

AK LEGISLATURE SPECIAL COMMITTEE FILES SCOMM 156 3343

(d) The principles and criteria for sustainable salmon fisheries shall be applied, by the department and the board using the best available information, as follows:

(1) at regular meetings of the board, the department will, to the extent practicable, provide the board with reports on the status of salmon stocks and salmon fisheries under consideration for regulatory changes, which should include

- (A) a stock-by-stock assessment of the extent to which the management of salmon stocks and fisheries is consistent with the principles and criteria contained in the policy under this section;
- (B) descriptions of habitat status and any habitat concerns;
- (C) identification of healthy salmon stocks and sustainable salmon fisheries;
- (D) identification of any existing salmon escapement goals, or management actions needed to achieve these goals, that may have allocative consequences such as the
 - (i) identification of a new fishery or expanding fishery;
 - (ii) identification of any salmon stocks, or populations within stocks, that present a concern related to yield, management, or conservation; and
 - (iii) description of management and research options to address salmon stock or habitat concerns;

(2) in response to the department's salmon stock status reports, reports from other resource agencies, and public input, the board will review the management plan, or consider developing a management plan, for each affected salmon fishery or stock; management plans will be based on the principles and criteria contained in this policy and will

- (A) contain goals and measurable and implementable objectives that are reviewed on a regular basis and utilize the best available scientific information;
- (B) minimize the adverse effects on salmon habitat caused by fishing;
- (C) protect, restore, and promote the long-term health and sustainability of the salmon fishery and habitat;
- (D) prevent overfishing; and
- (E) provide conservation and management measures that are necessary and appropriate to promote maximum or optimum sustained yield of the fishery resource;

(3) in the course of review of the salmon stock status reports and management plans described in (1) and (2) of this subsection, the board, in consultation with the department, will determine if any new fisheries or expanding fisheries stock yield concerns, stock management concerns, or stock conservation concerns exist; if so, the board will, as appropriate, amend or develop salmon fishery management plans to address these concerns; the extent of regulatory action, if any, should be commensurate with the level of concerns and range from milder to stronger as concerns range from new and expanding salmon fisheries through yield concerns, management concerns, and conservation concerns;

(4) in association with the appropriate management plan, the department and the board will, as appropriate, collaborate in the development and periodic review of an action plan for any new or expanding salmon fisheries, or stocks of concern; action plans should contain goals, measurable and implementable objectives, and provisions, including

- (A) measures required to restore and protect salmon habitat, including necessary coordination with other agencies and organizations;
- (B) identification of salmon stock or population rebuilding goals and objectives;
- (C) fishery management actions needed to achieve rebuilding goals and objectives, in proportion to each fishery's use of, and hazards posed to, a salmon stock;
- (D) descriptions of new or expanding salmon fisheries, management concern, yield concern, or conservation concern; and
- (E) performance measures appropriate for monitoring and gauging the effectiveness of the action plan that are derived from the principles and criteria contained in this policy;

(5) each action plan will include a research plan as necessary to provide information to address concerns; research needs and priorities will be evaluated periodically, based on the effectiveness of the monitoring described in (4) of this subsection;

(6) where actions needed to regulate human activities that affect salmon and salmon's habitat that are outside the authority of the department or the board, the department or board shall correspond with the relevant authority including the governor, relevant boards and commissions, commissioners, and chairs of appropriate legislative committees, to describe the issue and recommend appropriate action.

(e) Nothing in the policy under this section is intended to expand, reduce, or be inconsistent with, the statutory regulatory authority of the board, the department, or other state agencies with regulatory authority that impacts the fishery resources of the state.

(f) In this section, and in implementing this policy,

(1) "allocation" means the granting of specific harvest privileges, usually by regulation, among or between various user groups; "allocation" includes quotas, time periods, area restrictions, percentage sharing of stocks, and other management measures providing or limiting harvest opportunity;

(2) "allocation criteria" means the factors set out in AS 16.05.251 (e) considered by the board as appropriate to particular allocation decisions under 5 AAC 39.205, 5 AAC 75.017, and 5 AAC 77.007;

(3) "biological escapement goal" or "(BEG)" means the escapement that provides the greatest potential for maximum sustained yield; BEG will be the primary management objective for the escapement unless an optimal escapement or inriver run goal has been adopted; BEG will be developed from the best available biological information, and should be scientifically defensible on the basis of available biological information; BEG will be determined by the department and will be expressed as a range based on factors such as salmon stock productivity and data uncertainty; the department will seek to maintain evenly distributed salmon escapements within the bounds of a BEG;

(4) "burden of conservation" means the restrictions imposed by the board or department upon various users in order to achieve escapement, rebuild, or in some other way conserve a specific salmon stock or group of stocks; this burden, in the absence of a salmon fishery management plan, will be generally applied to users in close proportion to the users' respective harvest of the salmon stock;

(5) "chronic inability" means the continuing or anticipated inability to meet escapement thresholds over a four to five year period, which is approximately the generation time of most salmon species;

(6) "conservation concern" means concern arising from a chronic inability, despite the use of specific management measures, to maintain escapements for a stock above a sustained escapement threshold (SET); a conservation concern is more severe than a management concern;

(7) "depleted salmon stock" means a salmon stock for which there is a conservation concern;

(8) "diversity", in a biological context, means the range of variation exhibited within any level of organization, such as among genotypes within a salmon population, among populations within a salmon stock, among salmon stocks within a species, among salmon species within a community, or among communities within an ecosystem;

(9) "enhanced salmon stock" means a stock of salmon that is undergoing specific manipulation, such as hatchery augmentation or lake fertilization, to enhance its productivity above the level that would naturally occur; "enhanced salmon stock" includes an introduced stock, where no wild salmon stock had occurred before, or a wild salmon stock undergoing manipulation, but does not include a salmon stock undergoing rehabilitation, which is intended to restore a salmon stock's productivity to a higher natural level;

(10) "escapement" means the annual estimated size of the spawning salmon stock; quality of the escapement may be determined not only by numbers of spawners, but also by factors such as sex ratio, age composition, temporal entry into the system, and spatial distribution within the salmon spawning habitat;

(11) "expanding fishery" means a salmon fishery in which effective harvesting effort has recently increased significantly beyond historical levels and where the increase has not resulted from natural fluctuations in salmon abundance;

(12) "expected yields" mean levels at or near the lower range of recent historic harvests if they are deemed sustainable;

(13) "genetic" means those characteristics (genotypic) of an individual or group of salmon that are expressed genetically, such as allele frequencies or other genetic markers;

(14) "habitat concern" means the degradation of salmon habitat that results in, or can be anticipated to result in, impacts leading to yield, management, or conservation concerns;

(15) "harvestable surplus" means the number of salmon from a stock's annual run that is surplus to escapement needs and can reasonably be made available for harvest;

(16) "healthy salmon stock" means a stock of salmon that has annual runs typically of a size to meet escapement goals and a potential harvestable surplus to support optimum or maximum sustained yield;

(17) "incidental harvest" means the harvest of fish, or other species, that is captured in addition to the target species of a fishery;

- (18) "incidental mortality" means the mortality imposed on a salmon stock outside of directed fishing, and mortality caused by incidental harvests, interaction with fishing gear, habitat degradation, and other human-related activities;
- (19) "inriver run goal" means a specific management objective for salmon stocks that are subject to harvest upstream of the point where escapement is estimated; the inriver run goal will be set in regulation by the board and is comprised of the SEG, BEG, or OEG, plus specific allocations to inriver fisheries;
- (20) "introduced stock" means a stock of salmon that has been introduced to an area, or portion of an area, where that stock had not previously occurred; an "introduced salmon stock" includes a salmon stock undergoing continued enhancement, or a salmon stock that is left to sustain itself with no additional manipulation;
- (21) "management concern" means a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the SEG, BEG, OEG, or other specified management objectives for the fishery; a management concern is not as severe as a conservation concern;
- (22) "maximum sustained yield" or "(MSY)" means the greatest average annual yield from a salmon stock; in practice, MSY is achieved when a level of escapement is maintained within a specific range on an annual basis, regardless of annual run strength; the achievement of MSY requires a high degree of management precision and scientific information regarding the relationship between salmon escapement and subsequent return; the concept of MSY should be interpreted in a broad ecosystem context to take into account species interactions, environmental changes, an array of ecosystem goods and services, and scientific uncertainty;
- (23) "mixed stock fishery" means a fishery that harvests fish from a mixture of stocks;
- (24) "new fishery" means a fishery that new units of effort or expansion of existing effort toward new species, areas, or time periods, results in harvest patterns substantially different from those in previous years, and the difference is not exclusively the result of natural fluctuations in fish abundance;
- (25) "optimal escapement goal" or "(OEG)" means a specific management objective for salmon escapement that considers biological and allocative factors and may differ from the SEG or BEG; an OEG will be sustainable and may be expressed as a range with the lower bound above the level of SET, and will be adopted as a regulation by the board; the department will seek to maintain evenly distributed escapements within the bounds of the OEG;
- (26) "optimum sustained yield" or "(OSY)" means an average annual yield from a salmon stock considered to be optimal in achieving a specific management objective other than maximum yield, such as achievement of a consistent level of sustained yield, protection of a less abundant or less productive salmon stock or species, enhancement of catch per unit effort in sport fishery, facilitation of a non-consumptive use, facilitation of a subsistence use, or achievement of a specific allocation;
- (27) "overfishing" means a level of fishing on a salmon stock that results in a conservation or management concern;
- (28) "phenotypic characteristics" means those characteristics of an individual or group of salmon that are expressed physically, such as body size and length at age;
- (29) "rehabilitation" means efforts applied to a salmon stock to restore it to an otherwise natural level of productivity; "rehabilitation" does not include an enhancement, which is intended to augment production above otherwise natural levels;
- (30) "return" means the total number of salmon in a stock from a single brood (spawning) year surviving to adulthood; because the ages of adult salmon (except pink salmon) returning to spawn varies, the total return from a brood year will occur over several calendar years; the total return generally includes those mature salmon from a single brood year that are harvested in fisheries plus those that compose the salmon stock's spawning escapement; "return" does not include a run, which is the number of mature salmon in a stock during a single calendar year;
- (31) "run" means the total number of salmon in a stock surviving to adulthood and returning to the vicinity of the natal stream in any calendar year, composed of both the harvest of adult salmon plus the escapement; the annual run in any calendar year, except for pink salmon, is composed of several age classes of mature fish from the stock, derived from the spawning of a number of previous brood years;
- (32) "salmon" means the five wild anadromous semelparous Pacific salmon species *Oncorhynchus* sp., except steelhead and cutthroat trout, native to Alaska as follows:
- (A) chinook or king salmon (*O. tshawytscha*);
 - (B) sockeye or red salmon (*O. nerka*);
 - (C) coho or silver salmon (*O. kisutch*);
 - (D) pink or humpback salmon (*O. gorbuscha*); and

(E) chum or dog salmon (*O. keta*);

(33) "salmon population" means a locally interbreeding group of salmon that is distinguished by a distinct combination of genetic, phenotypic, life history, and habitat characteristics, comprised of an entire stock or a component portion of a stock; the smallest uniquely identifiable spawning aggregation of genetically similar salmon used for monitoring purposes;

(34) "salmon stock" means a locally interbreeding group of salmon that is distinguished by a distinct combination of genetic, phenotypic, life history, and habitat characteristics or an aggregation of two or more interbreeding groups which occur within the same geographic area and is managed as a unit;

(35) "stock of concern" means a stock of salmon for which there is a yield, management, or conservation concern;

(36) "sustainable escapement goal" or "(SEG)" means a level of escapement, indicated by an index or an escapement estimate, that is known to provide for sustained yield over a 5 to 10 year period, used in situations where a BEG cannot be estimated due to the absence of a stock specific catch estimate; the SEG is the primary management objective for the escapement, unless an optimal escapement or inriver run goal has been adopted by the board, and will be developed from the best available biological information; the SEG will be determined by the department and will be stated as a range that takes into account data uncertainty; the department will seek to maintain escapements within the bounds of the SEG;

(37) "sustainable salmon fishery" means a salmon fishery that persists and obtains yields on a continuing basis; characterized by fishing activities and habitat alteration, if any, that do not cause or lead to undesirable changes in biological productivity, biological diversity, or ecosystem structure and function, from one human generation to the next;

(38) "sustained yield" means an average annual yield that results from a level of salmon escapement that can be maintained on a continuing basis; a wide range of average annual yield levels is sustainable; a wide range of annual escapement levels can produce sustained yields;

(39) "sustained escapement threshold" or "(SET)" means a threshold level of escapement, below which the ability of the salmon stock to sustain itself is jeopardized; in practice, SET can be estimated based on lower ranges of historical escapement levels, for which the salmon stock has consistently demonstrated the ability to sustain itself; the SET is lower than the lower bound of the BEG and lower than the lower bound of the SEG; the SET is established by the department in consultation with the board, as needed, for salmon stocks of management or conservation concern;

(40) "target species" or "target salmon stocks" means the main, or several major, salmon species of interest toward which a fishery directs its harvest;

(41) "yield" means the number or weight of salmon harvested in a particular year or season from a stock;

(42) "yield concern" means a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs; a yield concern is less severe than a management concern, which is less severe than a conservation concern;

(43) "wild salmon stock" means a stock of salmon that originates in a specific location under natural conditions; "wild salmon stock" may include an enhanced or rehabilitated stock if its productivity is augmented by supplemental means, such as lake fertilization or rehabilitative stocking; "wild salmon stock" does not include an introduced stock, except that some introduced salmon stocks may come to be considered "wild" if the stock is self-sustaining for a long period of time;

(44) "action point" means a threshold value for some quantitative indicator of stock run strength at which an explicit management action will be taken to achieve an optimal escapement goal.

