June 1 to July 31. This area has low use, except near the Richardson Highway, and is used primarily by walk-in anglers from the Richardson Highway, but powerboat operators occasionally access the confluence of the Gulkana River with the Copper River after launching from Gakona or from the Richardson Highway bridge.

The Gulkana River drainage has historically supported the largest sport fishery for grayling in the UCUSMA. From 1977 through 1985, harvests of grayling from the Gulkana River drainage generally increased. A peak harvest of 20,165 fish occurred in 1985 and accounted for 62% and 35% of the total harvest in the UCUSMA and Southcentral region, respectively (Mills 1986).

The peak harvest experienced in 1985 raised concern that the grayling stocks in the drainage were in danger of overharvest, given that grayling stocks in several interior Alaska streams were depressed when subjected to similar harvest rates. Regulations were adopted in 1988 that reduced the bag and possession limit to five fish per day. Also, past research data indicated that the maximum size of grayling observed in the Gulkana River drainage was decreasing as the result of anglers targeting larger fish (Williams and Potterville 1983). In an attempt to maintain

historic size compositions, regulations were also adopted in 1988 that restricted anglers to only one grayling over 14 inches.

A research program was initiated by the Division of Sport Fish in 1986 to assess the status of the various grayling stocks of the Gulkana River drainage. Beginning in 1988, the study was conducted in conjunction with the University of Alaska and formed the basis of an M.S. thesis. Objectives of the research program were to determine stock structure, growth, annual abundance, survival, and recruitment; sustainable yields under a variety of management scenarios; and future monitoring strategies. This project was completed in June 1993 and the final report/thesis was completed in 1995 (Bosch 1995).

Recent Fishery Performance

The restrictions placed on the fishery during 1988 have significantly reduced the total harvest of grayling in the Gulkana River drainage (Figure 13). The 1999 grayling harvests are the lowest since harvest data began being collected in 1977. No assessment was conducted on the Gulkana River in 2000; it is assumed that grayling harvest remained stable.

Estimates of abundance indicate that current exploitation rates on the major stock units of grayling in the Gulkana River drainage appear sustainable given current harvest levels. Data from the research program also indicate that the restriction limiting anglers to only one grayling over 14 in is allowing the population to reach and maintain historic levels (Fish and Roach 1999).

Management Objectives

Grayling fisheries in the Gulkana River drainage are managed to assure maintenance of historic age and size composition and stock abundance. Harvest and catch of Arctic grayling are monitored by the SWHS. In 1998, stock assessment was conducted for comparison of age and size composition to previous assessment studies conducted in the early 1990's (Bosch 1995). Data collected in 1998 indicates that the grayling population in the Gulkana River, through the restrictive regulations, has a larger proportion of fish, greater than 14", than were present in the early 1990's (Fish and Roach 1999).

Fishery Outlook

It is anticipated that harvest levels of Arctic grayling will remain at recent levels. The current regulations appear to be maintaining the population at historic levels.

Recent Board of Fisheries Actions

During the 1996 meetings the BOF passed a proposal submitted by the department to establish a catch and release grayling fishery in the upper Gulkana River drainage (upstream of Paxson Lake). The intent of this regulation is to protect a small population of large sized grayling (> 18 in) in the Gunn and Fish Creek drainages. The upper Gulkana River above Paxson Lake is easily accessible from the Richardson Highway by foot and ATV. The research conducted by Bosch (1995) indicated that the upper Gulkana grayling population was separate from the Middle Fork and mainstem populations, and that though the population is small, the fish are large. The department determined that this population would be a candidate for a trophy catch and release fishery in order to preserve the current size composition of the population. This regulation has not affected the overall harvest of grayling in the Gulkana drainage, it may be that the majority of grayling caught in the upper Gulkana River were released prior to the regulation.

Current Issues

Overall, Gulkana River drainage grayling stocks appear healthy. The ADF&G is planning to develop a management plan for grayling in the Gulkana River drainage. The plan will strive to provide a diversity of fishing opportunities for grayling in the Gulkana River drainage under sustained yield management. This plan will be distributed for public comment and after completion will be forwarded to the BOF at a future scheduled meeting dealing with UCUSMA issues, likely the fall of 2002. Until completion of this management plan, continuation of the current management strategy and regulatory regime is recommended.

Data collected through the statewide mail survey suggest that many anglers fishing grayling in the Gulkana River drainage are practicing catch and release. Anglers have released over 90% of their catch on average since 1990 (Table 19). Assuming a 5% release mortality rate, this appears acceptable given current harvest and abundance levels.

There has been some dissatisfaction with the BOF action in 1996 on the upper Gulkana River. Anglers, who had fished the upper Gulkana River prior to 1996 and harvested Arctic grayling, still desire to do so. This may result in a proposal during the next BOF meeting, to allow some minimal level of harvest in the upper Gulkana River.

Ongoing and Recommended Research and Management

An objective of the research program was to develop a plan for monitoring the status of grayling stocks in the Gulkana River drainage. It is recommended that the following monitoring program be conducted to assure the sustained yield of the fishery. This consisted of annual monitoring of the mainstem stock for age composition and monitoring every three to five years for the upper reaches (upstream of Paxson Lake). The middle fork stock should be monitored by an abundance estimate and age composition every three to five years. Stock assessment was conducted in the mainstem for 1998, to determine age and length composition. Similar assessment should be conducted in the near future on the upper reaches to determine the impacts of the recent regulatory change and provide background information for the next BOF meeting.

LAKE TROUT SPORT FISHERIES

Background and Historical Perspective

Lake trout stocks of the UCUSMA provide significant fishing opportunities and economic benefit to the people of Alaska (Figure 14). This is the only area in Alaska where numerous lake trout fishery exist along the road system. From 1977 through 1988, an average of 7,294 lake trout were harvested from UCUSMA lakes and streams annually, accounting for 41% of the statewide lake trout harvest and 71% of the AYK region harvests over this period (Table 22). From 1989 to 1998, lakes and streams of the UCUSMA have accounted for over 36% of the annual statewide harvest of lake trout and 67% of the AYK region harvests.

Most of the lake trout harvest in the UCUSMA has come from lakes within the Tyone River (Lake Louise and Susitna and Tyone lakes) and Gulkana River (Paxson, Susitna, and Crosswind lakes) drainages (Table 23). From 1989 to 1998, these two drainages have accounted for 88% of the UCUSMA lake trout harvest and an average of 31% of the statewide lake trout harvest. Paxson Lake and Lake Louise have supported the largest fisheries for lake trout in the UCUSMA and Alaska. Together, these two lakes have accounted for 49% of the UCUSMA lake trout harvest and an average of 18% of the annual statewide harvest of lake trout from 1989 to 1998. Other major sport fisheries for lake trout in the UCUSMA occur in Summit and Crosswind lakes (in the Gulkana River drainage) and in Susitna Lake (in the Tyone River drainage).

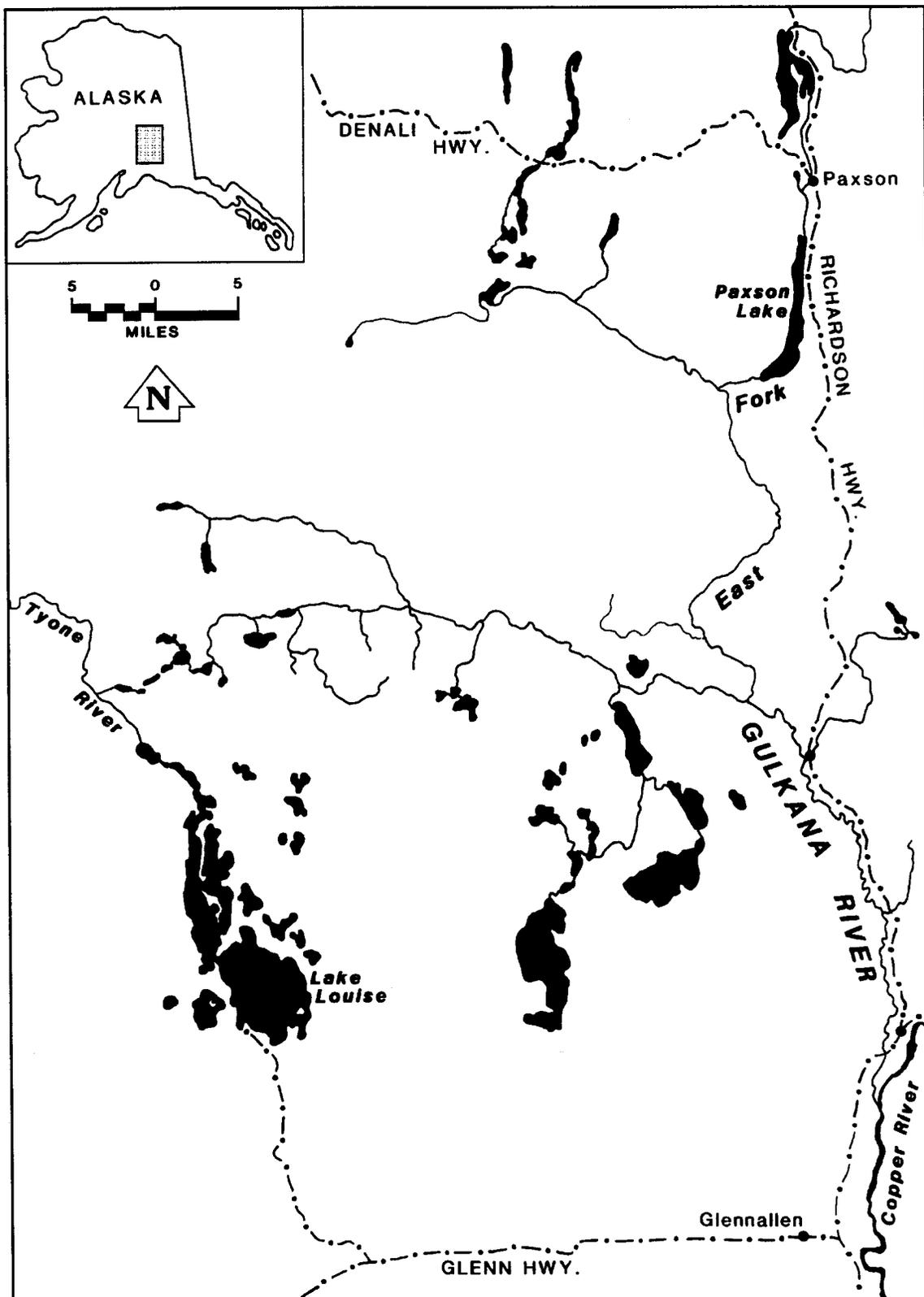


Figure 14.-Map of major lake trout fisheries in the UCUSMA.