History: Eff. 9/30/2000, Register 155; am 11/16/2000, Register 156; am 6/22/2001, Register 158

Authority: AS 16.05.251

5 AAC 39.223. Policy for statewide salmon escapement goals

- (a) The Department of Fish and Game (department) and the Board of Fisheries (board) are charged with the duty to conserve and develop Alaska's salmon fisheries on the sustained yield principle. Therefore, the establishment of salmon escapement goals is the responsibility of both the board and the department working collaboratively. The purpose of this policy is to establish the concepts, criteria, and procedures for establishing and modifying salmon escapement goals and to establish a process that facilitates public review of allocative issues associated with escapement goals.
- (b) The board recognizes the department's responsibility to
- (1) document existing salmon escapement goals for all salmon stocks that are currently managed for an escapement goal;
 - (2) establish biological escapement goals (BEG) for salmon stocks for which the department can reliably enumerate salmon escapement levels, as well as total annual returns;
 - (3) establish sustainable escapement goals (SEG) for salmon stocks for which the department can reliably estimate escapement levels when there is not sufficient information to enumerate total annual returns and the range of escapements that are used to develop a BEG;
 - (4) establish sustained escapement thresholds (SET) as provided in 5 AAC 39.222 (Policy for the Management of Sustainable Salmon Fisheries);
 - (5) establish escapement goals for aggregates of individual spawning populations with similar productivity and vulnerability to fisheries and for salmon stocks managed as units;
 - (6) review an existing, or propose a new, BEG, SEG and SET on a schedule that conforms, to the extent practicable, to the board's regular cycle of consideration of area regulatory proposals;
 - (7) prepare a scientific analysis with supporting data whenever a new BEG, SEG, or SET, or a modification to an existing BEG, SEG, or SET is proposed and, in its discretion, to conduct independent peer reviews of its BEG, SEG, and SET analyses;
 - (8) notify the public whenever a new BEG, SEG, or SET is established or an existing BEG, SEG, or SET is modified;
 - (9) whenever allocative impacts arise from any management actions necessary to achieve a new or modified BEG, SEG or SET, report to the board on a schedule that conforms, to the extent practicable, to the board's regular cycle of consideration of area regulatory proposals so that it can address allocation issues.
- (c) In recognition of its joint responsibilities, and in consultation with the department, the board will
- (1) take regulatory actions as may be necessary to address allocation issues arising from implementation of a new or modified BEG, SEG, and SET;
 - (2) during its regulatory process, review a BEG, SEG, or SET determined by the department and, with the assistance of the department, determine the appropriateness of establishing an optimal escapement goal (OEG); the board will provide an explanation of the reasons for establishing an OEG and provide, to the extent practicable, and with the assistance of the department, an estimate of expected differences in yield of any salmon stock, relative to maximum sustained yield, resulting from implementation of an OEG.
- (d) Unless the context requires otherwise, the terms used in this section have the same meaning given those terms in 5 AAC 39.222(f).

History: Eff. 6/22/2001, Register 158

Authority: AS 16.05.251

ALASKA DEPARTMENT OF FISH & GAME STATUS AND ACTION PLAN, 2008

INTRODUCTION

SYNOPSIS

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (SSFP, 5 AAC 39.222), the Alaska Board of Fisheries identified the Susitna River sockeye salmon stock as a stock of yield concern. The Board's decision was based on the most recent commercial harvest for the Central Susitna River sockeye salmon fishery, 20-year averages for the Central Susitna River sockeye salmon fishery, and the identification of yield concern based on the definition of yield concern arising from a chronic inability to maintain expected yields or harvestable surpluses above a management concern, which is less severe than a yield concern (5 AAC 39.222 (f)). The policy defines escapement thresholds over a time of most salmon species. This report describes the existing department's ability to conserve sockeye salmon in the Susitna River, and the department's ability to accurately estimate the sockeye salmon stock in the Susitna River. The report also provides information on the productivity and sustainability of the Susitna River sockeye salmon fishery, and the Board of Fisheries meeting.



SUSITNA SOCKEYE SALMON ACTION PLAN

STOCK ASSESSMENT

Since 1981 the Yentna River daily sockeye salmon escapement into the Susitna River has been thought to be the best estimate of the total Susitna River sockeye salmon escapement based on a variety of estimates passing Sunshine (1982-1985), passing Yentna (1981-1985; Yentna River trip 110; Westerman and Willette 2006). Based on Bendix sonar estimates since 1981 from approximately 37,000 to 181,000 sockeye salmon escapement into the Yentna River has ranged from approximately 90,000 to 180,000 for 2 of the past 8 years. Although sockeye salmon escapement is uncertainly surrounding their accuracy, various methods of escapement assessment

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SUSITNA RIVER SOCKEYE SALMON STOCK STATUS AND ACTION PLAN, 2008

INTRODUCTION

SYNOPSIS

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (SSFP; 5 AAC 39.222), the Alaska Board of Fisheries has identified the Susitna River sockeye salmon stock as a stock of yield concern. For this determination, the estimated Susitna River commercial harvest for the most recent 5-year average was compared to the previous 10- and 20-year averages for the Central District drift and Northern District fisheries. Identification of Susitna River sockeye salmon as a stock of yield concern is based on the definition of "yield concern" contained in SSFP. A "yield concern" is defined as "a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs; a yield concern is less severe than a management concern, which is less severe than a conservation concern" [5 AAC 39.222 (f) (42)]. The policy defines "chronic inability" as "the continuing or anticipated inability to meet escapement thresholds over a four to five year period, which is approximately the generation time of most salmon species" [5 AAC 39.222 (f) (5)].

This report describes the existing management plans and Emergency Order authority that the department follows to conserve Susitna River sockeye salmon. In light of increased uncertainty of the department's ability to accurately assess escapements of sockeye salmon into the Susitna River, a research plan has been developed to improve the department's ability to assess sockeye salmon stocks within the drainage. With these ongoing studies, the department will have better information on the productivity and sustainability of the stock at the 2011 Upper Cook Inlet Board of Fisheries meeting.

STOCK ASSESSMENT

Since 1981 the Yentna River daily sonar estimates have been used as an indicator of sockeye salmon escapement into the Susitna River drainage. The sockeye salmon escapement in the Yentna River has been thought to be approximately one half of the total Susitna River sockeye salmon escapement based on a combination of 1981-1985 capture-recapture abundance estimates passing Sunshine (1982-1985; Susitna River rkm 116), and sonar abundance estimates passing Yentna (1981-1985; Yentna River rkm 7) and Susitna Station (1981; Susitna River rkm 116; Westerman and Willette 2006).

Based on Bendix sonar estimates since 1981, the number of Yentna River spawners has ranged from approximately 37,000 to 181,000 sockeye salmon. The sonar estimate of sockeye salmon escapement into the Yentna River has not met the current SEG range of 90,000 to 160,000 for 5 of the past 8 years.

Although sockeye salmon escapements are estimated via a Bendix sonar system, there is great uncertainty surrounding their accuracy and precision. The high variability observed between various methods of escapement assessment (i.e., ongoing Bendix estimates compared with recent

estimates from capture-recapture and DIDSON sonar projects; Yanusz et al. 2007) has added to the uncertainty regarding our previous assessments.

In the Central District drift gillnet fishery, the estimated commercial harvest of Susitna River sockeye salmon for the most recent 5-year average (2003–2007) is 59% of the previous 10-year (1993–2002) average and 49% of the previous 20-year (1983–2002) average. In the Northern District, the most recent 5-year average is 31% of the previous 10-year average and 22% of the previous 20-year average. Since the total Upper Cook Inlet (UCI) commercial harvest averages 2.9 million sockeye salmon and the age composition allocation model estimate of the Susitna sockeye salmon harvest is only 8.4% of the total, the department has low confidence in the accuracy of our estimate of the Susitna sockeye salmon harvest.

ESCAPEMENT GOAL HISTORY

An escapement goal of 200,000 sockeye salmon was established for the Susitna River in 1979. It was set using a return-per-spawner value of 4, and an assumption that the Susitna River could produce about 800,000 adult sockeye salmon. A review of the goal in 1989 based on euphotic volume of rearing lakes suggested the existing goal was valid. In 1986, the sonar site at Susitna Station was destroyed by a flood, and no alternative hydroacoustic site could be found on the mainstem of the Susitna. Therefore, hydroacoustic estimates from a Yentna River site were used to assess total Susitna River escapement. Based on comparisons of estimates for the Yentna and the Susitna Rivers over 5 years, 1981–1985, it was decided that an escapement of 100,000 to 150,000 sockeye salmon into the Yentna River should result in a total escapement of at least 200,000 sockeye salmon into the entire Susitna drainage (Fried 1994). This was based on the average proportion of the total Susitna River escapement, which entered the Yentna River (49%) during the 5 years studied, as well as the range of annual proportions (41–59%) for these 5 years.

In 2001, the biological escapement goal for the Yentna River was changed to a sustainable escapement goal of 90,000–160,000 sockeye salmon based on Yentna sonar data from 1981–2000, because reliable estimates of total return to the system were not available (Bue and Hasbrouck *Unpublished*). Escapement goal reviews since 2001 have resulted in no change recommended to this goal type or range (Hasbrouck and Edmundson 2007, Fair et al. 2007). In 2005, an optimal escapement goal of 75,000–180,000 Yentna River sockeye salmon was adopted by the Alaska Board of Fisheries contingent on the sockeye salmon run to the Kenai River being projected to exceed 4 million.

ACTION PLAN FOR ADDRESSING STOCK OF CONCERN

MANAGEMENT ACTIONS IN COMMERCIAL FISHERIES

Northern District Set Gillnet

In light of recent department data revealing concerns about the validity of Yentna River sockeye salmon enumeration data, it is the intent of the Board that Susitna River sockeye salmon stocks will be conservatively managed while the Department continues its studies in this drainage. Until the UCI BOF finfish meeting in 2011, Susitna River sockeye salmon will be managed as follows:

(1) From the beginning of the regular commercial salmon fishing season, which occurs on or after June 25, through July 19, the Northern District set gillnet fishery will fish no more than two regular 12-hour Monday and Thursday fishing periods per week.

(2) From July 20 through August 6, the Northern District set gillnet fishery will fish regular 12-hour Monday and Thursday fishing periods, but will be limited to no more than one 35-fathom set gillnet per permit. If it is determined by the Department that the Yentna River sockeye salmon [SEG or OEG] will be achieved during this time frame, the Department may increase the allowable fishing gear from one 35-fathom set gillnet per permit to two 35-fathom set gillnets per permit or the full complement of three set gillnets that are not more than 105 fathoms in aggregate length per permit.

(3) On the first regular fishing period after August 6, and thereafter, the Northern District set gillnet fishery will again return to a full complement of fishing gear of three set gillnets that are not more than 105 fathoms in aggregate length per permit, unless restricted or closed by emergency order.

Central District Drift Gillnet

The Central District drift gillnet fishery will be managed to conserve Susitna drainage sockeye salmon.

In the Central District drift gillnet fishery, there are two time periods in July where area restrictions are implemented by management plan to conserve northern bound salmon stocks. First, from July 9-15 the department must restrict the drift gillnet fishing fleet for two regular fishing periods to Area 1 (Figure 1) of the Central District (section A below), which is that area south of the south end of Kalgin Island, and to the Kenai and Kasilof Sections (the corridor).

From July 16-31 there are two regular period area restrictions to the drift gillnet fleet that are dependent upon the size of the Kenai River sockeye salmon run. For Kenai River sockeye salmon runs less than 2 million, the department must restrict the drift fleet to Area 1 (and the Kenai and Kasilof Sections); for runs of 2 million to 4 million, the drift fleet is restricted to Area 1 and Area 2 (and the Kenai and Kasilof Sections); and for runs greater than 4 million there are no mandatory restrictions. These restrictions apply to any two regular periods during this time frame.

The purpose of the July 9-15 restrictions are to allow for the passage of northern-bound sockeye salmon, while the July 16-31 restrictions are primarily for northern-bound sockeye and coho salmon.

MANAGEMENT ACTIONS IN SPORT FISHERIES

The sockeye salmon sport fishery in the Susitna River drainage will be prosecuted with a bag limit of 3 fish. If the Northern District set gillnet fishery is closed to conserve sockeye salmon, the Susitna River drainage sport fisheries will remain open unless the board directs otherwise. The Susitna River sport harvest is not used to determine spawning escapement or in the development of escapement goals.

RESEARCH PLAN

The department currently assesses Yentna River sockeye salmon escapement and commercial and sport harvests annually. The following research projects include current and proposed projects used to gather detailed information about sockeye salmon stocks in the Susitna River.

CURRENT SUSITNA RIVER DRAINAGE SOCKEYE SALMON RESEARCH PROJECTS

YENTNA RIVER SALMON ESCAPEMENT

Objectives: The primary objectives of this project are to estimate (1) the daily and cumulative escapement of sockeye salmon into the Yentna River, and (2) the age, length, and sex composition of those escapements.

Description: Fish passage into the Yentna River is estimated using side-looking (formerly referred to as side-scanning) Bendix sonar. Fish caught and sampled at companion fish wheels are used to apportion sonar counts to estimate species composition of fish passage (i.e., estimate abundance of sockeye salmon) and the age, length, and sex composition of the inriver sockeye salmon run.

COMPARING BENDIX AND DIDSON SONAR PASSAGE ESTIMATES IN THE YENTNA RIVER

Objective: The primary objective of this project is to compare the Bendix sonar estimates of migrating salmon in the Yentna River with estimates from a Dual frequency Identification SONar (DIDSON).

Description: A DIDSON sonar is placed on both banks of the Yentna River to collect fish passage data independent of the existing Bendix sonar. Both types of sonar equipment are operated at the same time and ensonify the same/similar area of the river so that the passage data is directly comparable.

INRIVER ABUNDANCE AND SPAWNER DISTRIBUTION OF SUSITNA RIVER SOCKEYE SALMON

Objectives: The primary objectives of this study are to (1) estimate the inriver abundance of adult sockeye salmon migrating into the Susitna River with a capture-recapture experiment, and (2) identify sockeye salmon spawning areas in the Susitna River.

Description: In 2006-2008, a capture-recapture experiment is conducted to estimate sockeye salmon abundance in the entire Susitna River. Radio telemetry is used to estimate the spawning distribution throughout the watershed.

EVALUATION OF SOCKEYE SALMON PRODUCTION FROM LAKES IN THE SUSITNA RIVER WATERSHED

Objectives: The primary objectives of this study are to (1) evaluate limnological conditions in seven lakes considered important (major) to sockeye salmon production and compare current conditions to those observed in the 1980s and 1990s, (2) estimate the abundance and mean body size of juvenile sockeye salmon and other juvenile fishes rearing in each lake in the fall, (3) estimate the age composition of the juvenile sockeye salmon in each lake, and (4) evaluate the survival from potential egg deposition to fall fry and from fall fry to smolt.

Description: Estimates of smolt and fall fry abundance, and limnological characteristics such as water chemistry and zooplankton abundance by species are collected (Chelatna, Shell, Byers, Swan, Larson, Stephan, and Judd lakes). Analyses focus on determining carrying capacity of the lakes for sockeye salmon fry and assessing the adequacy of spawning escapements over time.

BIOLOGICAL COMPOSITION OF COMMERCIAL SOCKEYE SALMON HARVEST IN UPPER COOK INLET

Objective: The primary objective of this project is to estimate the age and sex composition of the commercial salmon harvest.

Description: Sockeye salmon harvested in various commercial fisheries in UCI are sampled using a stratified systematic sampling design. Area strata are determined *a priori* using established fishery districts and subdistricts. Temporal stratification is determined post season based on catch patterns in each fishery and the number of samples collected.

STOCK COMPOSITION OF THE UPPER COOK INLET SOCKEYE SALMON COMMERCIAL HARVEST

Objectives: The primary objectives of this study are to (1) estimate the stock composition of sockeye salmon harvested in major commercial fisheries in spatial/time strata, and (2) compare stock composition among substrata (i.e., fish processors for the drift gillnet fishery and beaches within each management subdistrict for the set gillnet fishery).

Description: This project uses new single nucleotide polymorphism (SNPs) genetic stock identification (GSI) methods to estimate stock-specific composition of the commercial harvest in UCI.

PROPOSED SUSITNA RIVER DRAINAGE SOCKEYE SALMON RESEARCH PROJECTS

A recent review of Division of Commercial Fisheries and Sport Fish Division programs in the Susitna River drainage identified the need for improved escapement, smolt, and habitat information for sockeye salmon. The following research programs are planned to gather further detailed information about sockeye salmon stocks in the Susitna River drainage:

SUSITNA RIVER SOCKEYE SALMON MAJOR SYSTEM ADULT WEIRS

Objective: The primary objective of this project is to estimate the abundance of sockeye salmon spawners entering 7 major rearing lakes in the Susitna River watershed.

Description: Adult weirs will be collaboratively operated by the Department and the Cook Inlet Aquaculture Association (CIAA) on 7 major sockeye salmon rearing lakes (Chelatna, Shell, Byers, Swan, Larson, Stephan, and Judd lakes) in the Susitna River watershed to estimate spawner abundance. The age, sex, and length composition of the adult sockeye salmon escapement will be estimated at each weir. Environmental conditions will be recorded daily (i.e., percent cloud cover, precipitation, and stream and air temperature). Sockeye salmon spawner abundance estimates will be used to (1) evaluate the accuracy of sockeye salmon passage estimates from the Yentna River sonar project, (2) help set escapement goals, and (3) estimate freshwater production of sockeye salmon in the watershed (in conjunction with smolt production project described below).

SUSITNA RIVER SOCKEYE SALMON ADDITIONAL SYSTEM ADULT WEIRS

Objective: The primary objective of this project is to estimate the abundance of sockeye salmon spawners entering 7 additional rearing lakes in the Susitna River watershed.

Description: Adult weirs will be collaboratively operated by the Department and CIAA on 7 additional sockeye salmon rearing lakes (Whiskey, Hewitt, Lockwood, Trapper, Red Shirt, Spink, and Trinity lakes) in the Susitna River watershed to estimate spawner abundance. The age, sex, and length composition of the adult sockeye salmon escapement will be estimated at each weir. Environmental conditions will be recorded daily (i.e., percent cloud cover, precipitation, and stream and air temperature). Sockeye salmon spawner abundance estimates will be used to (1) evaluate the accuracy of sockeye salmon passage estimates from the Yentna River sonar project, (2) help set escapement goals, and (3) estimate freshwater production of sockeye salmon in the watershed (in conjunction with smolt production project described below).

SUSITNA RIVER SOCKEYE SALMON MAJOR SYSTEM SMOLT PRODUCTION

Objective: The primary objective of this project is to estimate the abundance of sockeye salmon smolt emigrating from 7 major rearing lakes in the Susitna River watershed.

Description: The abundance of sockeye salmon smolt emigrating from 7 major sockeye salmon rearing lakes (Chelatna, Shell, Byers, Swan, Larson, Stephan, and Judd lakes) in the Susitna River watershed will be collaboratively estimated by the Department and CIAA. Fyke nets will be operated from late May through June at 6 of the lakes to provide a total smolt enumeration. At the remaining lake (Chelatna Lake), three inclined-plane traps will be operated from late May through August, and smolt population size will be estimated using standard mark-recapture techniques. Age, weight and length of smolts will be estimated from samples collected daily at each site. Smolt abundance estimates will be used to (1) forecast adult returns, and (2) estimate freshwater production of sockeye salmon in the watershed (in conjunction with adult escapement estimates).

SUSITNA RIVER SOCKEYE SALMON ADDITIONAL SYSTEM SMOLT PRODUCTION

Objective: The primary objective of this project is to estimate the abundance of sockeye salmon smolt emigrating from 7 additional rearing lakes in the Susitna River watershed.

Description: The abundance of sockeye salmon smolt emigrating from 7 additional sockeye salmon rearing lakes (Whiskey, Hewitt, Lockwood, Trapper, Red Shirt, Spink, and Trinity lakes) in the Susitna River watershed will be collaboratively estimated by the Department and CIAA. Fyke nets will be operated from late May through June at all of these lakes to provide a total smolt enumeration. Age, weight and length of smolts will be estimated from samples collected daily at each site. Smolt abundance estimates will be used to (1) forecast adult returns, and (2) estimate freshwater production of sockeye salmon in the watershed (in conjunction with adult escapement estimates).

SUSITNA RIVER FISH PASSAGE RESTORATION

Objective: The primary objective of this project is to restore and improve salmonid access to upstream spawning and rearing habitats in the lower Susitna River.

Description: Upstream access to historically occupied salmonid habitats will be evaluated in the lower Susitna River to facilitate removal of culvert barriers or other in-stream obstructions. As many as 10 upstream fish passage barriers will be identified, prioritized according to cost-benefit

analyses of fishery values and project costs, and upstream access improved and restored. During construction and after the fish passage restoration projects have been completed, an established monitoring protocol will be used to track individual restoration project performance.

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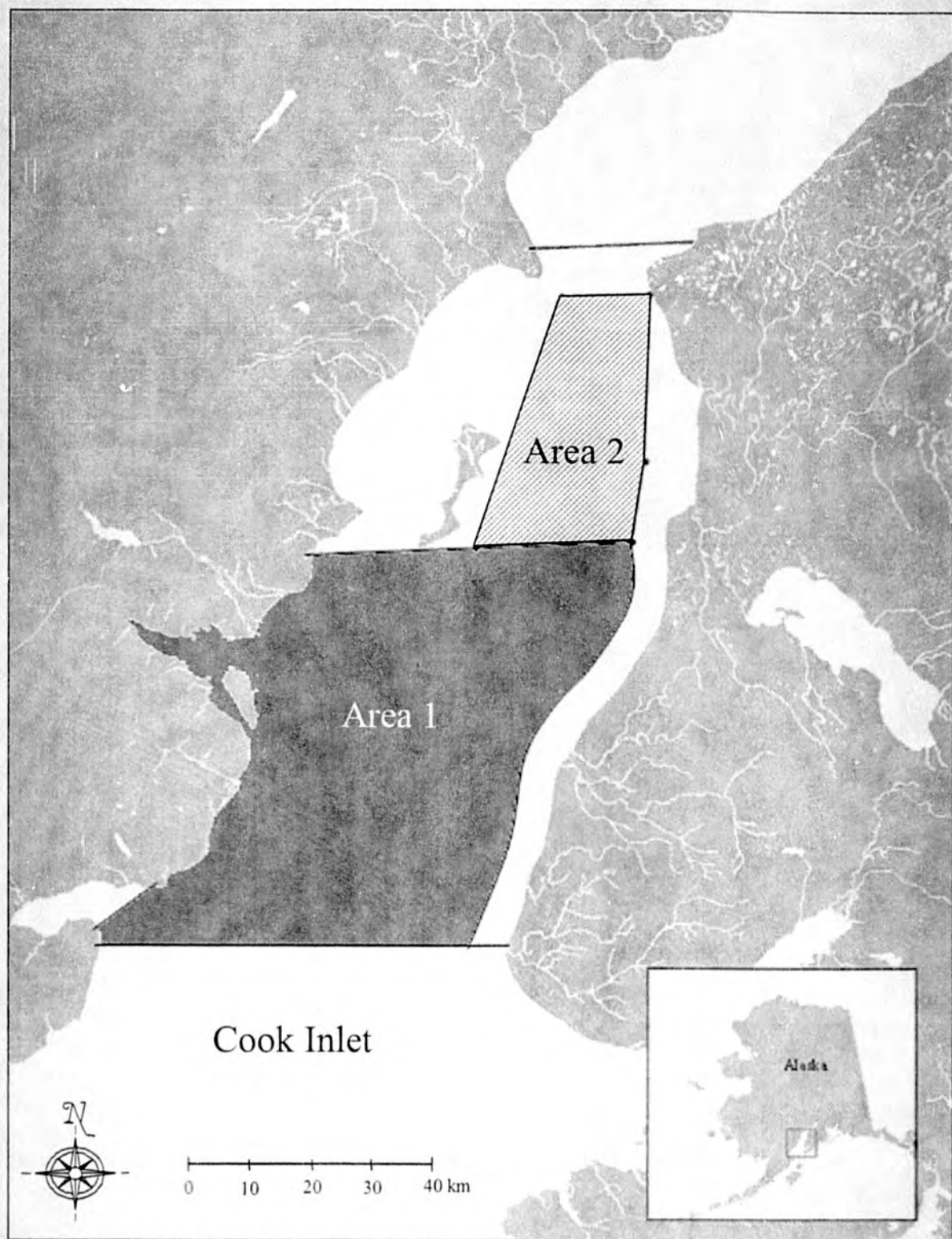


Figure 1.—Map of Central Cook Inlet showing management fishing boundaries for Area 1 and Area 2 for drift gillnet fisheries.

Kvichak River Sockeye Salmon Stock Status and Action Plan, 2006; a Report to the Alaska Board of Fisheries

by

Steve Morstad

and

Timothy T. Baker

November 2006

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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KVICHAK RIVER SOCKEYE SALMON STOCK STATUS AND ACTION PLAN, 2006; A REPORT TO THE ALASKA BOARD OF FISHERIES

by

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KVICHAK RIVER SOCKEYE SALMON STOCK STATUS AND ACTION
PLAN, 2006; A REPORT TO THE ALASKA BOARD OF FISHERIES

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ABSTRACT

In response to the guidelines established in the *Sustainable Salmon Fisheries Policy* (ADF&G 2000), the Alaska Department of Fish and Game (ADF&G) first classified the Kvichak River sockeye salmon *Oncorhynchus nerka* stock as a "Stock of Yield Concern" in 2001 (Bristol Bay Staff 2000). The classification of Kvichak River sockeye salmon was subsequently changed to a "Stock of Management Concern" in 2003. This classification change was based on the definition of "management concern" found in the policy. A "management concern" is defined as, "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for salmon stocks within the bounds of Sustainable Escapement Goal (SEG), Biological Escapement Goal (BEG), Optimal Escapement Goal (OEG), or other specified management objectives for the fishery." The increased protection provided by commercial, sport, and subsistence fisheries restrictions and closures that have occurred in recent years appears to be helping the Kvichak River sockeye salmon stock recover: there was a surplus harvest of Kvichak River sockeye salmon in the commercial fishery in 2006; minimum escapement goals were met in 2005 and 2006; recruits per spawner have improved in recent years; and the Kvichak River sockeye salmon stock exploitation rates have been significantly reduced in recent years. Even with these recent improvements, there is still need for concern. The sockeye salmon escapements to the Kvichak River have fallen below the lower end of the current escapement goal during 7 of the past 11 years, including 5 of the past 7 years. Therefore, it is recommended that the Kvichak River sockeye salmon stock remain classified as a "Stock of Management Concern." ADF&G would like to see the continued improvement of the Kvichak River sockeye salmon stock before demoting to a lower classification.

Key words: Kvichak River, sockeye salmon, *Oncorhynchus nerka*, stock of concern, commercial, fishing, ADF&G, sustainable salmon fisheries policy, Alaska Board of Fisheries, Bristol Bay, Alaska.

INTRODUCTION

The *Sustainable Salmon Fisheries Policy* (SSFP; 5 AAC 39.222) directs the Alaska Department of Fish and Game (ADF&G) to provide the Alaska Board of Fisheries (BOF), at regular meetings, with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation. In the Bristol Bay Management Area one stock (Kvichak River sockeye salmon, *Oncorhynchus nerka*) has been identified (Figures 1 and 2). This report provides ADF&G's assessment of this candidate stock of concern and recommendation that Kvichak River sockeye salmon remain a stock of management concern.

KVICHAK RIVER SOCKEYE SALMON

Stock Assessment

Previously the Kvichak River sockeye salmon stock, on average, was the largest contributor to the Bristol Bay salmon harvest. The Kvichak stock has historically had a 5-year cycle with individual years labeled as: peak, pre-peak and off-cycle years. Since 1955, the number of Kvichak River spawners has ranged from 227,000 to 24 million sockeye salmon (Table 1). The largest recorded total run was 48 million in 1965, a peak cycle year (Table 1). ADF&G has operated a counting tower to enumerate salmon escapements on the Kvichak River since 1955. Additionally, each spring from 1975 to 2003, the number of migrating smolt were estimated using hydroacoustics. In conjunction, age, length, and weight information was obtained from smolt sampled with fyke nets (Crawford and Fair 2003); this also began in 1975 and is ongoing.

The current Biological Escapement Goal (BEG) for Kvichak River sockeye salmon, adopted in 1997, is 2 million to 6 million for off-cycle years and 6 million to 10 million for pre-peak and peak years (Fair 2000). Setting a BEG for the Kvichak River sockeye salmon run has proven difficult because of divergence in productivity between cycle years and off-cycle years, poor density dependence in spawner-recruit data, and a lack of fit for Ricker type spawner-recruit

curves. In addition to the goal, an exploitation rate of 50% was set on runs of 4–20 million to provide guidance in setting goals within the range. The management objective for a given off-cycle year would then be defined as 50% of the total inshore Kvichak River run, and would never be less than 2 million or greater than 10 million. The management objective for a given pre-peak or peak cycle year would then be defined as 50% of the total inshore Kvichak River run, and would never be less than 6 million or greater than 10 million. Beginning in 1996, escapements were frequently less than the lower goal with 7 of the past 11 years below the goal (Figure 3).

Commercial harvests have also declined in recent years from a combined average of approximately 5.7 million (1966 to 1995) to an average of approximately 1.4 million (1996 to 2005; Figure 4). Moreover, commercial fishing was restricted in the Naknek-Kvichak District at some point each year since 1996, forcing the fishery into the Naknek River Special Harvest Area. In recent years, as directed in *Kvichak River Sockeye Salmon Management Plan* (5 AAC 67.025), sport fishing restrictions have routinely been imposed when escapements were projected to be less than 2 million fish. Restrictions have generally taken the form of bag limit reductions and area closures designed to minimize potential conflicts with subsistence users. Prior to enacting the current management plan, the poor return in 2000 resulted in a closure of the sockeye salmon sport fishery in the entire Kvichak drainage.