Table 22.-Harvest of lake trout by recreational anglers fishing UCUSMA waters, averaged for 1977–1988 and annually from 1989 to 1999.

| Year | UCUS Harvest | Alaska Harvest | Percent ^b | Region III Harvest | Percent ^c |
|------------------------------|--------------|----------------|----------------------|--------------------|----------------------|
| 1977-1988 ^a | 7,294 | 17,619 | 41 | 10,242 | 71 |
| 1989 | 7,147 | 17,070 | 42 | 10,752 | 66 |
| 1990 | 5,503 | 12,602 | 44 | 7,246 | 76 |
| 1991 | 4,864 | 13,772 | 35 | 7,897 | 62 |
| 1992 | 4,251 | 12,525 | 34 | 6,442 | 66 |
| 1993 | 4,569 | 13,094 | 35 | 7,167 | 64 |
| 1994 | 4,058 | 11,374 | 36 | 5,889 | 69 |
| 1995 | 2,934 | 8,412 | 35 | 4,266 | 69 |
| 1996 | 2,632 | 9,086 | 29 | 3,838 | 69 |
| 1997 | 1,923 | 7,486 | 26 | 3,289 | 58 |
| 1998 | 1,723 | 5,985 | 29 | 2,675 | 65 |
| 1999 | 2,135 | 9,948 | 21 | 4,131 | 52 |
| 1989-1998^a | 3,960 | 11,141 | 36 | 5,946 | 67 |
| 1994-1998^a | 2,654 | 8,469 | 31 | 3,991 | 66 |

^a Average value for the years during the period.

^b Percent of all lake trout harvested in state which were harvested in UCUS.

^c Percent of all lake trout harvested in Region III which were harvested in UCUS.

Table 23.-Harvest of lake trout by recreational anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^e | 1994-1998 ^e |
|-------------------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------|------------------------|
| Gulkana Drainage | | | | | | | | | | | | | | |
| Paxson Lake | 1,260 ^a | 1,557 | 2,139 | 1,248 | 1,118 | 778 | 262 | 507 | 297 | 452 | 205 | 342 | 856 | 345 |
| Summit Lake | 685 ^a | 863 | 968 | 981 | 524 | 344 | 353 | 224 | 120 | 158 | 59 | 220 | 459 | 183 |
| Crosswind Lake | 460 | 272 | 306 | 463 | 378 | 311 | 429 | 94 | 339 | 96 | 238 | 525 | 293 | 239 |
| Other Lakes | 143 ^b | 9 | 68 | 28 | 85 | 256 | 66 | 0 | 42 | 10 | 24 | 54 | 59 | 28 |
| Gulkana River ^c | 171 | 178 | 102 | 70 | 155 | 20 | 44 | 90 | 294 | 132 | 15 | 14 | 110 | 115 |
| Total | 2,719 | 2,879 | 3,583 | 2,790 | 2,260 | 1,709 | 1,154 | 915 | 1,092 | 848 | 541 | 1,155 | 1,777 | 910 |
| Upper Susitna Drainage | | | | | | | | | | | | | | |
| Lake Louise | 2,005 ^d | 1,979 | 1,036 | 1,332 | 1,033 | 1,316 | 1,463 | 946 | 662 | 585 | 625 | 430 | 1,098 | 856 |
| Susitna Lake | 669 ^d | 441 | 187 | 308 | 324 | 669 | 426 | 200 | 381 | 52 | 131 | 176 | 312 | 238 |
| Other Lakes | 367 ^d | 761 | 119 | 182 | 348 | 295 | 308 | 173 | 186 | 60 | 95 | 135 | 253 | 164 |
| Streams | 0 | 0 | 0 | 14 | 0 | 19 | 140 | 199 | 44 | 0 | 0 | 0 | 42 | 77 |
| Total | 3,044^d | 3,181 | 1,342 | 1,836 | 1,705 | 2,299 | 2,337 | 1,518 | 1,185 | 697 | 851 | 741 | 1,695 | 1,318 |
| Klutina Drainage | 209 ^b | 150 | 68 | 84 | 39 | 28 | 74 | 71 | 22 | 33 | 13 | 35 | 58 | 43 |
| Tazlina Drainage | 78 ^b | 0 | 51 | 42 | 62 | 0 | 15 | 0 | 164 | 103 | 96 | 97 | 53 | 76 |
| Copper River Drainage | | | | | | | | | | | | | | |
| Upstream of Gulkana | 180 ^b | 506 | 102 | 42 | 23 | 145 | 309 | 164 | 81 | 100 | 95 | 89 | 157 | 150 |
| Downstream of Klutina | 52 ^b | 103 | 238 | 14 | 0 | 133 | 22 | 20 | 22 | 0 | 0 | 0 | 55 | 13 |
| Other Sites | 476 ^b | 328 | 119 | 56 | 162 | 255 | 147 | 246 | 66 | 142 | 128 | 18 | 165 | 146 |
| Area Total | 7,294^e | 7,147 | 5,503 | 4,864 | 4,251 | 4,569 | 4,058 | 2,934 | 2,632 | 1,923 | 1,723 | 2,135 | 3,960 | 2,654 |

^a Includes 1984-1988 average only. Prior to 1984 Paxson and Summit lake harvests were combined.

^b Includes 1983-1988 average only. Prior to 1983, this harvest was included in “other waters” in the SWHS report.

^c Includes lower river harvest.

^d Includes 1984-1988 average only. Prior to 1984 Louise, Susitna, and Tyone lake harvests were combined.

^e Average value for the years during the period.

Prior to 1987, anglers fishing UCUSMA waters were allowed a daily take of two lake trout over 20 inches and 10 lake trout under 20 in. Under these regulations, lake trout harvests from UCUSMA waters were relatively stable, averaging about 7,500 (Table 22). A study conducted in 1986, however, suggested that eight of nine lake populations in the upper Copper and Delta River drainages were being harvested well over the annual harvest estimated to be sustainable based on lake trout populations in Canada and the Great Lakes (Burr 1987). As a result of these research findings, the daily bag limit for UCUSMA waters was reduced to two fish and a minimum size limit of 18 in was adopted for Summit and Paxson lakes, Lake Louise, and the remainder of the Tyone River drainage in 1987. The minimum size limit was imposed to allow female lake trout to spawn once before reaching harvestable size.

A research program was initiated in 1990 to evaluate the status of lake trout fisheries in the UCUSMA. The goal of the research program was to determine appropriate management strategies that assure the sustained yield of lake trout in UCUSMA lakes. The study was conducted primarily in Paxson Lake and Lake Louise. Annual results of the research project are summarized in Szarzi (1992, 1993), Szarzi and Bernard (1994, 1995, 1997).

In 1994, the minimum size limit for lake trout was increased from 18 to 24 inches in the Tyone drainage, Crosswind, Paxson and Summit lakes; the bag limit was reduced from two to one lake trout in the Tyone drainage and Crosswind Lake. The minimum size limit was increased to better protect female lake trout spawning for the first time in the Tyone drainage and Crosswind Lake and to reduce the harvest to a sustainable level in Paxson and Summit lakes. The bag limit reduction was imposed on lakes with lake trout of greater than average length to prevent effort from being concentrated on these size classes.

Recent Fishery Performance

Since adoption of the new regulations in 1987 and further restrictions in 1994, lake trout harvests from UCUSMA lakes and streams have fallen. The 1999 harvest of 2,135 lake trout was similar to the previous two years and less than the recent 5-year average (Table 23). In general, harvests from both the Gulkana River and Tyone River drainages have declined or remained stable since 1994.

Management Objectives

Two methods are available to assess the current status of lake trout fisheries in the UCUSMA. The first involves estimating the level of sustainable harvests for lakes based on an observed lake trout production-lake surface area relationship for northern latitude lakes (Healy 1970). Healy found that northern latitude lakes could sustain harvests at a rate of approximately $0.5 \text{ kg ha}^{-1} \text{ y}^{-1}$. Because estimates of the average weight of lake trout from most lakes in the UCUSMA are unavailable, the sustainable harvest of lake trout has been estimated based on the probable range of lake trout weights: 1.0 to 3.5 kg. Based on Healy's approach and these assumed weights, lakes in the UCUSMA which are less than 500 ha appear capable of sustaining harvests of 70 to 250 lake trout annually depending, in part, upon their elevation, depth, acreage, and available spawning habitat. Based on these estimates, the harvest of lake trout from lakes smaller than 500 ha appears to be slightly below estimates of sustainable yield. For lakes larger than 500 ha which are not road accessible (e.g., Crosswind, Tanada, and Copper lakes), harvests also appear below estimates of sustainable yield. These larger lakes appear capable of sustaining annual harvests from about 250 to 700 lake trout.

For lakes larger than 500 ha which are road accessible (e.g., Paxson, Summit, Susitna lakes and Lake Louise), Healy's methods plus an alternate approach based on the volume of water in the preferred temperature range for lake trout (8° to 12°C), termed the thermal habitat volume (THV), could be used to estimate the current status of lake trout stocks in these lakes. Based on the THV approach, the sustainable yield for Paxson Lake is 0.92 kg ha⁻¹ y⁻¹, for Lake Louise 0.89 kg ha⁻¹ y⁻¹, and for Susitna Lake 0.90 kg ha⁻¹ y⁻¹. Thermal habitat volume information is not available for Summit Lake. Using the average weight of lake trout harvested in each lake to convert yields to numbers of fish, the sustainable harvest from Paxson Lake is approximately 800 lake trout, Lake Louise 2,123 lake trout, and Susitna Lake 1,191 lake trout. These yields compare to yields based on Healy's approach of 430 lake trout from Paxson Lake, 1,740 lake trout from Lake Louise, 660 lake trout from Susitna Lake, and 440 lake trout from Summit Lake. Based on these estimates, current harvests of lake trout appear to be below sustainable levels.

Estimates of maximum sustainable yield based on a Lake Area model (Healy) and the THV model have the potential for overestimating sustainable harvests. Both models were developed in Ontario, Canada. These lakes have greater productivity than Alaskan lakes, and as a result the estimates of sustainable yield are erroneously high for UCUSMA lakes, and must be used only as a signal for regulatory adjustments or stock assessment. Lake trout are slow to mature and have low reproductive potential, overexploitation could result in population declines that would take multiple years for recovery. Based upon this information, a conservative management strategy is desired for the UCUSMA lakes, maintaining harvest levels below the lowest estimates of maximum sustainable yield determined by the methods described above.

Fishery objectives have yet to be defined for specific UCUSMA lake trout fisheries. To date, regulations have been written to assure that maximum sustained yield of the UCUSMA lake trout resource is not exceeded. It is likely that as fishery objectives are defined for specific lake trout fisheries, they will center on assuring for optimal, rather than maximal, sustained yield. For some lakes, optimal sustained yield will equal maximum sustained yield; for other lakes, however, optimal sustained yield will be lower than maximum sustained yield to accommodate angler's wishes for trophy or other types of special fisheries.