Prior to commercial fishing, area residents harvested Bristol Bay salmon for subsistence uses. The BOF determination of the amount reasonably necessary for subsistence uses is described in 5 AAC 01.336 as 157,000–172,171 salmon in the Bristol Bay area, “including 55,000 to 65,000 Kvichak River sockeye salmon; this finding does not include salmon stocks in the Alagnak River.” In the Naknek-Kvichak District, sockeye subsistence harvest averaged about 92,000 from 1985–1994 and 72,000 from 1995–2004. Annual subsistence harvest of Kvichak River sockeye salmon averaged 60,000 fish from 1985 to 2004 (Westing et al. 2006) with recent harvests ranging from 33,000 to 53,000 (2000–2005).

In April 2006 an interdivisional salmon escapement goal review team, including staff from the Divisions of Commercial Fisheries and Sport Fish, was formed to comprehensively review the existing salmon escapement goals in the Bristol Bay Management Area based on the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222) and the *Policy for Statewide Salmon Escapement Goals* (5 AAC 39.223). While this review is ongoing, fisheries data analyses indicate that the current Kvichak River sockeye salmon escapement goal will be changed from a BEG to a Sustainable Escapement Goal (SEG), but otherwise remain unchanged. Results of this escapement goal review will be presented at the December 2006 BOF meeting.

Commercial Fisheries Management

The Bristol Bay commercial fishery is managed using several measures of inseason run strength so that spawning escapement goals are met by distributing the escapement through time based on the historical run timing schedule. Commercial fishing periods are opened based on both spawning escapement and harvest indicators. Commercial fishing in Bristol Bay is not opened by emergency order until indicators suggest a harvestable surplus of sockeye salmon is available.

Daily and cumulative inseason escapement estimates, based on visual counts from towers, are compared to expected counts derived from historical averages of counts and run timing. This gives managers the ability to determine whether a run is smaller, the same, or larger than

expected. Unfortunately, sockeye salmon often require several days to travel from fishing districts to the counting towers. Therefore, inriver test fishing projects have been established to estimate the number of sockeye salmon that have left the fishing district but have not yet reached the counting tower (West and Fair 2006). This allows managers to provide adequate fishing opportunity to harvest surplus production while still achieving spawning escapement goals.

Commercial harvest information is used in a similar fashion to spawning escapement information. The actual daily and cumulative number of sockeye salmon harvested is compared to expected numbers derived from pre- and inseason projections to provide information on run size. Additionally, ADF&G conducts district test fishing during closed fishing periods to gauge the relative abundance and distribution of sockeye salmon within areas that may be open to harvest.

Previous Alaska Board of Fisheries Actions

The Kvichak River sockeye salmon stock was found to be a "Stock of Yield Concern" during the January 2001 Alaska Board of Fisheries meeting. In response to the "Stock of Yield Concern" designation, the BOF modified 5AAC 06.357 *Ugashik River Sockeye Salmon Special Harvest Area Management Plan*, 5AAC 06.359 *Egegik River Sockeye Salmon Special Harvest Area Management Plan*, 5AAC 06.360 *Naknek River Sockeye Salmon Special Harvest Area Management Plan*, and 5AAC 67.025 *Kvichak River Drainage Sockeye Salmon Management Plan* to provide additional protection for Kvichak River sockeye salmon. Bristol Bay fisheries were managed in accordance with these plans with no directed commercial fishing and a reduced sport fishery for Kvichak River sockeye salmon.

During the 2003 December Bristol Bay BOF meeting, several regulation changes were adopted concerning the Naknek/Kvichak District. The Kvichak sockeye salmon stock was elevated from a Stock of Yield Concern to a Stock of Management Concern due to the recent chronic inability to meet escapement goals. A Stock of Management Concern is defined (5 AAC 39.222) as "a concern arising from a chronic inability, despite use of specific management measures, to maintain escapements for a salmon stock within the bounds of the SEG, BEG, Optimal Escapement Goal (OEG), or other specified management objectives for the fishery."

With this 2003 action came the stipulation that if the Kvichak River run is forecasted to be less than 30% above the minimum BEG, fishing will begin in the Special Harvest Areas of Naknek, Egegik and Ugashik Rivers (5 AAC 06.360 (h)).

Regulatory History

Kvichak River sockeye salmon have been utilized for subsistence for centuries. This system's main producer is sockeye salmon and its importance is increased due to the system's inclusion of the villages of Levelock, Igiugig, Pedro Bay, Kokhanok, Iliamna/Newhalen, Nondalton, and Port Alsworth.

Permits are required to harvest salmon for subsistence purposes in the Kvichak River drainage. Since 1990, under state regulations, all state of Alaska residents have been eligible to participate in subsistence salmon fishing in all Bristol Bay drainages. Gillnets up to 25 fathoms are the only recognized legal subsistence gear.

The commercial fishery is closed between June 1 and September 30, but it can be opened by emergency order. There are three management plans addressing commercial fishing within the Naknek-Kvichak District. The first is referred to as the *Commercial Set and Drift Gillnet Sockeye*

Salmon Fisheries Management and Allocation Plan (SAAC 06.355; ADF&G 2001). This plan specifies the allocation of sockeye salmon between commercial set and drift gillnet fisheries within the district and establishes management measures to achieve allocation. Part of this plan (SAAC 06.364 (e); ADF&G 2001) attempts to provide adequate Kvichak River sockeye salmon spawning escapement by managing, to the extent practicable, a fishery in the Naknek Section with limited set and drift gillnet gear fishing during ebb tides.

The second plan is referred to as the *Naknek River Sockeye Salmon Special Harvest Area Management Plan* (SAAC 06.360; ADF&G 2001). This plan states that on or after June 27, if Kvichak River cumulative escapement is one or more days behind the historical schedule for meeting the goal, the following actions are taken:

1. The Naknek-Kvichak District will be closed, and to reduce the potential for interception of Kvichak River sockeye salmon in other districts,
 - a. Fishing in the Egegik District may be restricted to the Egegik River Special Harvest Area;
 - b. Fishing in the Ugashik District will occur within a restricted area prior to June 29; and
 - c. If Naknek River spawning escapement is projected to be greater than 800,000 sockeye salmon, the Naknek River Special Harvest Area can open, and the upper spawning escapement goal for the Naknek River will be raised from 1.4 million to 2.0 million sockeye salmon.

The third plan is referred to as the *Naknek-Kvichak District Commercial Set and Drift Gillnet Sockeye Salmon Fisheries Management and Allocation Plan* (SAAC 06.364; ADF&G 2001). The purpose of this plan is to establish the allocation of sockeye salmon between the commercial set and drift gillnet fisheries within the Naknek-Kvichak District and to establish management measures for ADF&G to achieve the allocation.

Stock of Concern Analyses

Escapement

During the most recent 5 years, the minimum escapement goal was achieved in 2005 and 2006 (Table 2; Figure 3). The minimum escapement goal has been met in only 4 out of the last 11 years: 1998, 1999, 2005, and 2006 (Figure 3). It should be noted that the off-cycle escapement goal was changed from 4 million to 2 million (variable) in 1997 (implemented in 1998; Table 2). Escapements in 1996 and 1997 would not have met the current off-cycle goal of 2 million although the shortfall is not alarming. However, ADF&G was concerned with the 70% escapement shortfall during a Kvichak peak year (2000). There have been two pre-peak (1959 and 1964) and no peak year escapements which were less than the escapement in 2000. ADF&G was encouraged that the minimum escapement goal was met in 2005 and 2006.

Yield

The actual yield was less than the median yield in all years (both peak and off-cycle) except one (2006) of the most recent 5-year period (Table 3 and Figure 4). The term "lower range of historic harvest" was not defined in the "Sustainable Salmon Fisheries Policy." Therefore, the degree of yield concern and the point at which a yield concern was classified were subject to interpretation.

Exploitation Rate

The commercial fishing exploitation rate on Kvichak sockeye salmon was significantly reduced in recent years, especially for very low runs (Figure 5). For example, in 2002 and 2003, the exploitation rate of Kvichak stocks was less than 2%.

Return per Spawner

There has been an increase in the production of the Kvichak River sockeye salmon stock in recent years. The return per spawner from brood years 1991–1999 averaged 0.8 fish per spawner (Figure 6). There has been an increase in the return per spawner in recent years (brood years 2000–2002) averaging 3.1 returns per spawner since 2000. We expect the return per spawner to increase for these recent years even further because the return for these broods has not been completed.

Stock of Concern Recommendation

The increased protection provided by commercial and sport fisheries restrictions and closures that have occurred in recent years appears to be helping the Kvichak River sockeye salmon stock recover: there was a surplus harvest of Kvichak River sockeye salmon in the commercial fishery in 2005 and 2006; minimum escapement goals were met in 2005 and 2006; recruits per spawner have improved in recent years; and Kvichak River sockeye salmon stock exploitation rates have been significantly reduced in recent years. Even with these recent improvements, there is still need for concern. The sockeye salmon escapements to the Kvichak River have fallen below the lower end of the current escapement goal during 7 of the past 11 years, including 5 of the past 7 years. Therefore, it is recommended that the Kvichak River sockeye salmon stock remain classified as a "Stock of Management Concern". AD&FG would like to see the continued improvement of the Kvichak River sockeye salmon stock for 4 or 5 years before demoting to a lower classification.

KVICHAK RIVER SOCKEYE SALMON ACTION PLAN

ACTION PLAN REVIEW

Current Stock Status

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the Alaska Board of Fisheries during the October 1–3, 2003 work session classified the Kvichak River sockeye salmon stock as a management concern. This determination was based on the inability, despite the use of specific management measures, to maintain escapement for a salmon stock within the bounds of the BEG for 4 of the past 5 years.

Customary and Traditional Use Finding and the Amount Necessary

The Alaska Board of Fisheries has made a positive finding for Customary and Traditional Use for all salmon in the Bristol Bay area of 157,000 to 172,171 salmon. Of those, 55,000 to 65,000 sockeye salmon were determined reasonably necessary for Kvichak River drainage.

Habitat Factors Adversely Affecting the Stock

There are no habitat factors adversely affecting the Kvichak stock within the entire drainage.

Do New Or Expanding Fisheries On This Stock Exist?

Presently, there are no new or expanding fisheries on this stock. There are no proposals specific to expanding fisheries on this stock.

Existing Management Plans

The Board reviews existing management plans for consistency with principles and criteria of the Sustainable Salmon Fisheries Policy or adopts new management for the stock consistent with the principles and criteria of the Sustainable Salmon Fisheries Policy.

The following are the current regulations:

5 AAC 06.200. FISHING DISTRICTS, SUBDISTRICTS, AND SECTIONS.

5 AAC 06.310. FISHING SEASONS.

5 AAC 06.320. FISHING PERIODS.

5 AAC 06.355. BRISTOL BAY COMMERCIAL SET AND DRIFT GILLNET SOCKEYE SALMON FISHERIES MANAGEMENT AND ALLOCATION PLAN.

5 AAC 06.359. EGEGIK RIVER SOCKEYE SALMON SPECIAL HARVEST AREA MANAGEMENT PLAN.

5 AAC 06.360. NAKNEK RIVER SOCKEYE SALMON SPECIAL HARVEST AREA MANAGEMENT PLAN.

5 AAC 06.364. NAKNEK/KVCHIAK DISTRICT COMMERCIAL SET AND DRIFT GILLNET SOCKEYE SALMON FISHERIES MANAGEMENT AND ALLOCATION PLAN.

5 AAC 06.365. EGEGIK DISTRICT COMMERCIAL SET AND DRIFT GILLNET SOCKEYE SALMON FISHERIES MANAGEMENT AND ALLOCATION PLAN.

5 AAC 09.200. DESCRIPTION OF DISTRICTS AND SECTIONS.

5 AAC 09.310. FISHING SEASONS.

ACTION PLAN DEVELOPMENT

Kvichak Sockeye Salmon Action Plan Goal

To rebuild the Kvichak sockeye salmon run back to historical levels by attaining the escapement goal.

Previous Actions

During the BOF meeting in January of 2001, ADF&G presented a summary of four potential action plans (Bristol Bay staff, 2000) of which three reduced the exploitation rate on Kvichak stocks in each eastside district. In deliberation the BOF made the following changes: (1) In the Ugashik District, when the preseason forecast of Kvichak sockeye salmon does not provide for an exploitation rate greater than 40%, fishing time between June 16 to June 23 can not exceed 48-hours. In addition, if the Naknek River Special Harvest Area (NRSOA) is in effect anytime before June 29, fishing will be restricted to the Ugashik River Special Harvest Area (URSHA); (2) In the Egegik District, when the NRSOA is open to commercial fishing then fishing in the Egegik District is restricted to the Egegik River Special Harvest Area (ERSHA) and will remain in the ERSOA until fishing resumes in the Naknek/Kvichak District; and (3) In the

Naknek/Kvichak District, the district is closed to both gear groups when Kvichak River escapement falls one or more days behind the cumulative escapement goal curve on or after June 27. When fishing the NRSHA, an OEG is in effect raising the upper end of the escapement goal range from 1.4 million to 2.0-million sockeye salmon. During the 2003 BOF meeting, ADF&G presented one additional action plan item to further reduce the exploitation rate on Kvichak stocks (Bristol Bay 2003). The BOF required that fishing will begin in the Special Harvest Areas of Naknek, Egegik and Ugashik Rivers if the Kvichak River run is forecasted to be less than 30% above the minimum biological escapement goal (5 AAC 06.360 (h)).

Management Under Current Regulations

In 2004, the forecast for the Kvichak River projected a harvestable surplus of 6.6 million sockeye salmon with an escapement goal of 6.0 million. The BOF authorized a General District fishery in 2004, which opened areas outside of the normal district boundaries. With these additional areas open and a projected harvest of 6.6 million sockeye no restrictions were placed on the eastside fisheries. Limited fishing occurred in the Naknek/Kvichak District prior to June 23 with most of the harvest caught in the General District. Commercial fishing was restricted to the Naknek Section for the drift fleet and marginal fishing in the Kvichak Section for set gillnet gear. Escapement to Kvichak River was on track until July 6 when it fell more than 1 day behind. At that time, the District was closed and fishing was restricted to the NRSHA. The final escapement was 5.5 million sockeye salmon which was slightly less than the minimum escapement goal of 6.0 million. In 2005 and 2006, the preseason forecast projected a surplus of less than 30% above the minimum escapement goal and the eastside fisheries began in their respective special harvest areas. The outcome both in 2005 and 2006 was that the Kvichak River met its escapement objectives.

It is ADF&G's opinion that it has the necessary regulations to meet escapement objectives for Kvichak River sockeye salmon when the total run exceeds the minimum escapement goals and is forecasted within 30%. Further, it is the department opinion that the restrictions in current regulations are sufficient to minimize the exploitation and insure the vast majority of the sockeye salmon returning to the Kvichak River will escape the commercial fishery when total run is less than the minimum escapement goal.

Action Plan Alternatives

No new action plans necessary, continue under current plans.

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- Bristol Bay Staff. 2000. Kvichak River sockeye salmon stock status and action plan 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A00-37, Anchorage.

Table 1—Historical yield, escapement and total inshore run of Kishik River sockeye salmon.

Year	Actual Yield		Actual Escapement		Total Inshore Run	
	Pre-Peak & Peak	Off-peak	Pre-Peak & Peak	Off-peak	Pre-Peak & Peak	Off-peak
2006	2,300,318		3,000,228		3,800,446	
2005	232,480		1,320,782		2,827,782	
2004	5,311,786		2,200,134		7,711,750	
2003	38,214		1,620,808		1,721,048	
2002			107,884		507,884	
2001	148,202		252,000		548,242	
2000	13,782,001		8,062,020		20,104,283	
1999	9,207,229		5,787,202		14,414,282	
1998	1,828,432		8,706,022		10,414,282	
1997	120,480		1,002,248		1,122,728	
1996	1,002,248		6,700,974		7,703,222	
1995	6,700,974		1,622,780		8,323,754	
1994	1,002,248		1,622,780		2,625,028	
1993	6,700,974		1,622,780		8,323,754	
1992	1,002,248		1,622,780		2,625,028	
1991	6,700,974		1,622,780		8,323,754	
1990	1,002,248		1,622,780		2,625,028	
1989	6,700,974		1,622,780		8,323,754	
1988	1,002,248		1,622,780		2,625,028	
1987	6,700,974		1,622,780		8,323,754	
1986	1,002,248		1,622,780		2,625,028	
1985	6,700,974		1,622,780		8,323,754	
1984	1,002,248		1,622,780		2,625,028	
1983	6,700,974		1,622,780		8,323,754	
1982	1,002,248		1,622,780		2,625,028	
1981	6,700,974		1,622,780		8,323,754	
1980	1,002,248		1,622,780		2,625,028	
1979	6,700,974		1,622,780		8,323,754	
1978	1,002,248		1,622,780		2,625,028	
1977	6,700,974		1,622,780		8,323,754	
1976	1,002,248		1,622,780		2,625,028	
1975	6,700,974		1,622,780		8,323,754	
1974	1,002,248		1,622,780		2,625,028	
1973	6,700,974		1,622,780		8,323,754	
1972	1,002,248		1,622,780		2,625,028	
1971	6,700,974		1,622,780		8,323,754	
1970	1,002,248		1,622,780		2,625,028	
1969	6,700,974		1,622,780		8,323,754	
1968	1,002,248		1,622,780		2,625,028	
1967	6,700,974		1,622,780		8,323,754	
1966	1,002,248		1,622,780		2,625,028	
1965	6,700,974		1,622,780		8,323,754	
1964	1,002,248		1,622,780		2,625,028	
1963	6,700,974		1,622,780		8,323,754	
1962	1,002,248		1,622,780		2,625,028	
1961	6,700,974		1,622,780		8,323,754	
1960	1,002,248		1,622,780		2,625,028	
1959	6,700,974		1,622,780		8,323,754	
1958	1,002,248		1,622,780		2,625,028	
1957	6,700,974		1,622,780		8,323,754	
1956	1,002,248		1,622,780		2,625,028	
1955	6,700,974		1,622,780		8,323,754	
1954	1,002,248		1,622,780		2,625,028	
1953	6,700,974		1,622,780		8,323,754	
1952	1,002,248		1,622,780		2,625,028	
1951	6,700,974		1,622,780		8,323,754	
1950	1,002,248		1,622,780		2,625,028	
1949	6,700,974		1,622,780		8,323,754	
1948	1,002,248		1,622,780		2,625,028	
1947	6,700,974		1,622,780		8,323,754	
1946	1,002,248		1,622,780		2,625,028	
1945	6,700,974		1,622,780		8,323,754	
1944	1,002,248		1,622,780		2,625,028	
1943	6,700,974		1,622,780		8,323,754	
1942	1,002,248		1,622,780		2,625,028	
1941	6,700,974		1,622,780		8,323,754	
1940	1,002,248		1,622,780		2,625,028	
1939	6,700,974		1,622,780		8,323,754	
1938	1,002,248		1,622,780		2,625,028	
1937	6,700,974		1,622,780		8,323,754	
1936	1,002,248		1,622,780		2,625,028	
1935	6,700,974		1,622,780		8,323,754	
1934	1,002,248		1,622,780		2,625,028	
1933	6,700,974		1,622,780		8,323,754	
1932	1,002,248		1,622,780		2,625,028	
1931	6,700,974		1,622,780		8,323,754	
1930	1,002,248		1,622,780		2,625,028	
1929	6,700,974		1,622,780		8,323,754	
1928	1,002,248		1,622,780		2,625,028	
1927	6,700,974		1,622,780		8,323,754	
1926	1,002,248		1,622,780		2,625,028	
1925	6,700,974		1,622,780		8,323,754	
1924	1,002,248		1,622,780		2,625,028	
1923	6,700,974		1,622,780		8,323,754	
1922	1,002,248		1,622,780		2,625,028	
1921	6,700,974		1,622,780		8,323,754	
1920	1,002,248		1,622,780		2,625,028	
1919	6,700,974		1,622,780		8,323,754	
1918	1,002,248		1,622,780		2,625,028	
1917	6,700,974		1,622,780		8,323,754	
1916	1,002,248		1,622,780		2,625,028	
1915	6,700,974		1,622,780		8,323,754	
1914	1,002,248		1,622,780		2,625,028	
1913	6,700,974		1,622,780		8,323,754	
1912	1,002,248		1,622,780		2,625,028	
1911	6,700,974		1,622,780		8,323,754	
1910	1,002,248		1,622,780		2,625,028	
1909	6,700,974		1,622,780		8,323,754	
1908	1,002,248		1,622,780		2,625,028	
1907	6,700,974		1,622,780		8,323,754	
1906	1,002,248		1,622,780		2,625,028	
1905	6,700,974		1,622,780		8,323,754	
1904	1,002,248		1,622,780		2,625,028	
1903	6,700,974		1,622,780		8,323,754	
1902	1,002,248		1,622,780		2,625,028	
1901	6,700,974		1,622,780		8,323,754	
1900	1,002,248		1,622,780		2,625,028	

* Yield is a preliminary estimate for 2006.

Table 1.—Historical yield, escapement and total inshore run of Kvichak River sockeye salmon.

Year	Actual Yield		Actual Escapement		Total Inshore Run	
	Pre-Peak & Peak	Off-cycle	Pre-Peak & Peak	Off-Cycle	Pre-Peak & Peak	Off-Cycle
1959	281,930		680,000		961,930	
1960	7,976,500		14,630,000		22,606,500	
1961		6,863,814		3,705,849		10,569,663
1962		1,833,401		2,580,884		4,414,285
1963		223,459		338,760		562,219
1964	763,486		957,120		1,720,606	
1965	17,785,664		24,325,926		42,111,590	
1966		4,168,575		3,775,184		7,943,759
1967		1,800,652		3,216,208		5,016,860
1968		387,565		2,557,440		2,945,005
1969	3,760,565		8,394,204		12,154,769	
1970	16,581,224		13,935,306		30,516,530	
1971		3,764,861		2,387,392		6,152,253
1972		342,150		1,009,962		1,352,112
1973		21,791		226,554		248,345
1974	148,595		4,433,844		4,582,439	
1975	1,605,407		13,140,450		14,745,857	
1976		1,458,180		1,965,282		3,423,462
1977		739,464		1,341,144		2,080,608
1978		3,815,636		4,149,288		7,964,924
1979	13,418,829		11,218,434		24,637,263	
1980	12,743,074		22,505,268		35,248,342	
1981		5,234,733		1,754,358		6,989,091
1982		1,858,475		1,134,840		2,993,315
1983		16,534,901		3,569,982		20,104,883
1984	12,523,803		10,490,670		23,014,473	
1985	6,183,103		7,211,046		13,394,149	
1986		787,303		1,179,322		1,966,625
1987		3,526,824		6,065,880		9,592,704
1988		2,654,364		4,065,216		6,719,580
1989	11,456,509		8,317,500		19,774,009	
1990	10,551,217		6,970,020		17,521,237	
1991		3,808,873		4,222,788		8,031,661
1992		5,718,947		4,725,864		10,444,811
1993		5,287,523		4,025,166		9,312,689
1994	13,893,613		8,337,840		22,231,453	
1995	17,391,906		10,138,720		27,530,626	
1996		1,983,269		1,450,578		3,433,847
1997		179,480		1,503,732		1,683,212
1998		1,069,294		2,296,074		3,365,368
1999	6,392,296		6,196,914		12,589,210	
2000	1,026,986		1,827,780		2,854,766	
2001		330,538		1,095,348		1,425,886
MED	9,263,859	1,858,475	8,366,022	2,387,392	18,647,623	4,414,285
MAX	17,785,664	16,534,901	24,325,926	6,065,880	42,111,590	20,104,883
MIN	148,595	21,791	680,000	226,554	961,930	248,345
2002				703,884		703,884
2003		34,244		1,686,804		1,721,048
2004	2,211,186		5,500,134		7,711,320	
2005		532,450		2,320,332		2,852,782
2006		2,736,218 *		3,068,226		5,804,444

* Yield is a preliminary estimate in 2006.

Table 2.—Escapement analysis of Kvichak River sockeye salmon, 2002–2006.

Year	Actual Escapement	Minimum Escapement Goal	Difference	% Deviation from Goal ^a	Escapement > Goal	Frequency of Occurrence ^b
2002	703,884	2,000,000	-1,296,116	-65%	No	3 (n=27)
2003	1,686,804	2,000,000	-313,196	-16%	No	9 (n=27)
2004	5,500,134	6,000,000	-499,866	-8%	No	4 (n=27)
2005	2,320,332	2,000,000	320,332	16%	Yes	13 (n=27)
2006	3,068,226	2,000,000	1,068,226	53%	Yes	18 (n=27)

^a Percent deviation = (Actual - Goal) / Goal.

^b The number of escapement observations (1956–1998) which are less than the escapement of the current year.

Table 2.—Escapement analysis of Kvichak River sockeye salmon, 2002–2006.

Year	Actual Escapement	Minimum Escapement Goal	Difference	% Deviation from Goal ^a	Escapement > Goal	Frequency of Occurrence ^b
2002	703,884	2,000,000	-1,296,116	-65%	No	3 (n=27)
2003	1,686,804	2,000,000	-313,196	-16%	No	9 (n=27)
2004	5,500,134	6,000,000	-499,866	-8%	No	4 (n=27)
2005	2,320,332	2,000,000	320,332	16%	Yes	13 (n=27)
2006	3,068,226	2,000,000	1,068,226	53%	Yes	18 (n=27)

^a Percent deviation = (Actual - Goal) / Goal.

^b The number of escapement observations (1956–1998) which are less than the escapement of the current year.

Table 3.—Comparison of recent (2002–2006) pre-peak, peak and off-cycle yields to historical median yield for Kvichak River sockeye salmon.

Year	Actual Yield	Historical Median Yield		Difference	% Deviation from Median ^a	Yield < Lower Range ^b	Frequency of Occurrence ^c
		Pre-peak, Peak 1959–2000, n=18	Off-cycle 1961–2001, n=25				
2002	0		1,858,475	-1,858,475	-100%	Yes	0 (n=27)
2003	34,244		1,858,475	-1,824,231	-98%	No	2 (n=27)
2004	2,211,186	9,263,859		-7,052,673	-76%	No	5 (n=27)
2005	532,450		1,858,475	-1,326,025	-71%	No	8 (n=27)
2006	2,736,218		1,858,475	877,743	47%	No	18 (n=27)

^a Percent deviation = (Actual - Median) / Median.

^b Lower range of Pre-Peak and Peak years was 148,595 and off-cycle years were 21,791.

^c The number of yield observations (1959–2001) which are less than the yield of the current year.

^d Yield is a preliminary estimate in 2006.

Bristol Bay Area Commercial Salmon Fishery Management Districts

Alaska Department of Fish and Game

Division of Commercial Fisheries

(For Illustration Purposes Only - BBSALALL.PPT, Revised 10/14/97)

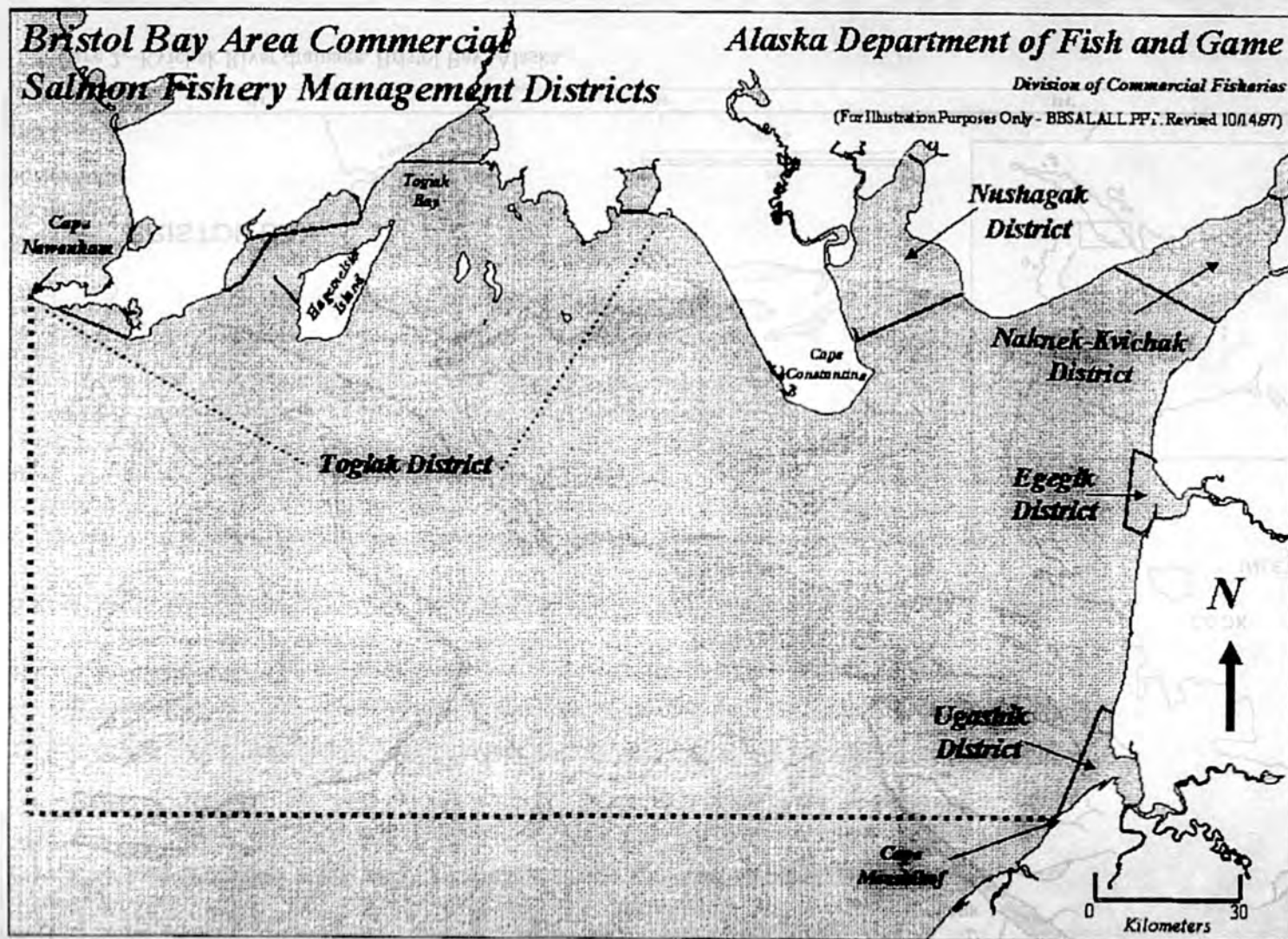


Figure 1.—Bristol Bay commercial salmon fishery management area, Alaska.