Fishery Management

Under a conservative management strategy many of the regulations in the UCUSMA area have conservative bag limits and size restrictions. The size restrictions provide an opportunity for the majority of lake trout to spawn at least once prior to harvest. Bag limits in the Tyone River drainage are limited to one fish per day; any increase in harvest opportunity could potentially result in a doubling of harvests. Assessment of lake trout stock status is currently based on evaluation of the SWHS. Stock assessment was discontinued in 1995 and information regarding the 2000 fishery will not be available until 2001. Due to the lack of temperature data for many of the UCUSMA lakes and many Alaska lakes do not get the temperature increases seen in Ontario lakes, the preferred method for maximum sustained yield estimation is the Lake Area Model. As mentioned previously, these estimates are guidelines and actual maximum sustained yield should be considered below the Lake Area Model estimates.

Fishery Outlook

Under the current regulations, it is anticipated that harvests of lake trout will remain stable. Harvests have declined with the 1994 regulation changes, particularly in the Gulkana drainage where the 5-year average is half of the 10-year average. The upper Susitna drainage has not seen as large a decline, though bag limits were reduced from two to one fish in 1994. The lake trout

populations in the Tyone drainage and Crosswind Lake are larger on average than Gulkana drainage trout populations and the 24-inch minimum size restriction would have a greater impact on those lakes. This is likely the reason the Gulkana drainage lakes saw a larger decline in harvests.

Recent Board of Fisheries Action

No proposals regarding lake trout were considered by the Board of Fisheries during the 1996 meeting. One proposal regarding lake trout was submitted to the 1999 BOF meeting requesting an increased bag limit to two lake trout on Crosswind Lake. Based upon current harvest levels at Crosswind Lake (average harvest of 293 trout from 1989 to 1998), a potential doubling of harvest would exceed the estimate of maximum sustainable yield of 467 based on the Lake Area model. The BOF did not support this proposal.

Current Issues

The present regulatory regime should protect all UCUSMA lake trout stocks from overharvest and allow increase abundance. Angler preferences for small lake trout to eat and trophies to admire are not being met in the larger lakes in the UCUSMA, however. A protected slot limit would achieve such an end.

Protected slot limits increase abundance by protecting the most productive fish while allowing a harvest of abundant small fish and less abundant but larger trophy-sized fish. Protected slot limits are in use on lake trout fisheries in Ontario but, to date, their effect has not been determined (Hicks and Quinn 1990). Inappropriate application of slot limits was found to crop off larger fish and create a stockpile of small fish in a brown trout population studied by Barnhart and Engstrom-Heg (1984).

Anglers at Lake Louise and Susitna lakes support slot limits, but managers feel that a slot limit is not appropriate for Paxson Lake at this time, as the abundance of immature lake trout has not been estimated. Increasing effort on this element of the population might reduce abundance by removing too much of the potential spawning stock needed to rebuild or sustain the population.

Recommended Research and Management

Research on lake trout has been discontinued. Fall sampling at Lake Louise and Paxson Lake ended in 1995, a final spring/summer sampling event occurred in 1997 (Szarzi and Bernard 1997). The applicability of thermal habitat models to Alaskan lake trout populations has not been verified. The feasibility of slot limits needs to be examined in select fisheries (Tyone drainage lakes, Crosswind Lake), in conjunction with a monitoring program to determine length and age composition changes. More information is needed regarding the characteristics of the life history and harvest of other lake trout stocks which have the potential to be overexploited including: size and age structure, maturity schedules, abundance and yield, and the contribution of the winter fishery to the lake trout harvests. Lakes of particular interest for stock assessment are Copper and Tanada lakes, accessed from the Nabesna Road via a 12-mile trail, Kimball Pass Lake, accessed on a 16-mile trail from the Richardson Highway, Crosswind Lake, east of Lake Louise and accessed by float plane or snowmachine, and Klutina Lake accessed from the Richardson Highway by the Klutina River Road (Brenwick-Craig Road).

BURBOT SPORT FISHERIES

Background and Historical Perspective

The many lakes and rivers of the UCUSMA (Figure 15) support some of the largest populations of burbot in Alaska and, prior to 1988, supported an average of 57% of the statewide sport

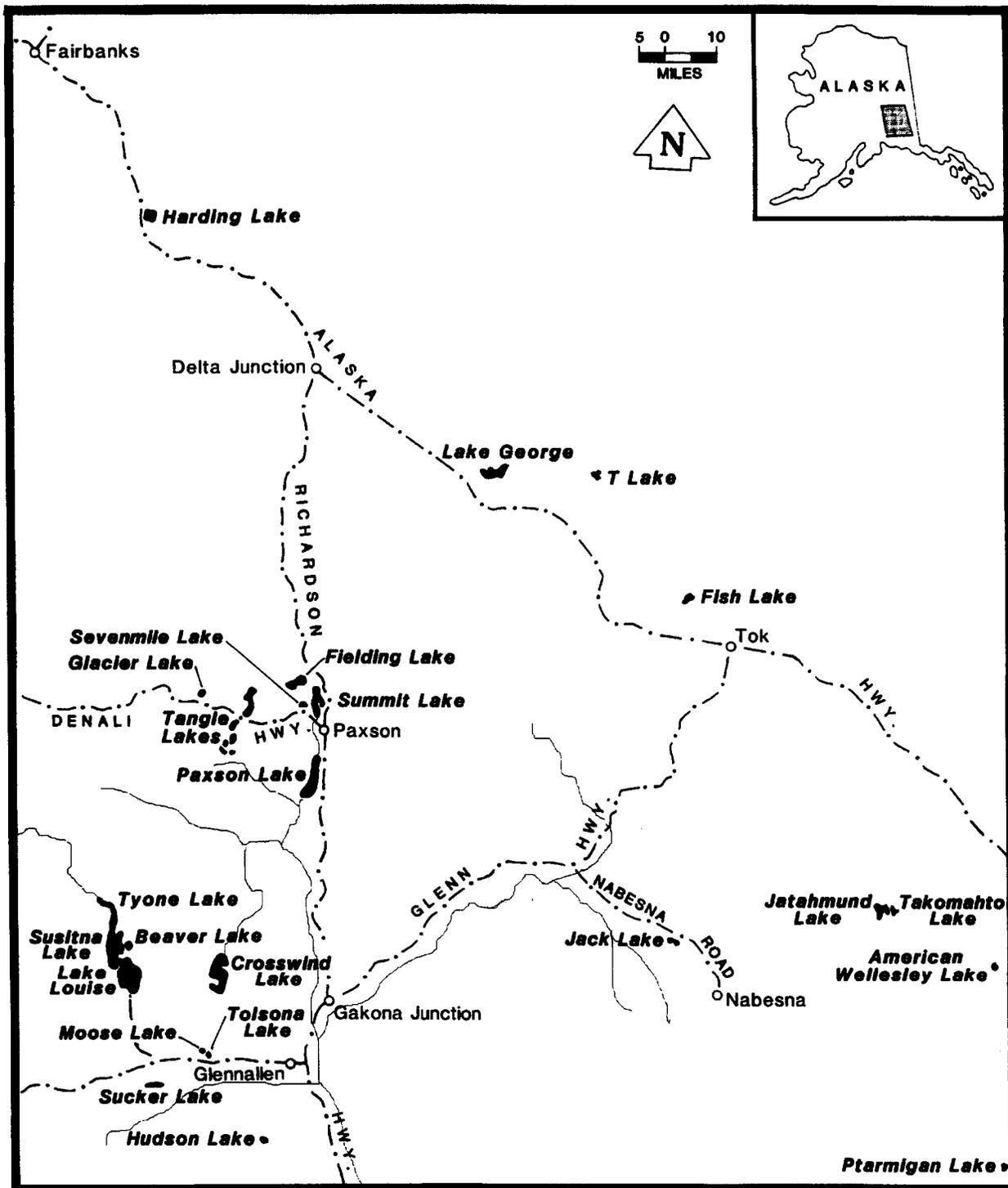


Figure 15.-Lakes supporting major burbot fisheries in the UCUSMA.

harvest of this species (Table 24). The largest fishery has historically occurred in the Lake Louise complex (consisting of Lake Louise, Susitna and Tyone lakes; Table 25). Other significant fisheries occur in the various lakes of the Gulkana River drainage (e.g., Paxson, Summit, and Crosswind lakes), Tolsona and Moose lakes, and various smaller remote lakes scattered throughout the UCUSMA. The fishery occurs primarily during the winter months from November to April using closely attended set or hand jig lines.

Prior to 1979, there were no daily bag or possession limits or gear restrictions governing the harvest of burbot in the UCUSMA. In recognition of burbot as an important sport species to be managed for sustained yield, a daily bag and possession limit of 15 burbot was enacted prior to the 1979 winter fishery. Anglers were allowed to harvest burbot by fishing multiple hand lines and unattended set lines with no more than a total of 15 hooks plus two hand-held jig hooks. Under these regulations, the sport harvest of burbot from UCUSMA waters increased dramatically, peaking in 1985 when record harvests of 19,355 burbot were taken.

The rapid growth in the fishery raised concern that several UCUSMA burbot stocks were either being, or in imminent danger of becoming, overexploited. In response, in 1987 daily bag limits and the number of hooks an angler could fish in area lakes were reduced to five, whether fished on unattended set-lines or hand held jig-lines. In several road accessible lakes (Lake Louise, Tyone, Susitna, Tolsona, Moose, and Summit lakes), the daily bag and possession limits were further reduced to two fish and anglers were restricted to using only two hooks. Also, the sport fishery for burbot in Hudson Lake was closed by emergency order based on findings that this burbot stock had been severely overexploited and was depressed (Lafferty and Vincent-Lang 1991).

During its 1988 meeting, the Board of Fisheries adopted a management plan for the burbot fisheries in lakes of the UCUSMA. The plan was adopted as regulation (5 AAC 52.045) to insure that the department had the necessary tools through which to manage the area's lake burbot fishery for *maximum sustained yield and opportunity to participate*. In order to achieve this management objective, the plan gave the department the authority to use time and area closures *and* method and means restrictions to manage the area's lake burbot sport fisheries. In adopting the plan, the BOF stated its desire to not have the bag limits for burbot reduced to less than two for road accessible lakes and five for remote lakes, as it was considered unreasonable by board members to participate in these fisheries at lower bag limits.