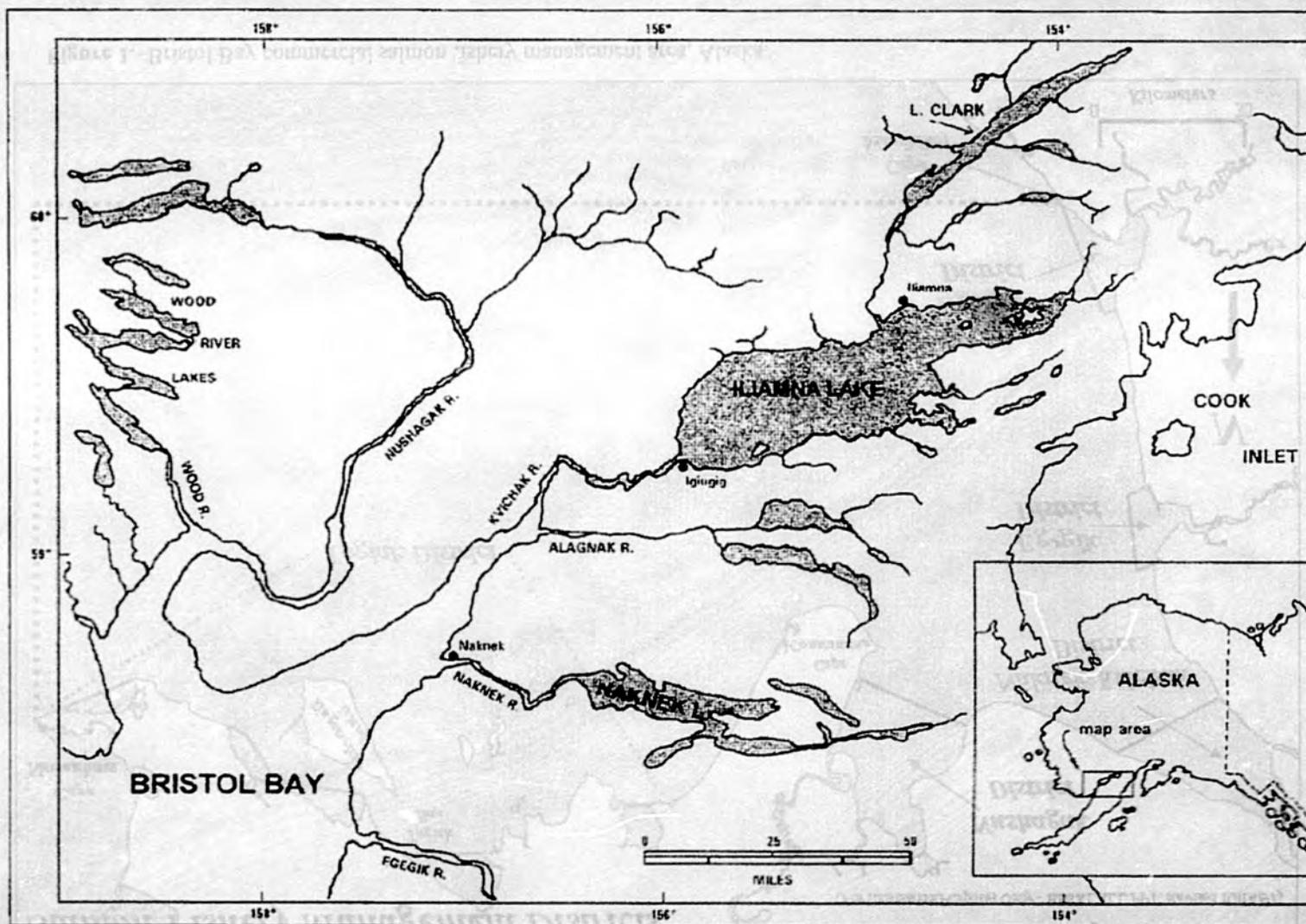


Figure 2.—Kvichak River drainage, Bristol Bay, Alaska.

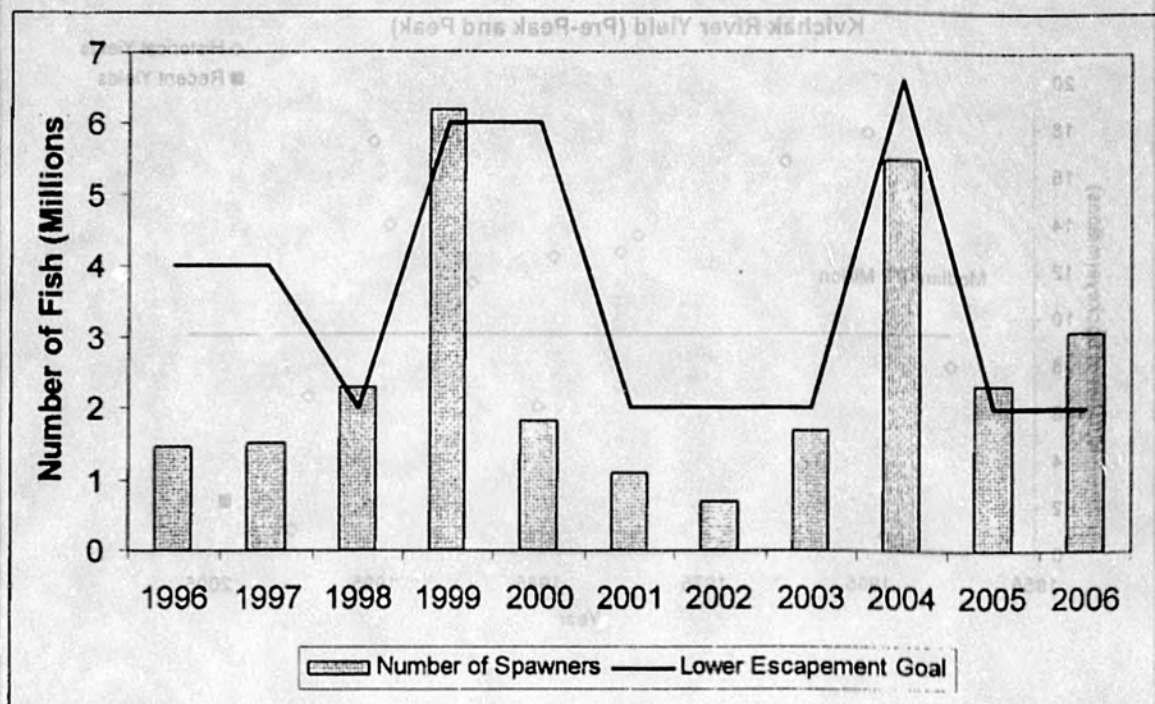


Figure 3.—Kvichak River sockeye salmon lower escapement goals and number of spawners, 1996–2006.

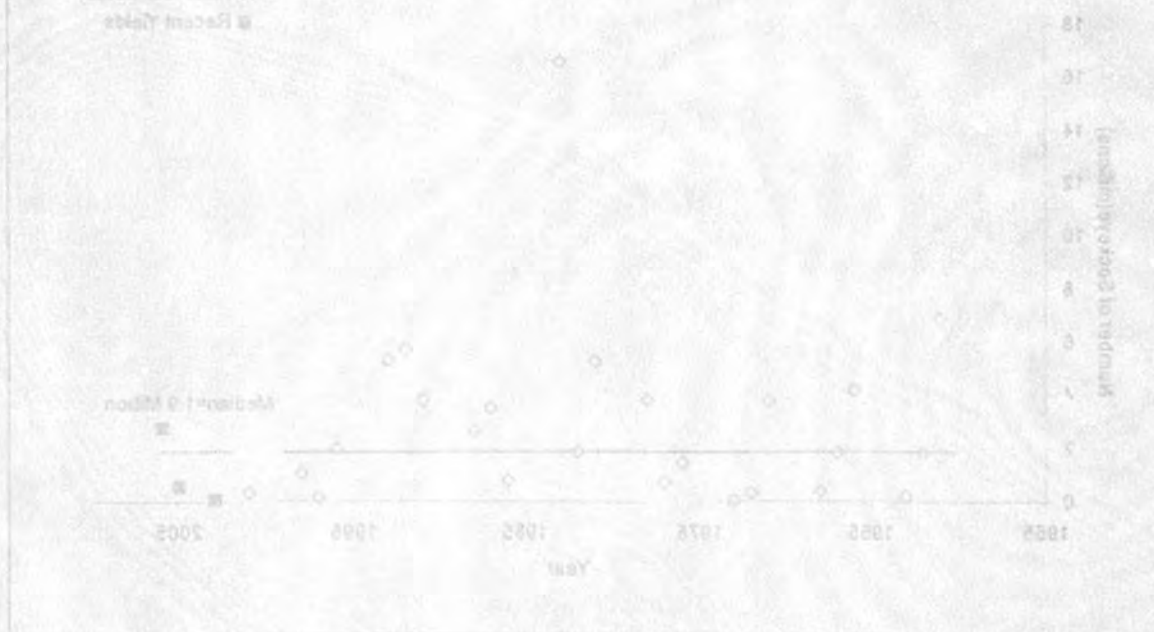


Figure 4.—Kvichak River sockeye salmon yield by year.

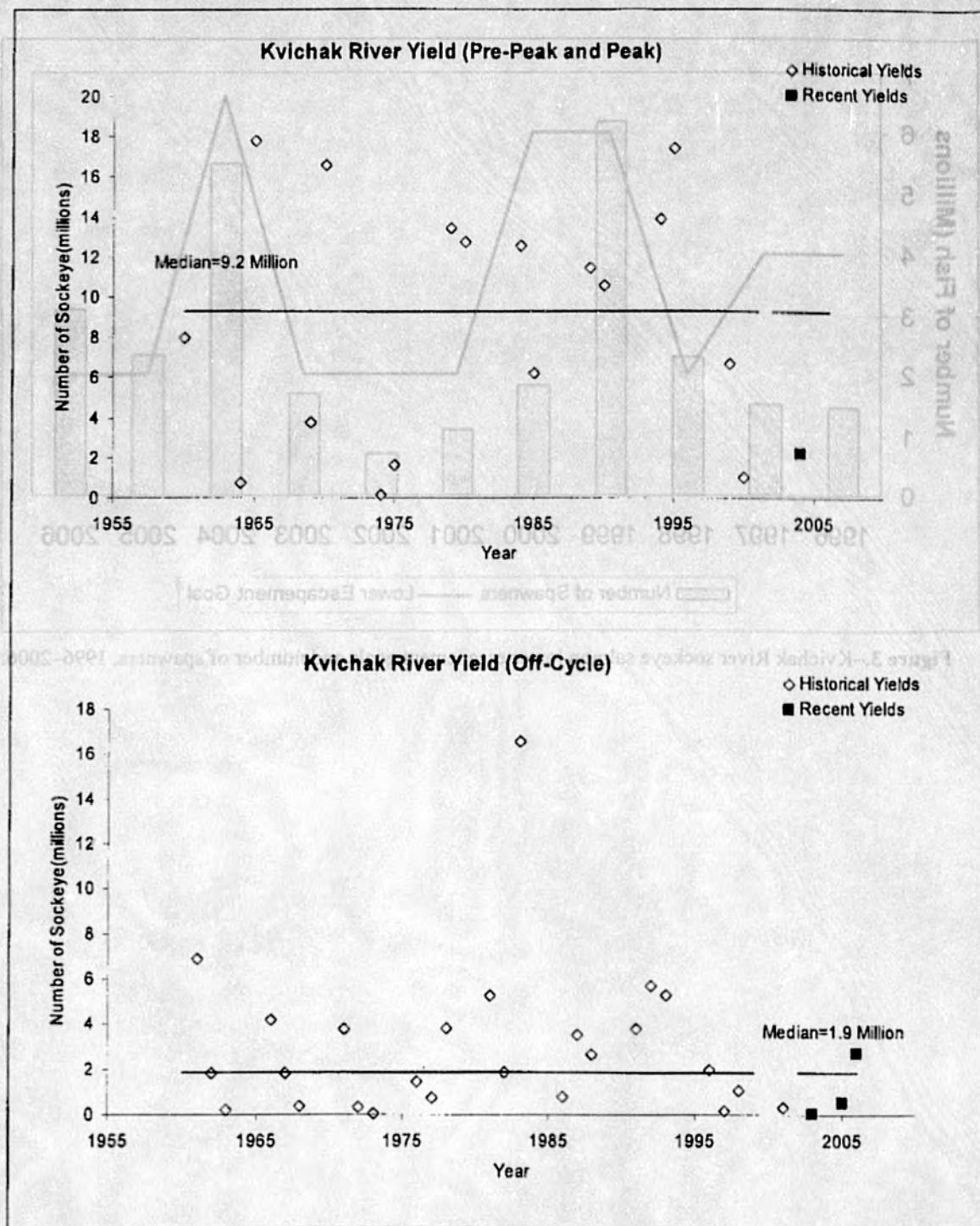


Figure 4.—Kvichak River sockeye salmon yield by year.