Further actions were implemented during 1989 under the newly adopted management plan. An emergency order was issued that closed the burbot fishery in Lake Louise based on research findings that showed the lake's burbot stocks had become severely depressed due to overfishing. In addition, an emergency order was issued to keep the burbot fishery in Hudson Lake closed, as research showed that burbot in this lake remained depleted. Emergency regulations were also enacted that eliminated set-lines from the sport fishery in all remaining lakes of the Tyone River drainage, given that anglers had begun to seek out previously unexploited lakes in the Tyone River drainage in response to restrictions and closures placed on other area lakes (Lafferty and Vincent-Lang 1991). A research program was initiated in 1986 to evaluate the life history of interior Alaska burbot and to determine stock status and sustained yields of burbot fisheries in the UCUSMA. The goal of the research program has been to determine appropriate management strategies that assure the maximum sustained yield of burbot from UCUSMA lakes. The study has been conducted in a variety of lakes. Results to date have provided managers with the tools to determine stock status using a variety of assessment methods and an estimate of the

Table 24.-Harvest of burbot by recreational anglers fishing UCUSMA waters, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Year | UCUS Harvest | Alaska Harvest | Percent | Region III Harvest | Percent |
|------------------------------|--------------|----------------|-----------|--------------------|-----------|
| 1977-1988 ^a | 8,186 | 14,432 | 57 | 12,350 | 66 |
| 1989 | 3,396 | 9,268 | 37 | 8,290 | 41 |
| 1990 | 1,836 | 10,577 | 17 | 7,319 | 25 |
| 1991 | 793 | 4,882 | 16 | 3,848 | 21 |
| 1992 | 1,495 | 7,245 | 21 | 5,748 | 26 |
| 1993 | 1,694 | 9,858 | 17 | 8,160 | 21 |
| 1994 | 2,869 | 10,868 | 26 | 8,572 | 33 |
| 1995 | 995 | 7,128 | 14 | 6,270 | 16 |
| 1996 | 981 | 5,841 | 17 | 4,792 | 20 |
| 1997 | 1,358 | 12,189 | 11 | 8,614 | 16 |
| 1998 | 1,485 | 6,882 | 22 | 5,304 | 28 |
| 1999 | 1,861 | 6,903 | 27 | 5,530 | 34 |
| 1989-1998^a | 1,690 | 8,474 | 20 | 6,692 | 25 |
| 1994-1998^a | 1,538 | 8,582 | 18 | 6,710 | 23 |

^a Average value for the years during the period.

Table 25.-Harvest of burbot caught by recreational anglers fishing in the UCUSMA by drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1988-1998 ^d | 1993-1998 ^d |
|-------------------------------|--------------------------|--------------|--------------|------------|--------------|--------------|--------------|------------|------------|--------------|--------------|--------------|------------------------|------------------------|
| Gulkana River Drainage | | | | | | | | | | | | | | |
| Lakes | 785 | 413 | 561 | 343 | 304 | 257 | 629 | 340 | 151 | 786 | 682 | 782 | 447 | 518 |
| Streams | 60 | 19 | 17 | 27 | 127 | 0 | 0 | 7 | 48 | 26 | 9 | 0 | 28 | 18 |
| Total | 845 | 432 | 578 | 370 | 431 | 257 | 629 | 347 | 199 | 812 | 691 | 782 | 475 | 536 |
| Upper Susitna Drainage | | | | | | | | | | | | | | |
| Lake Louise | 4,376 ^a | 976 | 255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 0 |
| Susitna/Tyone Lakes | | 656 | 323 | 45 | 533 | 172 | 766 | 137 | 163 | 262 | 149 | 670 | 321 | 295 |
| Other Waters | 112 ^b | 66 | 0 | 54 | 8 | 0 | 145 | 46 | 49 | 52 | 118 | 0 | 54 | 82 |
| Total | 4,404 | 1,698 | 578 | 99 | 541 | 172 | 911 | 183 | 212 | 314 | 267 | 670 | 498 | 377 |
| Klutina River Drainage | | | | | | | | | | | | | | |
| | 15 ^c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tazlina Drainage | | | | | | | | | | | | | | |
| Moose/Tolsona | 1,772 ^c | 94 | 408 | 108 | 127 | 21 | 93 | 23 | 81 | 0 | 0 | 0 | 96 | 39 |
| Hudson | 364 | 0 | 0 | 0 | 0 | 0 | 31 | 103 | 0 | 0 | 59 | 0 | 19 | 39 |
| Other | 375 ^c | 403 | 0 | 81 | 245 | 86 | 114 | 0 | 57 | 26 | 401 | 117 | 141 | 120 |
| Total | 1,543^c | 497 | 408 | 189 | 372 | 107 | 238 | 126 | 138 | 26 | 460 | 117 | 256 | 198 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 186 ^c | 459 | 238 | 0 | 8 | 611 | 799 | 122 | 73 | 129 | 50 | 152 | 249 | 235 |
| Downstream of Klutina | 8 ^c | 113 | 0 | 0 | 0 | 0 | 42 | 34 | 41 | 0 | 0 | 0 | 23 | 23 |
| Other Sites | 898^c | 197 | 34 | 135 | 143 | 547 | 250 | 183 | 318 | 77 | 17 | 140 | 185 | 169 |
| Area Total | 8,186^d | 3,396 | 1,836 | 793 | 1,495 | 1,694 | 2,869 | 995 | 981 | 1,358 | 1,485 | 1,861 | 1,690 | 1,538 |

^a Includes Susitna and Tyone lake harvest estimates. Prior to 1984 Louise, Susitna, and Tyone lake harvests were combined.

^b Includes 1986-1988 average only. No harvest reported prior to 1986.

^c Includes 1983-1988 average only.

^d Average of total annual harvest for the years during the period.

productivity of the area's burbot fisheries. Annual results of the research project are summarized in Lafferty et al. (1990-1992), Lafferty and Bernard (1993), Parker et al. (1987-1989), Taube et al. (1994, 2000), and Taube and Bernard (1995, 1999).

Although the more restrictive regulations greatly reduced harvest in the burbot fisheries of the UCUSMA, managers remained faced with a number of biological and social concerns regarding the management of the area's burbot fisheries. For this reason, managers supported a new approach to the administration of the UCUSMA lake burbot fisheries. Various options were considered; however, managers submitted a proposal to the Board at its 1991 meeting calling for the elimination of *unattended* set lines from all burbot fisheries in the UCUSMA. This proposal was intended to reduce angler efficiency, thereby providing protection from overexploitation to small burbot stocks in the area. Managers believe this action should assure the long-term opportunity to fish for and harvest burbot in the UCUSMA.

Lake Louise and Hudson Lake were also closed to burbot fishing at the 1991 Board meeting. Both lakes had been closed through emergency orders for the past several years and were expected to be closed through additional emergency orders into the future. A decision was therefore made to close these fisheries through regulation.

Following stock assessment in 1993, the burbot population in Hudson Lake had recovered sufficiently to open the lake to harvest. In the fall, of 1993 Hudson Lake was opened by emergency order, with a bag limit of two burbot. During the 1994 BOF meeting, the department submitted a proposal to reopen Hudson Lake to burbot through regulation. In addition, a proposal to allow limited use of unattended setlines in the Copper River was submitted jointly by ADF&G and the Copper Basin Advisory Committee. The Board of Fisheries approved both recommendations but they could not be implemented due to improper notification of the regulation proposal. The proposals were resubmitted and approved at the BOF meeting in December 1996.

Recent Fishery Performance

With the adoption of the more conservative regulations, harvests of burbot from UCUSMA waters decreased (Table 24). The harvest of 793 burbot during 1991 was the lowest on record. The reduction in harvest has allowed some of the previously overexploited burbot stocks in smaller lakes (e.g., Tolsona, Moose and Hudson lakes) and moderately sized lakes (e.g., Susitna and Paxson lakes) to recover to permit sustainable fisheries. For some lakes, however, these sustainable yields are substantially lower than maximum sustained yields the fisheries are capable of supporting. Larger lakes which were severely overexploited (e.g., Lake Louise) in the early to mid 1980s remain depressed. Stocks in larger lakes take longer to recover from overexploitation than do smaller and moderately-sized lakes. In Lake Louise, historically the largest burbot fishery in Alaska, the burbot stock remains low. The number of mature burbot in this lake, however, has leveled off at 4,000 in recent years (Taube et al. 2000). The current level of burbot abundance in this lake, although stable, remains less than the minimal abundance level of 7,000 established by managers to open the fishery. Once opened, only limited fishing will be allowed so that the stock can rebuild to permit a fishery capable of maximum sustained yield. Unfortunately, lack of recruitment into the Lake Louise burbot population continues to slow the recovery process.

Stock assessment on Tolsona Lake has continued on a yearly basis. Sampling in 1997 indicated a drastic decline in abundance between 1996 and 1997. This was attributed to environmental

conditions, summer kill in 1990 and 1991, and possibly in 1992, 1994, 1995, and not a result of overfishing. Closure of the fishery by emergency order occurred in early 1998 (Taube and Bernard 1999). Stock assessment will continue in Tolsona Lake and the fishery will reopen when the population rebuilds to 1,200 mature burbot. Based upon stock assessment in 1999 and 2000, the fishery will reopen in late winter 2001 (Taube and Bernard *In prep*).

The harvest of 1,861 burbot in 1999 was the highest since 1994. The 1999 harvest was above both the 10-year average and 5-year average harvest. Harvests from 2000 are expected to remain at current levels.

Management Objectives

Based on the lake burbot management plan (5 AAC 52.045), the burbot fisheries in lakes of the UCUSMA are to be managed for *maximum sustained yield and opportunity to participate*. In order to achieve this fishery objective, the plan gives the department the authority to use time and area closures *and* method and means restrictions to manage the area's burbot sport fisheries. Healthy stocks are managed to permit maximum sustained yield while depressed stocks are managed to allow the stocks to rebuild. Fishing is permitted on some depressed stocks, however exploitation levels allow the stocks to rebuild to permit a fishery capable of maximum sustained yield.

The management goal is to develop an orderly fishery. As these fisheries rebuild, it is hoped to provide between 10,000 to 15,000 angler days of ice fishing opportunity with a harvest of about 5,000 burbot on an annual basis in the UCUSMA.

Fishery Management

The majority of burbot fisheries in the UCUSMA are assessed through the SWHS. Several lakes of concern are sampled on a yearly or 3-year rotation. These lakes currently include Tolsona, Hudson, and Lake Louise. Assessment includes estimation of abundance, catch per unit effort (CPUE), and length composition. Tolsona Lake has been assessed annually since 1986, following the population decline in 1996 and 1997 the population is slowly rebuilding, but will remain closed by emergency order until historic population levels are attained. Lake Louise remains closed by regulation and assessment will be conducted in 2002, prior to the BOF meeting. The population at Lake Louise has maintained its current level of approximately 4,000 burbot since 1989. Dependent on assessment in 2001, the department may consider reopening Lake Louise to minimal harvest. It appears the population may not rebuild to historic levels, due to competition from the lake trout population (Taube et al. 2000). If this is true, a minimal harvest may be sustainable.

Fishery Outlook

Based upon current regulations the harvest of burbot in the UCUSMA should remain stable. Winter weather conditions can dictate ice-fishing effort in a given year; mild winter or late winter conditions can result in increased ice fishing effort. There is increasing snowmachine activity in the UCUSMA each year and undoubtedly some snowmachiners may include ice-fishing in their trips. This may account for the increasing burbot harvest in recent years.

Recent Board of Fisheries Actions

At the BOF meeting in December 1996 the two proposals that had been passed at the 1994 meeting, but nullified due to inadequate public notice, were resubmitted. The first established a personal use fishery for burbot in the mainstem Copper River. Under the authority of the personal use permit, burbot may be taken with unattended set lines from November 1 through

April 30. The daily bag and possession limit is five burbot. The department also has the authority to specify in the permit that the carcass be deposited in a collection container or the nearest department office with the harvest data. The second reopened Hudson Lake to burbot fishing with a bag and possession limit of two burbot.

The Copper River Personal Use Burbot Fishery adopted in 1996 during the BOF meeting has seen no participation since its inception. The lack of participation may be a result of limited access to the Copper River and unsafe ice conditions during the open season (November 1 – April 15). The BOF supported the department proposal at the 1999 BOF meeting to repeal the Personal Use fishery and allow a sport fishery that permits unattended setlines year round on the mainstem Copper River with a bag and possession limit of two burbot. The BOF also supported a second department proposal that reduced the bag and possession limit of burbot from five to two on Tolsona and Moose lakes. This proposal was a result of the recent population declines in Tolsona Lake.

Current Issues

Many anglers have been averse to what they perceive as rapid and drastic changes made to the burbot fisheries of the UCUSMA, and some remain convinced that the actions were unduly restrictive and unfair. This is particularly true with the action taken to eliminate *unattended* set lines from the burbot fisheries of the UCUSMA. Many anglers do not support this action and are choosing to not participate in this fishery because they cannot use this gear type. This reduces participation in fisheries capable of supporting effort and harvest. To promote participation, staff have encouraged anglers to shift to alternative gear types that are legal (attended set lines or tip ups); however, angler participation continues to remain low. The use of unattended setlines in the mainstem of the Copper River was legalized during 1996 but to this date no permits were issued during the three winters the personal use fishery was in effect. Historically, a few anglers using unattended setlines overharvested several UCUSMA burbot populations within a short time. Once overexploited, these fisheries need to be restricted or closed. Given life history characteristics of burbot, recovery of a depressed stock is slow, often taking many years to rebuild to a condition capable of sustaining a fishery. Creation of the lake burbot management plan gave managers the necessary tools to arrest a fishery that had overexploited a burbot stock. However, actions taken under this management plan promote reactive management where the department bears the burden of detecting overexploited stocks with costly assessment programs. This fragments the burbot fisheries of the UCUSMA and leads to regulations that can be confusing due to superseding emergency orders.

Ongoing and Recommended Research and Management

The burbot stock assessment program has resumed on a limited scale. A monitoring program has been proposed that will alternate between Lake Louise and Hudson Lake on a 3-year schedule. Catch-per-unit-effort will be estimated with baited hoop traps to monitor population trends. The Tolsona Lake population should continue to be sampled for abundance and length composition on a yearly basis, as well as for water quality. The lakes that were assessed during the mid to late 1980's should be revisited to determine if the populations have recovered to historic levels. If this has occurred, the potential of allowing minimal number of setlines should be visited to try to increase participation in the burbot fishery. Staff will continue to try to educate the angling public and seek their input to managing these important ice fisheries.

WILD RAINBOW AND STEELHEAD TROUT SPORT FISHERIES

Background and Historical Perspective

The UCUSMA is the northernmost extent of the natural range of rainbow and steelhead trout in North America. Given this, the area's widely distributed stocks of wild rainbow and steelhead trout stocks display generally low and variable production. To assure that these stocks are not overexploited, a conservative regulation package has been developed to manage the fisheries targeting these stocks. This package has been guided by the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*. This policy was adopted by the Board of Fisheries during 1986 and provides the department with:

1. management policies and implementation directives for Copper River basin rainbow and steelhead trout fisheries;
2. a systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for special management such as catch and release, trophy areas, or high yield fisheries; and
3. recommended research activities needed to meet these goals.

Under this policy, the entire Gulkana River drainage has been managed as a catch and release fishery for rainbow and steelhead trout since 1990. Managers believe that the abundance of rainbow/steelhead trout in this drainage is low and that the stocks are incapable of supporting any level of long-term sustainable harvest. Additional protection was provided in 1990 through the establishment of an unbaited, artificial lure only area in all flowing waters of the Gulkana River drainage upstream of an unnamed creek flowing into the Gulkana River 7.5 miles upstream of the confluence of the West Fork. During the 1996 BOF meeting the identified rainbow/steelhead trout spawning areas on the Middle Fork of the Gulkana River were closed to all sport fishing during the adult spawning and egg incubation period of April 15 through June 15. Also in 1996, the retention of rainbow or steelhead trout incidentally taken in the Copper River Personal Use Fishery was prohibited.

The policy has also guided the development of regulations for the Tebay River drainage. In Summit Lake and Bridge Creek in the Tebay drainage, special regulations were established in 1988 to provide anglers the opportunity to harvest a "trophy trout" in the UCUSMA. These regulations stated that rainbow/steelhead trout less than 32 inches in length could not be possessed or retained and the daily bag and possession limit for those over 32 inches was one. Research had once shown that these waters contained the largest nonanadromous rainbow trout in the Copper River drainage, with individual fish measuring over 32 inches in length and weighing up to 20 pounds. However, more recent research (Fleming 2000) reported that only 27% of all rainbow trout sampled (> 3,000 fish) were greater than 12 inches, with a maximum size of 18 in. These results indicate a drastic change in the size composition of this population. As a result, the "trophy trout" regulations were repealed by a department proposal which was adopted at the 1999 BOF meeting to change to a daily bag and possession limit of 10 per day, maximum size limit of 12 inches, and an open season of July 1 through May 31.

The waters of Lower Hanagita Lake and the Hanagita River from Lower Hanagita Lake to the Tebay River have been managed as a catch-and-release fishery since 1988. In all these waters, only unbaited, artificial lures have been permitted. This special regulation was adopted in 1988 to afford additional protection to these stocks. Research conducted by Fleming (1999), indicated

a smaller than previously thought spawning population. This resulted in a department proposal, which was adopted at the 1999 BOF meeting, to extend the catch and release only regulations to the entire Hanagita River drainage and the portion of the Tebay River drainage downstream of its confluence with the Hanagita River.

All other waters supporting wild rainbow/steelhead trout stocks are managed under a two fish daily and two fish possession limit of which only one fish may be over 20 inches. The season is year-round with the exception of the Middle Fork Gulkana River spawning closure of April 15 through June 15 and Bessie and Our creeks (tributaries to Moose Lake), which are closed from May 5 through June 15 to protect, spawning grayling. Under this regulation package, the harvest of wild rainbow and steelhead trout has been lowered.

Recent Fishery Performance

An estimated 563 wild rainbow trout were harvested in 1999, which was near the 1989-1998 average of 587 harvested (Table 26). The catch of wild rainbow for 1999 was estimated at 1,643, which is below the 1990-1998 average catch of 2,303 (Table 27). Eight steelhead trout were reported harvested in 1999 (Table 28), which is the first year since 1994 in which steelhead trout were reported harvested. Catch of steelhead in 1999 was nearly twice the average catch from 1990 to 1998 (Table 29). Historic trends in the area's wild rainbow/steelhead fishery are difficult to ascertain, as annual harvest and catch estimates have been small and have fluctuate substantially.

Management Objectives

The wild rainbow trout and steelhead populations are managed under the guidelines outlined in the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*.

Fishery Management

In 1998, the first directed assessment by the department of wild rainbow trout and steelhead trout was conducted on the Gulkana River (Fleming 1999). Length, age and genetic data were gathered from both rainbow trout and steelhead within the spawning area on the Middle Fork and mainstem Gulkana. In 1999, the Middle Fork spawning areas were sampled again and aerial surveys of the West Fork were conducted to locate other spawning areas (Fleming 2000). In addition, Fleming (2000) sampled Summit Lake in the Tebay drainage for abundance, age and length composition, and water quality. These studies were conducted to provide data regarding proposals submitted by the department for the 1999 BOF meeting. These proposals addressed several fishery regulations and offered replacement language so that the UCUSMA regulations regarding rainbow and steelhead trout would comply with the *Upper Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy*.

Fishery Outlook

With the passage of the department submitted proposals, it is anticipated that the harvests of rainbow and steelhead trout will remain stable or decline slightly from the historic average. These actions will protect existing stocks and allow those that may be depleted to recover and provide the opportunity to catch rainbow and steelhead trout.

Table 26.-Harvest of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^f | 1994-1998 ^f |
|---|--------------------------|--------------|--------------|------------|--------------|------------|--------------|------------|--------------|--------------|------------|------------|------------------------|------------------------|
| Gulkana River Drainage^a | | | | | | | | | | | | | | |
| Upper River | 1,387 ^b | 656 | 391 | 164 | 8 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 0 |
| Lower River | | 0 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Total | 1,387^b | 656 | 425 | 164 | 8 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 129 | 0 |
| Klutina River Drainage | 109 ^c | 56 | 17 | 96 | 63 | 108 | 8 | 37 | 0 | 12 | 8 | 0 | 41 | 13 |
| Tazlina Drainage | 62 ^c | 9 | 170 | 0 | 24 | 0 | 8 | 47 | 10 | 0 | 48 | 73 | 32 | 23 |
| Tonsina Drainage | 114 ^c | 38 | 17 | 14 | 103 | 40 | 87 | 28 | 26 | 0 | 8 | 24 | 36 | 30 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 33 ^c | 0 | 68 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Downstream of Klutina ^d | 32 ^c | 1,051 | 17 | 109 | 214 | 0 | 515 | 94 | 148 | 132 | 176 | 117 | 246 | 213 |
| Other Sites | 1,129 | 366 | 662 | 177 | 681 | 730 | 981 | 225 | 892 | 955 | 203 | 563 | 587 | 651 |
| Area Total | 3,080^c | 2,176 | 1,376 | 628 | 1,093 | 918 | 1,599 | 431 | 1,076 | 1,099 | 443 | 777 | 1,084 | 930 |

^a In 1991, the river was closed to the harvest of rainbow trout.

^b Includes average of entire drainage.

^c Includes 1983-1988 average harvest only. Prior to 1983, this harvest was included in the listing for “Other waters” in the SWHS report.

^d Not including Tonsina drainage.

^e Average of total annual harvest.

^f Average of total annual harvest for the years during the period.