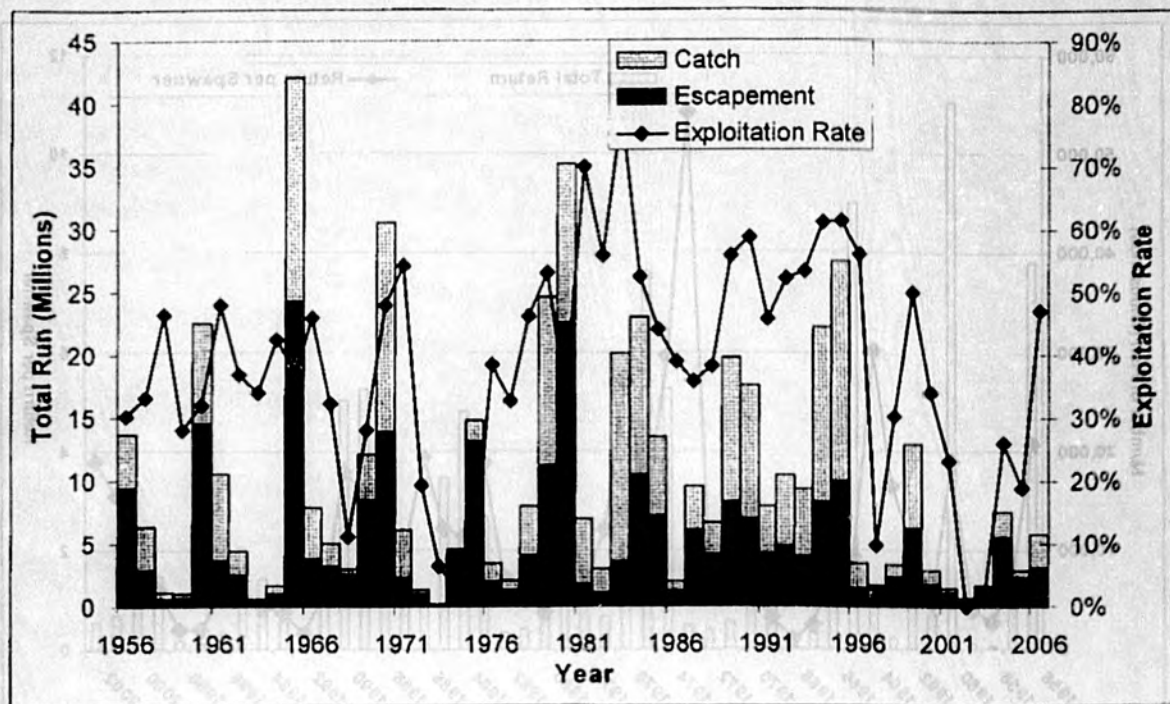


Figure 5.—Kvichak River sockeye salmon catch, escapement, and exploitation rate, 1956–2006.

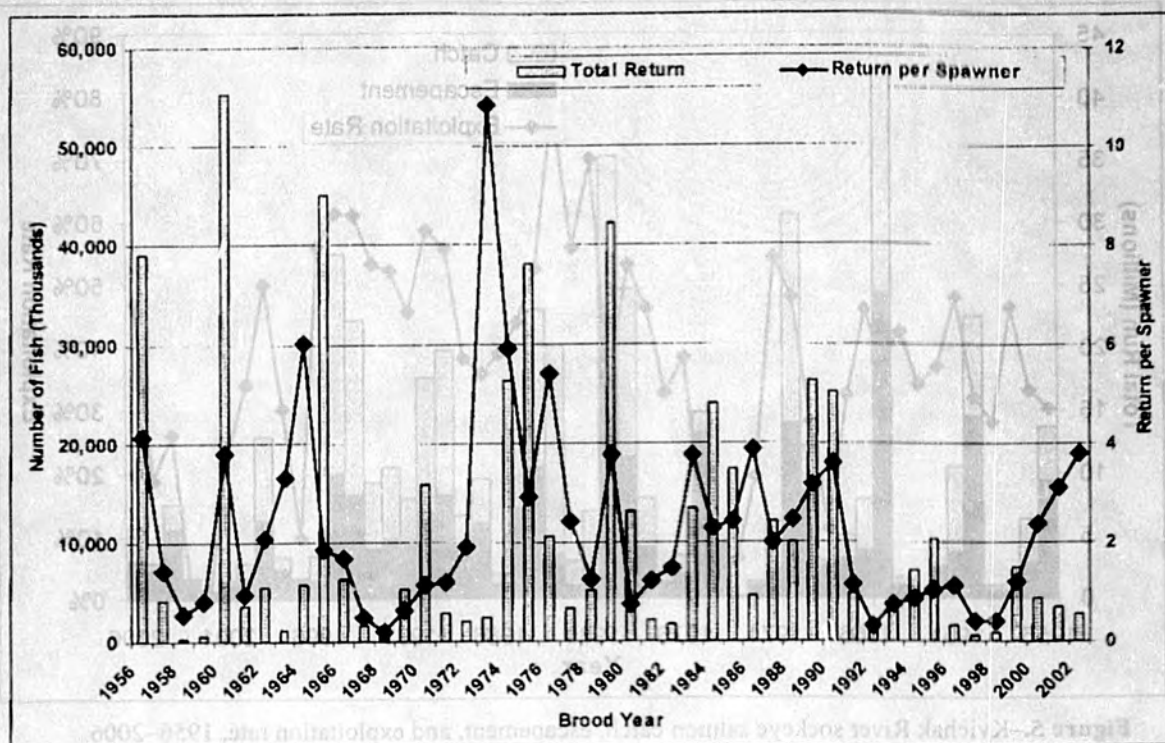


Figure 6.—Total returns and return per spawner by brood year for sockeye salmon in the Kvichak River system, 1956–2002.

NORTON SOUND SHAKTOOLIK AND UNALAKLEET
SUBDISTRICTS CHINOOK SALMON STOCK STATUS AND
ACTION PLAN



A Report to the Alaska Board of Fisheries

By:

Wesley W. Jones

Regional Information Report No. 3A03-38

Alaska Department of Fish and Game
Division of Commercial Fisheries
333 Raspberry Road
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EXECUTIVE SUMMARY

Synopsis

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (SSFP) 5 AAC 39.222, the department recommended designating the Norton Sound Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) chinook salmon stock as a yield concern at the October 2003 Board work session. Since 1998, escapement goals have usually been met, but harvests have been severely restricted to do so. These restrictions resulted in an average commercial harvest of 695 fish per year for the five-year period (1999-2003), which is 90% below the previous 10-year harvest (1989-1998) of 7,131 (Table 1). Subsistence harvests during the period 1999-2002 declined 42% compared to the 1994-1998 period. In 2003, there was no commercial harvest of chinook salmon and the subsistence harvest is anticipated to be below average because of inseason restrictions. Therefore, during the past five years there has been a chronic inability to maintain near average yields despite specific management actions taken annually.

Stock Assessment Background

The Norton Sound District is composed of six commercial fishing subdistricts (Figure 1). Most subdistricts have several rivers where subsistence fishing occurs and except for the Nome Subdistrict there are few restrictions (Figure 2).

The salmon harvests for subsistence uses in Norton Sound have gradually increased since statehood, but have remained stable the last decade. Commercial harvests have decreased for salmon in many subdistricts the last few years, but escapements have not increased in response to less fishing pressure. Throughout Norton Sound a number of salmon runs have been lower in recent years. Most of the decreasing harvests were due to weak runs, low prices resulting in less fishing effort, and in some subdistricts the lack of a market.

There are two escapement projects in Subdistrict 6 (Unalakleet). The department operates a test net several miles upstream from the mouth of the Unalakleet River and the Native Village of Unalakleet operates a counting tower further upstream on the North River tributary. Unalakleet River test net indices for chinook salmon have declined over the period 1999-2003 (Figure 3). The North River tower escapement goal has been met four of the five years from 1999-2003 (Figure 4). Following 2000 when the goal was not met, more restrictions have been placed on chinook salmon fishing in order to meet escapement.

Commercial chinook salmon harvests for the two subdistricts combined (Table 1, Figure 5) averaged 7,131 per year for the period 1989-1998. This average declined substantially to 695 fish for the last five years (1999-2003) as chinook runs became weaker (Figures 6, 7 and 8). Subsistence harvest data were not collected in both subdistricts from 1986 through 1993. Subsistence harvests declined from an average of 6,329 for the period 1994-1998 to an average of 3,643 for the four-year period 1999-2002, a 42% decrease (Table 1). A four-year period is used because subsistence harvest is not yet available for 2003.

Fishery Management Background

Commercial and Subsistence Fisheries

Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) have been managed as one fishery because past studies have shown salmon bound for these Subdistricts (Figure 1) intermingle and that harvests in one subdistrict most likely affect the other. The Unalakleet River test net and the North River Tower in Subdistrict 6 are used by the department to assess chinook escapement. North River tower has proven to be a good indicator of chinook salmon abundance in relation to the Unalakleet River (Wuttig, 1999).

The strategy used by the department to open the commercial chinook salmon fishery in Subdistricts 5 and 6 is to wait until increasing subsistence catches have been observed for at least 7 days at the mouth of the Unalakleet River. Typically, chinook salmon commercial fishing periods have been scheduled twice weekly and of 24 hours in duration. This strategy is followed to prevent fishing on milling chinook salmon, migrating Yukon River stocks and to allow for adequate escapement. The only subsistence fishing schedule is for the Unalakleet River which is closed for 36 hours per week from June 1 to July 15 because there is more fishing pressure due to a larger population in Unalakleet than Shaktoolik. The Shaktoolik River is open seven days per week to subsistence fishing and escapements are thought to track well with the Unalakleet River drainage. Aerial surveys are attempted on the Shaktoolik River when conditions are favorable.

In 2000 and 2001, the chinook salmon commercial fishery was closed after two periods because of weak runs. In 2002 and 2003, there were no commercial chinook fisheries because of weak runs. Subsistence fishing for chinook salmon was also closed for three weeks in the Shaktoolik and Unalakleet River drainages during 2003 (Table 2).

Sport Fisheries

Sport fisheries have been active on the Unalakleet River for many years. The U. S. Air Force operated a recreational fishing camp on the river in the early 1960s, and a commercial sport fishing lodge was constructed on the river in the late 1960s by the Breedlove family. The lodge is still in operation but has changed hands and expanded. Between 1983 and 2001 estimated sport fishing effort has ranged from 1,701 angler days in 1989 to 6,257 in 2000 with an average of 3,772 angler days. In 2002, estimated effort increased to 8,195 angler days. The estimated chinook harvests have ranged from 39 fish in 1983 to 850 fish during 1986 (Table 1). The 10-year (1989-1998) average harvest was 350 chinook salmon, and the recent 4-year (1999-2002) average harvest was 389 chinook salmon. In 2002, the estimated harvest was 544 chinook salmon. The estimated exploitation of chinook in the Unalakleet River by sport fisheries has ranged from about 3.0% in 1996 to about 7.6% in 2002 with an overall average of 4.2% between 1996 and 2002 (Table 4).

Sport fishing effort in the Shaktoolik River is very light, and data are not available.

Sport fishery management actions are usually not taken inseason unless it appears that escapement goals will not be met and an action to reduce subsistence harvest is contemplated.

Most management actions to date have focused on coho salmon. Only one emergency order to reduce sport fish harvest of chinook has been written. In 2003, the Unalakleet and Shaktoolik rivers were closed to the retention of chinook and chum salmon from July 3 through August 15.

STOCK OF CONCERN RECOMMENDATION

Based on the definitions provided in the sustainable salmon policy of 5 AAC 39.222(f) (42), the department considers the Shaktoolik and Unalakleet Subdistricts chinook salmon stock as a candidate for stock of concern status. Specifically, the department assesses the level of concern for the Shaktoolik and Unalakleet Subdistricts chinook salmon stock as a yield concern. Escapement goals have usually been met, but managers have increased restrictions on fishing to do so. These restrictions resulted in an average commercial harvest of 695 fish per year for the five-year period 1999-2003, which is 90% below the previous 10-year harvest (1989-1998) of 7,131 fish and no directed commercial chinook salmon harvest was allowed in 2002 and 2003. Therefore, there has been a chronic inability to maintain near average yields despite specific management actions taken annually.

Stream	Escapement	Year	Type	Recommendation	Goal
Unalakleet R.	400-800	1999	Yield	Discontinue	Discontinue
Shaktoolik R.	500-1,000	1999	Yield	Discontinue	Discontinue

Outlook

The 2004 chinook salmon run in Norton Sound Subdistricts 5 and 6 should be similar to runs in recent years when no commercial fishing was allowed. However, if the chinook salmon run is stronger than expected and escapement is projected to be met, commercial fishing will be allowed. Information from Bering Sea studies (BASIS) and trawl bycatch information indicate a higher abundance of all salmon species than last year. Depending on the origin of these salmon, the 2004 run may be larger than anticipated.

Alaska Board of Fisheries Action

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, the Alaska Board of Fisheries, during the January 12-19, 2004 regulatory meeting, is anticipated to classify the Norton Sound Subdistricts 5 and 6 chinook salmon stock as a yield concern.

ESCAPEMENT GOAL EVALUATION

The department has undertaken a review of escapement goals for several Norton Sound salmon stocks where long-term escapement, catch, and age composition data exist that enable the development of biological escapement goals (BEG) or sustainable escapement goals (SEG) based on analysis of production consistent with the escapement goal policy. Chum salmon escapement goals developed in 2000 (Clark 2001a, 2001b) were reviewed and updated for this Board cycle. Additionally, all Norton Sound chinook salmon goals were reviewed in 2003 and additional information was considered in the development of additional goals. A separate report details the escapement goal review for the AYK Region (ADF&G 2004).

In 1999 the department established chinook salmon aerial survey escapement goals for the Shaktoolik, Unalakleet/Old Women and North rivers. An escapement goal for the North River Tower was also established in 1999. It is difficult to obtain aerial survey counts for chinook salmon from the Shaktoolik, Unalakleet/Old Women and North Rivers because of weather and river conditions. A tagging study completed by the Division of Sport Fish in 1999 showed the North River tower chinook salmon count represents about 40% of the chinook salmon escapement to the Unalakleet River Drainage (Table 3; Wuttig 1999). The department recommends discontinuing the use of the aerial escapement goals for the Shaktoolik, Unalakleet/Old Women and North Rivers in favor of using information from the Unalakleet test net and the North River tower. Utilizing additional data since the escapement goal for the North River was established resulted in the department recommending a range of 1,200 to 2,600 chinook salmon (ADF&G 2004).

List of Current Goals and Proposed SEGs for Subdistricts 5 and 6 Chinook Salmon Stock.

Stream	Escapement Target	Year Adopted	Target Type	BEG Team Recommendation	Recommended Goal
Shaktoolik R	400-800	1999	EG	Discontinue	
Unalakleet/Old Women R	550-1,100	1999	EG	Discontinue	
North River (aerial)	250-500	1999	EG	Discontinue	
North River (Tower)	1,200-2,400	1999	EG	Establish	SEG 1,200 - 2,600

MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCKS OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY

Norton Sound Subdistricts 5 and 6 Chinook Salmon Management Plan Review/Development

Current Stock Status

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (5 AAC 39.222), the department recommended the designation of the Subdistricts 5 and 6 chinook salmon stock as a yield concern at the October 2003 Board work session. The Board of Fisheries, after reviewing stock status information and public input during the January 2004 regulatory meeting, is anticipated to classify the Subdistricts 5 and 6 chinook salmon stock as a yield concern. This determination is based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs for the last five years.