Table 27.-Catch of wild rainbow trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 1999 and averaged for 1990 – 1998.

| Areas | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1990-1998 ^b |
|------------------------------------|--------------|--------------|--------------|--------------|---------------|--------------|---------------|---------------|---------------|---------------|------------------------|
| Gulkana River Drainage | | | | | | | | | | | |
| Upper River | 2,344 | 1,256 | 1,496 | 2,468 | 3,231 | 3,463 | 5,323 | 7,915 | 4,111 | 5,960 | 3,512 |
| Lower River | 51 | 14 | 166 | 305 | 149 | 495 | 1,371 | 199 | 1,317 | 1,743 | 452 |
| Total | 2,395 | 1,270 | 1,662 | 2,773 | 3,380 | 3,958 | 6,694 | 8,114 | 5,428 | 7,703 | 3,964 |
| Klutina River Drainage | | | | | | | | | | | |
| | 34 | 246 | 103 | 958 | 95 | 37 | 42 | 53 | 8 | 23 | 175 |
| Tazlina Drainage | | | | | | | | | | | |
| | 645 | 792 | 253 | 99 | 207 | 47 | 10 | 29 | 48 | 108 | 237 |
| Tonsina Drainage | | | | | | | | | | | |
| | 17 | 41 | 293 | 98 | 290 | 234 | 26 | 0 | 25 | 83 | 114 |
| Copper River | | | | | | | | | | | |
| Upstream of Gulkana | 509 | 342 | 0 | 79 | 161 | 0 | 0 | 0 | 0 | 23 | 121 |
| Downstream of Klutina ^a | 153 | 109 | 1,908 | 663 | 4,881 | 1,402 | 1,647 | 3,364 | 4,993 | 700 | 2,124 |
| Other Sites | | | | | | | | | | | |
| | 2,768 | 1,106 | 2,581 | 1,954 | 3,499 | 1,247 | 2,326 | 4,686 | 557 | 1,643 | 2,303 |
| Area Total | 6,521 | 3,906 | 6,800 | 6,624 | 12,513 | 6,925 | 10,745 | 16,246 | 11,059 | 10,283 | 9,038 |

^a Not including Tonsina drainage.

^b Average of total annual catch for the years during the period.

Table 28.-Harvest of steelhead trout by sport anglers fishing UCUSMA waters by drainage, averaged for 1977 – 1988 and annually from 1989 to 1999.

| Areas | 1977-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-1998 ^c | 1994-1998 ^c |
|---|-----------------------|-----------|-----------|------------|----------|----------|----------|-----------|----------|----------|----------|----------|------------------------|------------------------|
| Gulkana River Drainage^a | 29 | 47 | 34 | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 | 2 |
| Tazlina Drainage | 0 ^b | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 0 ^b | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream of Klutina | 0 ^b | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Sites | 54 | 37 | 0 | 114 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 8 | 16 | 1 |
| Area Total | 83^c | 84 | 34 | 114 | 8 | 0 | 7 | 10 | 0 | 0 | 0 | 8 | 26 | 3 |

^a In 1991, the river was closed to the harvest of steelhead trout.

^b Includes 1983-1988 average harvest only. Prior to 1983, this harvest was included in “Other waters” in the SWHS report.

^c Average of total annual harvest.

Table 29.-Catch of steelhead trout by sport anglers fishing UCUSMA waters by drainage, annually from 1990 to 1999 and averaged for 1990 – 1998.

| Areas | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1990-1998 ^a |
|-------------------------------|------------|------------|-----------|------------|------------|-----------|------------|------------|------------|------------|------------------------|
| Gulkana River Drainage | 68 | 26 | 39 | 102 | 0 | 51 | 121 | 126 | 109 | 256 | 71 |
| Tazlina Drainage | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Copper River | | | | | | | | | | | |
| Upstream of Gulkana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream of Klutina | 0 | 0 | 0 | 0 | 332 | 0 | 0 | 0 | 87 | 0 | 47 |
| Other Sites | 68 | 114 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 20 |
| Area Total | 136 | 140 | 39 | 102 | 332 | 51 | 121 | 126 | 196 | 264 | 138 |

^a Average of total annual catch.

Recent Board of Fisheries Actions

Several changes to the UCUSMA rainbow and steelhead trout regulations were approved at the December 1999 BOF meeting. A new regulation providing additional protection, permits the use of only unbaited, single hook, artificial lures in all flowing waters of the UCUSMA, with the exception of the Klutina River drainage and other drainages specifically listed in the regulations. The entire Hanagita River drainage and the portion of the Tebay River drainage downstream of its confluence with the Hanagita River became catch and release only for rainbow and steelhead trout. This change provided consistency in the drainage regulations and provided additional protection to the small steelhead spawning population in the Hanagita River. The final change applies to Summit Lake in the Tebay River drainage, where the bag and possession limit became 10 per day, with a maximum size limit of 12 in. This action is taken to re-establish large rainbow trout in Summit Lake.

Current Issues

Public concern over poor stock condition and no rainbow trout greater than 20 inches in the trophy fishery at Summit Lake has increased during recent years. Stock assessment in this system to determine if this is the case was conducted in 1999 and a proposal was passed at the 1999 BOF to allow a liberal harvest of small stunted rainbow trout to encourage growth of large fish. If this regulation, in itself, does not provide additional harvest, the department has examined alternative methods of fish removal to encourage larger size rainbow trout in the population.

Ongoing and Recommended Research and Management Activities

The existing assessment program should be continued, with direction towards estimating abundance of rainbow trout and steelhead in the Gulkana River. A follow up assessment at Summit Lake should be conducted to determine if the new regulations are effective in restoring the trophy fishery. A research plan should be developed for assessment of new areas of potential concern or creating and/or expanding existing databases on rainbow/steelhead trout populations in the UCUSMA. A steelhead trout distribution study could be conducted coincidentally with the current chinook salmon study to collect distribution data.

DOLLY VARDEN SPORT FISHERIES

Background and Historical Perspective

Dolly Varden is a popular sport fish species in the UCUSMA, particularly among local residents fishing in the Klutina and Tonsina river drainages. Populations, both resident and anadromous, are found throughout the upper Copper River drainage. Dolly Varden are not present in the Gulkana River drainage, no juvenile or adult fish have been captured during any of the department stock assessment projects on the river. A single report of a Dolly Varden caught through the ice in the lower river during the 1999/2000 winter, is the only documentation of any Dolly Varden in the Gulkana River. Dolly Varden occur upstream of the Gulkana River, in the Chitina River drainage, and in drainages downstream of the Gulkana River. There is no explanation as to why this species is not present in the Gulkana River. Based upon harvest and catch reports from the SWHS, a minor harvest occurs in the upper Susitna River drainage, though due to the barrier at Devils Canyon it is believed these are resident populations. There is limited knowledge regarding the Dolly Varden populations in the UCUSMA, there has been only one project directed towards this species. A University of Alaska – Fairbanks graduate study,

co-funded by ADF&G, BLM and the Alaska Cooperative Fishery Research Unit (ACFRU), was conducted on the Tielke and Little Tonsina rivers in 1985 and 1986 (Gregory 1988). This study documented the biological characteristics of Tielke River Dolly Varden and compared these to the characteristics of a sample of Little Tonsina River Dolly Varden.

There has been a directed sport fishery in the Klutina and Tonsina river drainages for Dolly Varden. These occur primarily in the Little Tonsina River and the upper Klutina River near the outlet of the lake, generally before the chinook salmon fishery begins in late June and after the chinook salmon fishery closes at the end of July. Harvests of Dolly Varden in the UCUSMA, since the inception of the SWHS in 1977, have ranged from 904 fish in 1978 to 6,001 in 1985. In 1985, 51% and 34% of the harvest occurred in the Klutina and Tonsina river drainages. The bag and possession limit for Dolly Varden has been at 10 per day and 10 in possession since at least the early 1970's. Creel surveys were conducted on the Klutina River in 1988 and 1989, but no data on Dolly Varden harvests were collected, as the creel surveys were directed at estimating chinook and sockeye harvests (Roth and Delaney 1989, Potterville and Webster 1990).

Recent Fishery Performance

Harvests of Dolly Varden prior to 1983 were not separated by individual systems in the SWHS. From 1983 to 1988, harvests averaged 4,687 fish, the Klutina and Tonsina rivers accounted for 50% and 21% of the harvest during this period, respectively (Table 30). From 1989 to 1998, harvests averaged 2,300 fish, the Klutina and Tonsina river harvests contributing 59% and 19% to the harvest total during this period. The harvest trends are declining, with the harvest of 1,092 in 1997, the lowest since 1978. The 1999 harvest of 2,390 was the highest since 1996.

Management Objectives

There are currently no specific management objectives for Dolly Varden. The underlying goal of the department, however, has been to assure sustained yield and provide fishing opportunity on fish resources.

Fishery Management

The Dolly Varden fisheries of the UCUSMA are assessed through the SWHS.

Fishery Outlook

With little biological or stock assessment data on the Dolly Varden stocks of the UCUSMA, it is uncertain whether the recent decline in harvests is a result of stock decline or reduced fishing effort. The SWHS does not distinguish effort between individual species, but in the Klutina River sport fisheries, it is assumed that most effort is directed at chinook salmon. The recent regulatory restrictions towards chinook salmon in the Tonsina River may have resulted in effort shifting towards other species, such as Dolly Varden or Arctic grayling. Without a creel survey to assess the proportion of effort directed at individual species, the current effort data denotes drainage or system trends only. If fishing effort in the UCUSMA as a whole increase, it is anticipated that Dolly Varden harvest will increase also.

Recent Board of Fisheries Action

As a result of biological concern regarding the Tonsina River chinook salmon stock in recent years the use of bait was restricted and only unbaited, single hook, artificial lures were permitted following the 1996 BOF meeting. At the March 1999 BOF meeting, the bait restriction was modified to allow bait to be used with a hook gap of 3/8 inch or less. This regulatory modification was made to permit fisheries for Dolly Varden and Arctic grayling in the Tonsina

River using traditional gear to harvest these species, while still reducing the harvest of chinook salmon.

Current Issues

There is a lack of biological and stock data for UCUSMA Dolly Varden populations. It is not known whether both resident and anadromous populations exist within individual systems. It is assumed, based upon the observed size of Dolly Varden harvested from the Klutina and Tonsina river drainages, that these fish are anadromous Dolly Varden. In addition, there is no data, aside from the SWHS, and auxiliary data from the CWT chinook salmon project and lake and stream evaluation data from the 1960’s and 1970’s, on distribution of Dolly Varden in the UCUSMA. Based upon harvest and catch data from the SWHS, there is a significant fishery for Dolly Varden in the UCUSMA and a need for data concerning these exploited stocks.

Ongoing and Recommended Research and Management

Since there is a lack of baseline data on Dolly Varden stocks, future research projects in the UCUSMA that may capture Dolly Varden should record biological data for incorporation into an area database. If creel surveys are conducted on the Klutina or Tonsina rivers for chinook or sockeye salmon, otoliths should be collected for microprobe analysis from any Dolly Varden that may be sampled. This will determine if the fish are anadromous or resident. Creel surveys will also provide data on fishing effort directed toward Dolly Varden.

UPPER COPPER / UPPER SUSITNA MANAGEMENT AREA SPORT FISHERY ENHANCEMENT

The Alaska Department of Fish and Game stocks about 30 lakes in the upper Copper River drainage and upper Susitna River drainage management area (UCUSMA) to provide fishing opportunities for popular game species in locations where fishing opportunities don’t exist or are limited. The lake stocking program will serve a segment of the public who want to fish but must remain on or near the road system. This program provides increased fishing opportunities and offers a diversity of species in urban and rural areas where minimal or no opportunities exist for sport fishing. It also diverts effort from wild populations in areas for which the department has conservation concerns. These lakes vary in size from 1.5 to 500 acres.

ADF&G stocks fingerling size fish (2-4 in) in some lakes and catchable size fish (6 to 12 in) in other lakes. Most large lakes can produce sufficient numbers of catchables from stockings of fingerling to meet angler demand. Smaller lakes or the more popular large lakes are stocked with catchables because stockings of fingerlings cannot provide sufficient numbers of catchables to meet angler demand. Catchables are stocked as soon as the ice is gone, helping to accommodate angler enthusiasm for spring fishing.

Daily bag and possession limits for stocked fish in lakes are:

| Species | Daily Bag and Possession Limit | Size Limit |
|-----------------|--------------------------------|-----------------------|
| Rainbow trout | 10 | Only 1 over 20 inches |
| Arctic grayling | 10 | No size limit |
| Silver salmon | 10 | Less than 16 inches |
| Arctic char | 10 | No size limit |

Objectives

1. Manage important native fish populations according to sustained yield principles.
2. Provide a minimum of 5,000 angler-days of sport fishing effort.
3. Provide sport angling opportunity and diversity by stocking a mix of game fish.
4. Publicize and promote the fishing opportunities available to anglers.
5. Improve public access where needed.

Actions

Fish stockings for specific lakes are listed in Table 31. Fish stockings for 1998 - 2000 are summarized in Table 32 and projected fish stockings for 2001 and 2002 are summarized in Table 33.

Evaluations

1. Sport fishing effort and harvest will be estimated through the SWHS.
2. Population status may be assessed by periodic on-site sampling or as a component of research projects.

Fishery Statistics

During 1990 - 1999, the total annual effort on stocked species ranged from 3,232 to 8,647 angler-days and averaged about 5,809 angler-days (Table 34). Five-year moving averages for number of anglers, effort, catch and harvest are shown in Figure 16. Since 1990, 64% of the catch and 76% of the harvest of stocked game fish was made up of rainbow trout. Arctic grayling and coho/chinook (silver/king) salmon contribute 33% and 3% to catch and 21% and 3% to harvest, respectively (Figure 17). Average annual effort per surface acre for stocked species is about 2.7 angler-days. The average catch rate (catch / effort) for stocked fish in the UCUSMA is about 2.9 fish per angler-day of effort (Table 35). The annual cost of producing and stocking fish (stocking cost) has ranged from about \$8,222 to \$84,051 while the annual cost-per-day of fishing (cost / effort) has ranged from \$1.95 to \$13.31 (Table 35).

Of all the stocked lakes in the UCUSMA, Silver Lake is the most popular. Since 1990, it accounted for about 33% of the anglers and effort generated on stocked waters. It also accounted for 42% of the catch and 35% of the harvest of all stocked fish.

Table 30.-Harvest of Dolly Varden by sport anglers fishing UCUSMA waters by drainage, averaged for 1983 – 1988 and annually from 1989 to 1999.

| Areas | 1983-88 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 1989-98 ^b | 1994-98 ^b |
|------------------------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|----------------------|
| Klutina River Drainage | 2,365 | 2,402 | 2,156 | 1,448 | 1,294 | 1,818 | 1,250 | 712 | 838 | 549 | 1,092 | 1,818 | 1,356 | 888 |
| Tazlina Drainage | 151 | 188 | 476 | 0 | 57 | 26 | 11 | 44 | 0 | 0 | 16 | 22 | 82 | 14 |
| Tonsina Drainage | 988 | 1,023 | 459 | 179 | 630 | 689 | 216 | 500 | 462 | 107 | 98 | 363 | 436 | 277 |
| Copper River | | | | | | | | | | | | | | |
| Upstream of Gulkana | 223 | 38 | 0 | 26 | 0 | 106 | 56 | 66 | 1,043 | 135 | 0 | 32 | 147 | 260 |
| Downstream of Klutina ^a | 179 | 272 | 34 | 397 | 8 | 18 | 9 | 59 | 73 | 44 | 33 | 45 | 95 | 44 |
| Other Sites | 782 | 56 | 34 | 90 | 8 | 516 | 56 | 314 | 159 | 257 | 350 | 110 | 184 | 227 |
| Area Total | 4,687^b | 3,979 | 3,159 | 2,140 | 1,997 | 3,173 | 1,598 | 1,695 | 2,575 | 1,092 | 1,589 | 2,390 | 2,300 | 1,710 |

^a Not including Tonsina drainage.

^b Average of total annual harvest for the years during the period.

Table 31.-Actions for remote stocked lakes in the UCUSMA.

| Area (Access)Lake | Lake Size in Acres | Species | Stocking Years |
|---------------------------|--------------------|-------------------|----------------------|
| Glenn Highway | | | |
| Arizona Lake | 25 | Grayling | Alternate |
| Buffalo Lake | 4 | Rainbow | Annual |
| DJ Lake | 4 | Rainbow | Alternate |
| Gergie Lake | 60 | Rainbow | Alternate |
| Little Junction Lake | 5 | Grayling | Alternate |
| Ryan Lake | 45 | Rainbow | Annual |
| Tex Smith Lake | 15 | Rainbow | Annual |
| Tolsona Lake | 500 | Rainbow | Annual |
| Richardson Highway | | | |
| Dick Lake | 40 | Char, Grayling | Alternate, Alternate |
| Meiers Lake | 100 | Grayling | Annual |
| Squirrel Creek Pit | 5 | Grayling, Rainbow | Annual, Annual |
| Lake Louise Road | | | |
| Caribou Lake | 13 | Grayling | Alternate |
| Connor Lake | 18 | Grayling | Alternate |
| Crater Lake | 16 | Rainbow | Alternate |
| Elbow Lake | 6 | Grayling | Alternate |
| Forgotten Lake | 18 | Grayling | Alternate |
| Junction Lake | 18 | Grayling | Alternate |
| Little Crater Lake | 2 | Rainbow | Alternate |
| Old Road Lake | 1.5 | Rainbow | Annual |
| Peanut Lake | 12 | Rainbow | Alternate |
| Round Lake | 2 | Rainbow | Annual |
| Edgerton Highway | | | |
| Three Mile Lake | 20 | Rainbow | Alternate |
| Two Mile Lake | 17 | Rainbow | Alternate |
| McCarthy Road | | | |
| Sculpin Lake | 190 | Rainbow | Annual |
| Silver Lake | 500 | Rainbow | Annual |
| Strelna Lake | 290 | Coho, Rainbow | Annual, Alternate |
| Van Lake | | Rainbow | Alternate |
| Remote Lakes | | | |
| North Jans Lake | 58 | Rainbow | Alternate |
| South Jans Lake | 100 | Coho, Rainbow | Annual, Alternate |
| Tolsona Mt. Lake | 75 | Rainbow | Alternate |

Table 32.-Summary of stocking activities for stocked lakes in the UCUSMA 1998-2000.

| Species | Catchable | Subcatchable | Fingerling | Total |
|-----------------|-----------|--------------|------------|---------|
| 1998 | | | | |
| Arctic Char | 1,000 | | | 1,000 |
| Rainbow Trout | 9,050 | 14,947 | | 23,997 |
| Coho Salmon | | 34,907 | | 34,907 |
| Total | 10,050 | 49,854 | | 59,904 |
| 1999 | | | | |
| Arctic Grayling | 512 | | | 512 |
| Rainbow Trout | 3,618 | 208,139 | 7,682 | 219,439 |
| Coho Salmon | | 53,428 | | 53,428 |
| Total | 4,130 | 261,567 | 7,682 | 273,379 |
| 2000 | | | | |
| Arctic Char | 1,521 | | | 1,521 |
| Arctic Grayling | 7,562 | | | 7,562 |
| Rainbow Trout | 7,179 | | | 7,179 |
| Coho Salmon | | 35,938 | | 35,938 |
| Total | 16,262 | 35,938 | | 52,200 |

Table 33.-Summary of projected game fish stockings for small remote lakes in the UCUSMA, 2001-2002.

| Number of Lakes 2000/2001 | Species | Lifestage | Target Size (in) | 2001 Projected | 2002 Projected |
|------------------------------|---------------|--------------|---------------------|-------------------|-------------------|
| 0/1 | Arctic Char | Catchable | 100g | 0 | 2,000 |
| 0/2 | Coho Salmon | Fingerling | 4g | 0 | 54,000 |
| 2/10 | Grayling | Catchable | 100g | 4,800 | 7,850 |
| 11/11 | Rainbow Trout | Catchable | 100g | 7,000 | 7,000 |
| 11/0 | Rainbow Trout | Fingerling | 2g | 171,000 | 0 |
| 0/2 | Salmon Hybrid | Subcatchable | 40g | 0 | 3,600 |

Table 34.-Effort, harvest, and catch statistics by species for small remote lakes in the UCUSMA 1990-1999.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Effort | | | | | | | | | | |
| Number of Anglers ^a | 3,078 | 3,716 | 5,758 | 3,956 | 4,053 | 3,893 | 3,290 | 2,395 | 3,006 | 2,184 |
| Number of Days Fished (effort) | 3,751 | 5,035 | 8,647 | 6,161 | 7,945 | 8,122 | 6,316 | 3,232 | 4,216 | 4,666 |
| Catch | | | | | | | | | | |
| Rainbow trout | 6,810 | 10,772 | 21,910 | 17,418 | 14,814 | 11,058 | 8,043 | 8,144 | 11,781 | 5,529 |
| Coho salmon | 51 | 389 | 670 | 56 | 550 | 109 | 611 | 607 | 1,593 | 333 |
| Lake trout | 5,502 | 2,136 | 5,764 | 6,735 | 9,182 | 8,569 | 6,394 | 6,444 | 3,260 | 6,254 |
| Total | 12,363 | 13,297 | 28,344 | 24,209 | 24,546 | 19,736 | 15,048 | 15,195 | 16,634 | 12,116 |
| Harvest | | | | | | | | | | |
| Rainbow trout | 2,700 | 6,308 | 8,723 | 6,795 | 5,109 | 4,355 | 3,947 | 2,512 | 4,942 | 3,370 |
| Coho salmon | 17 | 111 | 433 | 56 | 134 | 42 | 225 | 315 | 412 | 249 |
| Lake trout | 1,393 | 794 | 1,969 | 1,186 | 2,324 | 1,429 | 971 | 1,405 | 489 | 1,521 |
| Total | 4,110 | 7,213 | 11,125 | 8,037 | 7,567 | 5,826 | 5,143 | 4,232 | 5,843 | 5,140 |

^a Estimates of the numbers of anglers in this table are inflated because some anglers fish at more than one location. As a result, they are counted more than once.

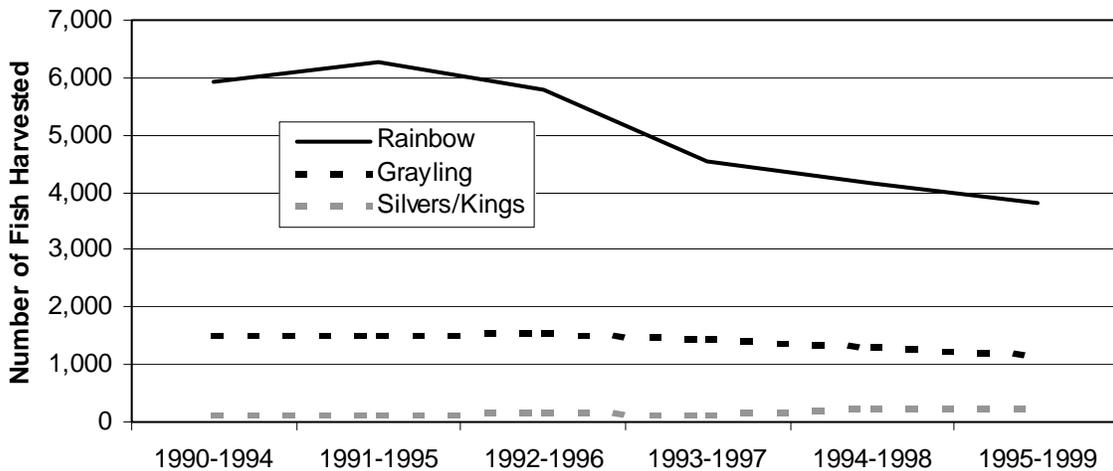
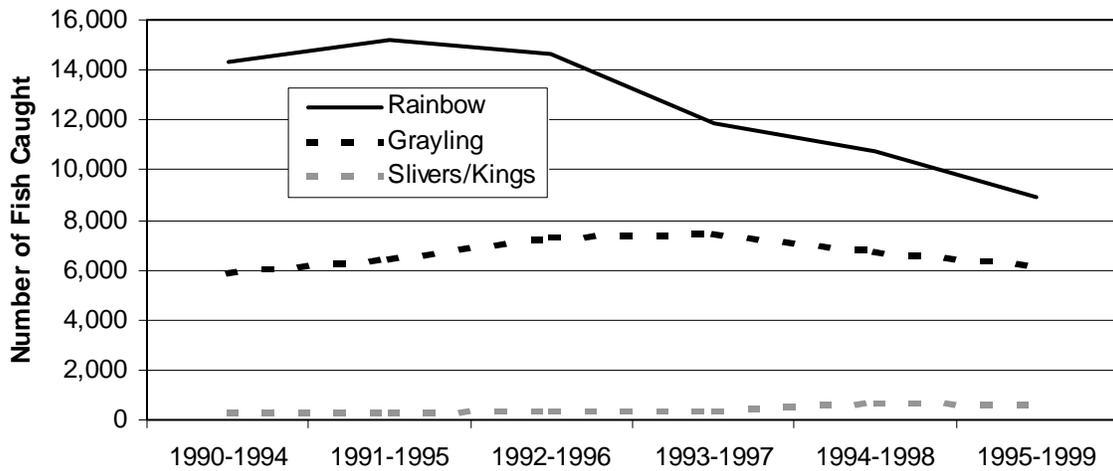
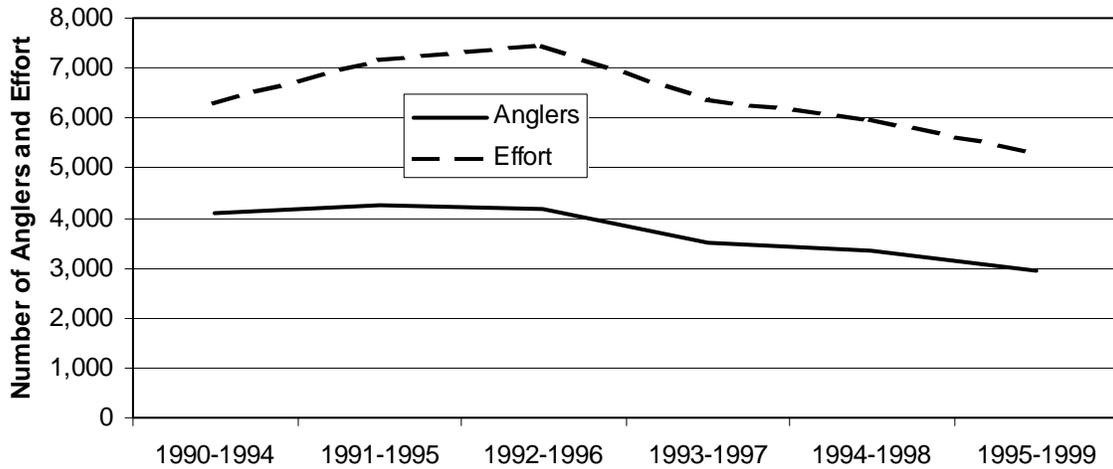
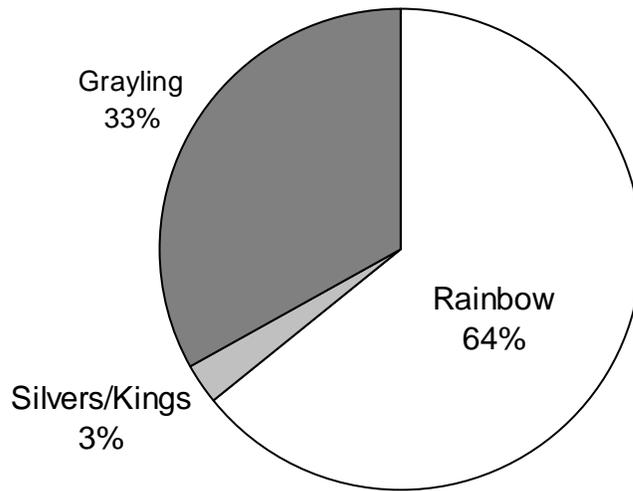


Figure 16.-Five-year moving averages for fishing effort (angler-days) and number of fish caught and harvested from stocked lakes in the UCUSMA 1990-1999.

Catch



Harvest

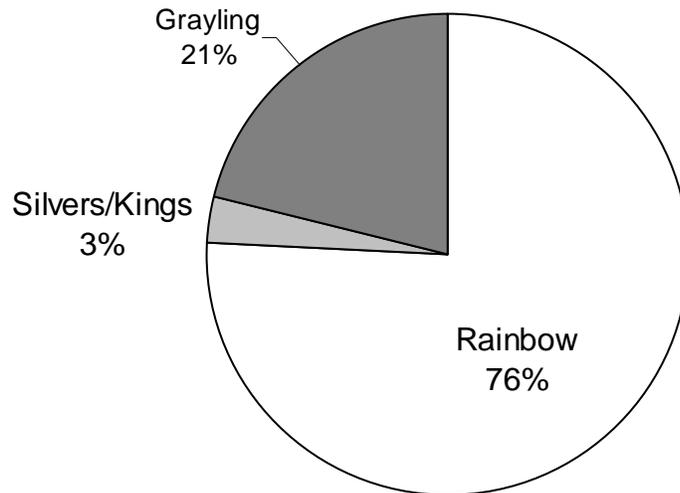


Figure 17.-Catch and harvest composition by species for stocked lakes in the UCUSMA.

Table 35.-Summary of fishery statistics for stocked lakes in the UCUSMA 1990-1999.

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-----------------------------|--------|--------|--------|--------|--------|----------|----------|----------|---------|----------|
| Days fished (effort) | 3,751 | 5,035 | 8,647 | 6,161 | 7,945 | 8,122 | 6,316 | 3,232 | 4,216 | 4,666 |
| Catch | 12,363 | 13,297 | 28,344 | 24,209 | 24,546 | 19,736 | 15,048 | 15,195 | 16,634 | 12,116 |
| Harvest | 4,110 | 7,213 | 11,125 | 8,037 | 7,567 | 5,826 | 5,143 | 4,232 | 5,843 | 5,140 |
| Catch rate (catch / effort) | 3.3 | 2.6 | 3.3 | 3.9 | 3.1 | 2.4 | 2.4 | 4.7 | 3.9 | 2.6 |
| Stocking cost | | | | | | \$43,871 | \$84,051 | \$27,185 | \$8,222 | \$17,305 |
| Cost-per-day of fishing | | | | | | \$5.40 | \$13.31 | \$8.41 | \$1.95 | \$3.71 |
| Cost-per-fish caught | | | | | | \$2.22 | \$5.59 | \$1.79 | \$0.49 | \$1.43 |
| Cost-per-fish harvested | | | | | | \$7.53 | \$16.34 | \$6.42 | \$1.41 | \$3.37 |

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APPENDIX A

Appendix A.-Listing of the addresses and contact numbers for information sources regarding UCUSMA information.

| Organization | Address | Phone | Internet address |
|--|---|----------------|--|
| Alaska Department of Fish and Game - Glennallen Area office | PO Box 47 Glennallen, AK 99588-0047 | (907) 822-3309 | www.state.ak.us/local/akpages/FISH.GAME |
| - Fairbanks Regional office | 1300 College Road Fairbanks, AK 99701-1599 | (907) 459-7207 | |
| U.S. Bureau of Land Management | PO Box 147 Glennallen, AK 99588-0147 | (907) 822-3217 | www.glennallen.ak.blm.gov |
| Wrangell-St. Elias National Park & Preserve | PO Box 439 Copper Center, AK 99573 | (907) 822-5234 | www.nps.gov/wrst |
| Ahtna, Inc | PO Box 649 Glennallen, AK 99588-0649 | (907) 822-3476 | |
| Chitina Native Corporation | PO Box 3 Chitina, AK 99566 | (907) 823-2223 | |
| Greater Copper Valley Chamber of Commerce | PO Box 469 Glennallen, AK 99588-0469 | (907) 822-5555 | www.traveltoalaska.com |