C&T Use Finding and the Amount Necessary

The Board of Fisheries has made a positive finding for Customary and Traditional Use to be 96,000 to 160,000 for all salmon in the Norton Sound-Port Clarence Districts. Because subsistence fishing restrictions targeting the chinook salmon stocks has only occurred once (2003) in the last five years in Subdistricts 5 and 6 and the Department is not anticipating the

need for restrictions, it is believed amount necessary for subsistence (ANS) findings specific to chinook salmon is not necessary at this time.

Habitat Factors Adversely Affecting the Stock

Annual spring flooding causes ice to scour many rivers sections with in the Shaktoolik and Unalakleet Rivers. There has been fish habitat damage in the Unalakleet drainage due to road construction. An access road has blocked complete estuarine exchange within the lower Unalakleet River Estuary; although fish passage is maintained through other channels. Historically this area has not been mined as in the northern Norton Sound and in particular the Nome Area. The upper Unalakleet River is designated as a Wild and Scenic River and the habitat remains pristine.

Do New Or Expanding Fisheries On This Stock Exist?

There are no new or expanding fisheries on this stock. However, Norton Sound bound chinook salmon may be caught as bycatch in the Bering Sea groundfish fishery.

Existing Management Plan

5 AAC 01.160 FISHING SEASONS AND PERIODS. (b) In the Norton Sound District, fish may be taken at any time except as follows:

(3) in the Unalakleet River from June 1 through July 15, salmon may be taken only from 8:00 a.m. Monday until 8:00 p.m. Saturday.

5 AAC 01.170 LAWFUL GEAR AND GEAR SPECIFICATIONS. (g) In the Unalakleet River from June 1- July 15, no person may operate more than 25 fathoms of gillnet in the aggregate and no person may operate an unanchored fishing net.

ACTION PLAN DEVELOPMENT

Norton Sound Subdistricts 5 and 6 Chinook Salmon Action Plan Goal

Reduce fishing mortality in order to meet spawning escapement goals, to provide reasonable opportunity for subsistence fishing, and to reestablish historic range of harvest levels by other users.

ACTION PLAN ALTERNATIVES

Action 1. Provide subsistence salmon gillnet mesh size specifications in Subdistricts 5 and 6, and use of gear types other than gillnets to allow harvest of other species when it is necessary to conserve chinook salmon.

Objective

The objective of this recommended action is to allow subsistence fishers the opportunity to target other species of salmon when it is necessary to conserve chinook salmon.

Specific action recommended to implement the objective

Provide the department emergency order authority to restrict subsistence salmon gillnets to 6 inch or smaller mesh size and to 4 and one-half inch or smaller mesh size when there is an inadequate surplus of chinook salmon. In addition, provide emergency order authority to close fishing with gillnets, but allow use of other gear types (such as beach seines). This would allow the department to target other species such as chum and pink salmon, while conserving chinook salmon.

5 AAC 01.170. LAWFUL GEAR AND GEAR SPECIFICATIONS. (i)

- (1) the pink salmon fishing season in Subdistricts 1-3 1-6 and immediately reopen the season in these subdistricts, during which gillnets must have a mesh size of four and one-half inches or less;
- (2) the fishing season in Subdistricts 2 and 3 2-6 and immediately reopen the season in those subdistricts to subsistence fishing with any gear that is lawful under 5 AAC 01.170, except gillnets.

5 AAC 01.160. FISHING SEASONS AND PERIODS. (b)

(6) in Subdistricts 5 and 6, salmon other than king salmon may be taken by beach seine during periods established by emergency order.

5 AAC 01.170. LAWFUL GEAR AND GEAR SPECIFICATIONS. (j) Notwithstanding (a) - (i) of this section, during times when the commissioner determines it to be necessary for the conservation of king salmon, the commissioner, by emergency order may close the fishing season in Subdistricts 5 and 6 and immediately reopen the season in these subdistricts, during which gillnets:

- (1) must be 6 inch or less mesh;
- (2) may not exceed the length specified by the commissioner in the emergency order.

Subsistence issues/considerations

The recommended action is consistent with state subsistence law requirements.

Cost/Benefit Analysis

There would be a cost to subsistence fishers if they need to purchase another gillnet of the required mesh size or a beach seine. The benefit is that subsistence fishers would be able to harvest other abundant salmon species during times of inadequate chinook salmon surplus.

Performance measures

Projects are set in place to monitor escapement inseason.

Action 2. When a very low chinook salmon run is identified, determine when commercial and sport fisheries are closed or restricted in relation to one another.

Objective

The objective of this action is to provide the department guidance in management actions taken in regard to the commercial fishery and the sport fishery during poor runs. The general public, sport fishers, and sport fishing guides would benefit if there was a policy or regulation that addressed what conservation actions would occur in the sport fishery based on conservation actions taken in the commercial fishery.

Specific action recommended to implement the objective

When commercial fishing is closed to conserve chinook salmon then sport fishing will be limited (reduce bag limits, catch and release, or closure).

Subsistence issues/considerations

The recommended action is consistent with user group priorities.

Cost/Benefit Analysis

There would be a cost to sport fish guides and outfitter businesses if sport fishing was closed or restricted for a species sport fishers wanted to target. The benefit would be having more chinook salmon on the spawning grounds during times of poor runs.

Performance measures

Projects are set in place to monitor escapement inseason and to obtain commercial, sport and subsistence harvests.

BOARD OF FISHERIES REGULATORY PROPOSALS ADDRESSING NORTON SOUND SUBDISTRICTS 5 AND 6 CHINOOK SALMON STOCK OF CONCERN

Change daily bag limits and set seasonal bag limits for chinook salmon - proposal numbers: 127 and 129.

Change fishing hours for guided sport fishing - proposal number: 128.

RESEARCH PLAN

Norton Sound Initiative and AYK Sustainable Salmon Initiative

The Norton Sound Research and Restoration Initiative (NSR&RI) Steering Committee (SC) has been formed and in association with the NSR&RI Scientific Technical Committee (STC) is identifying and prioritizing research needs in response to the low chum salmon run in 1999. Through this initiative, native organizations, private industry, non-profit organization, state and federal agencies have joined together to form an innovation partnership to cooperatively address salmon research and restoration needs. The Arctic-Yukon-Kuskokwim Sustainable Salmon

Initiative (AYK SSI) was formed after the NSR&RI and is similar in organization, but encompasses the Yukon and Kuskokwim areas in addition to Norton Sound.

Research Projects

The NSR&RI has several projects occurring in Norton Sound. One project surveyed the Shaktoolik, Unalakleet and North Rivers for possible resistance board weirs sites. Two suitable sites were identified on the Unalakleet River (Menard 2001). Further studies are proposed to NSR&RI and AYK SSI that will help evaluate the utility of counts from the Unalakleet River weir site in management.

The department has submitted proposals to radio tag chum and coho salmon to determine their spawning distribution in the Unalakleet River drainage. Previously there was a radio tagging project to document chinook salmon distribution (Wuttig 1999). Data obtained from these telemetry studies and the weir site study will allow the department to submit a proposal for a weir at the best counting location.

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Table 1. Commercial, subsistence and sport chinook salmon harvests for Subdistricts 5 and 6, 1961-2003.*

Year	Combined Subdistricts 5 & 6		Subdistrict 5 (Shaktoulik)		Subdistrict 6 (Unalakleet)		Sport Fish Unalakleet River	
	Commercial	Subsistence	Commercial	Subsistence	Commercial	Subsistence	Catch	Harvest
1961	5,300		140		5,160			
1962	6,827		1,738		5,089			
1963	6,421		480		5,941			
1964	1,904	565	631	77	1,273	488		
1965	1,448	552	127	31	1,321	521		
1966	1,518	232	310	142	1,208	90		
1967	1,794	752	43	262	1,751	490		
1968	1,021	196	61	10	960	186		
1969	2,309	364	33	40	2,276	324		
1970	1,801	538	197	43	1,604	495		
1971	2,450	998	284	87	2,166	911		
1972	2,654	707	419	64	2,235	643		
1973	1,686	374	289	51	1,397	323		
1974	2,683	406	583	93	2,100	313		
1975	2,289	181	651	18	1,638	163		
1976	2,103	166	892	24	1,211	142		
1977	4,212	772	1,521	49	2,691	723		
1978	8,864	1,125	1,339	81	7,525	1,044		
1979	8,731	702	2,377	62	6,354	640		
1980	5,425	1,103	1,086	57	4,339	1,048		
1981	7,641	877	1,484	8	6,157	869		
1982	5,445	981	1,677	68	3,768	913		
1983	9,764	1,868	2,742		7,022	1,868		93
1984	8,417	1,650	613		6,804	1,650		39
1985	17,933	1,695	5,312	298	12,621	1,397		179
1986	5,569		1,075		4,494			850
1987	5,460		2,214		3,246			
1988	2,889		671		2,218			
1989	5,643		1,241		4,402			49
1990	8,642	2,476	2,644		5,998	2,476	361	278
1991	5,858		1,324		4,534		375	296
1992	4,507		1,098		3,409		476	117
1993	8,700		2,756		5,944		2,340	382
1994	5,285	6,469	885	1,175	4,400	5,294	517	379
1995	8,856	6,324	1,239	1,275	7,617	5,049	588	259
1996	4,984	6,438	1,340	1,114	3,644	5,324	2,059	384
1997	11,516	7,471	2,449	1,146	9,067	6,325	5,144	842
1998	7,323	4,945	910	982	6,413	3,963	1,539	513
1999	2,508	3,509	581	818	1,927	2,691	669	415
2000	742	2,869	160	440	582	2,429	1,045	345
2001	206	4,598	90	936	116	3,662	542	250
2002	5	3,597 ^b	1	1230 ^b	4	2,367 ^b	835 ^b	544 ^b
2003	12	^b	2	^b	10	^b		
1999-2003 average	695	3,643 ^b	167	856 ^b	528	2,787 ^b	Sport Fish 1999-2002 average 773	389
Commercial 1989-1998 average	7,131		1,589		5,543		Sport Fish 1989-1998 average	350
Subsistence 1994-1998 average		6,329		1,138		5,191	Sport Fish 1994-1998 average 1,969	475

* Subsistence harvest data are incomplete prior to 1979. Subsistence surveys not conducted in all communities between 1986-1993.

^b 2003 data not yet available, average is 1999-2002.

Table 2. Subdistricts 5 and 6 Management Actions

1993	-Commercial drift fishing allowed in June so fishers can avoid fouling their nets with the debris loads in the spring. Chum fishing closed early because of weak run.
1994	-Chinook salmon periods limited to two 24-hour periods per week. Pink salmon fishing opened continuously. There was no fisher interest in chum salmon. A strong coho salmon run results in record harvest.
1995	-Strong chinook salmon run. Buyer expresses interest in pink salmon and limited interest in chum salmon. Late season coho salmon closure (August 26) to bolster escapement.
1996	-Early run of chinook salmon. Limited market for chum salmon. Pink salmon fishing opened continuously. Strong run of coho salmon.
1997	-The last year the majority of the chinook periods are two 48-hour periods per week. Best chinook commercial harvest of the decade. Limited market for chum salmon. Coho run is below average and season closes on August 23.
1998	-The majority of chinook periods are now 24 hours in length. Limited market for chum salmon. Pink salmon fishing opened continuously because of large surplus of pink salmon. Shaktoolik Subdistrict opened to continuous fishing the last two weeks of August to provide flexibility during persistent inclement weather.
1999	-Weak runs of chinook, chum and coho salmon. Coho commercial fishing restricted to two 24-hour periods per week instead of the normal two 48-hour periods per week.
2000	-Only two commercial chinook fishing periods. Lowest commercial chinook and chum harvest to date. Pink salmon fishing opened continuously to allow buyer to more effectively direct fleet. Pink catches were below average which was attributed to low volumes of fish and lack of fishing interest.
2001	-Only two commercial chinook fishing periods. Lowest commercial chinook and chum harvest to date.
2002	-No commercial chinook or chum fishing because of weak runs. No market interest in pink salmon unless there is a 500,000 pink salmon harvest projection. -Coho commercial fishing time reduced to two 24 hour periods per week. Commercial coho fishing closed on August 19 to protect coho salmon. Sport fish reduces bag limit to one per day from five per day.
2003	-No commercial chinook or chum fishing because of weak runs. -Three week (July 3-25) subsistence salmon fishing closure to protect chinook and chum in Shaktoolik and Unalakleet River drainages. Subsistence beach seining for pink salmon is allowed.

Table 3. North River Tower Chinook Salmon count expanded to the Unalakleet Drainage.

Year	Operating Period	North River Tower Chinook Count	Estimated Unalakleet River Drainage Chinook Count ^a
1984	June 25-July 28	2,844	7,110
1985	June 27-Aug 31	1,426	3,565
1986	June 25-July 18	1,613	4,033
1996	June 16-July 25	1,197	2,993
1997	June 16-Aug 21	4,185	10,463
1998	June 15-Aug 12	2,100	5,250
1999	June 30-Aug 31	2,263	5,658
2000	June 17-Aug 12	1,046	2,615
2001	July 5-Sept 15 ^b	1,337	3,343
2002	June-19-Aug 30	1,505	3,763
2003	June 15-Sept 13	1,452	3,630

^a North River Tower chinook count represents 40% of the Unalakleet drainage chinook escapement (Wuttig 1999)

^b Minimum count due to late start of project

Table 4. Exploitation of Unalakleet River drainage chinook salmon.

Year	North River Count	Estimated Total Unk Escapement ^a	Estimated total run (Esc+Harvest)	Proportion exploited Commercial	Proportion exploited Subsistence	Proportion exploited Sport	Total exploitation com+sub	Total exploitation com+sub+sp
1996	1,197	2,993	12,730	0.286	0.418	0.030	0.705	0.735
1997	4,185	10,463	27,539	0.329	0.230	0.031	0.559	0.590
1998	2,100	5,250	16,652	0.385	0.238	0.031	0.623	0.654
1999	2,263	5,658	11,106	0.174	0.242	0.037	0.416	0.453
2000	1,046	2,615	6,316	0.092	0.385	0.055	0.477	0.531
2001	1,337	3,343	6,769	0.017	0.415	0.037	0.432	0.469
2002	1,505	3,763	7,243	0.001	0.330	0.076	0.331	0.407
2003	1,452	3,630						
Avg 97-01	2,186	5,466	13,676	0.199	0.302	0.038	0.501	0.539
Avg 00-02	1,296	3,240	6,775	0.037	0.377	0.056	0.413	0.469

^a Escapement estimated based on data from Wuttig 1999.

Figure 1. Norton Sound commercial salmon fishing districts and subdistricts.

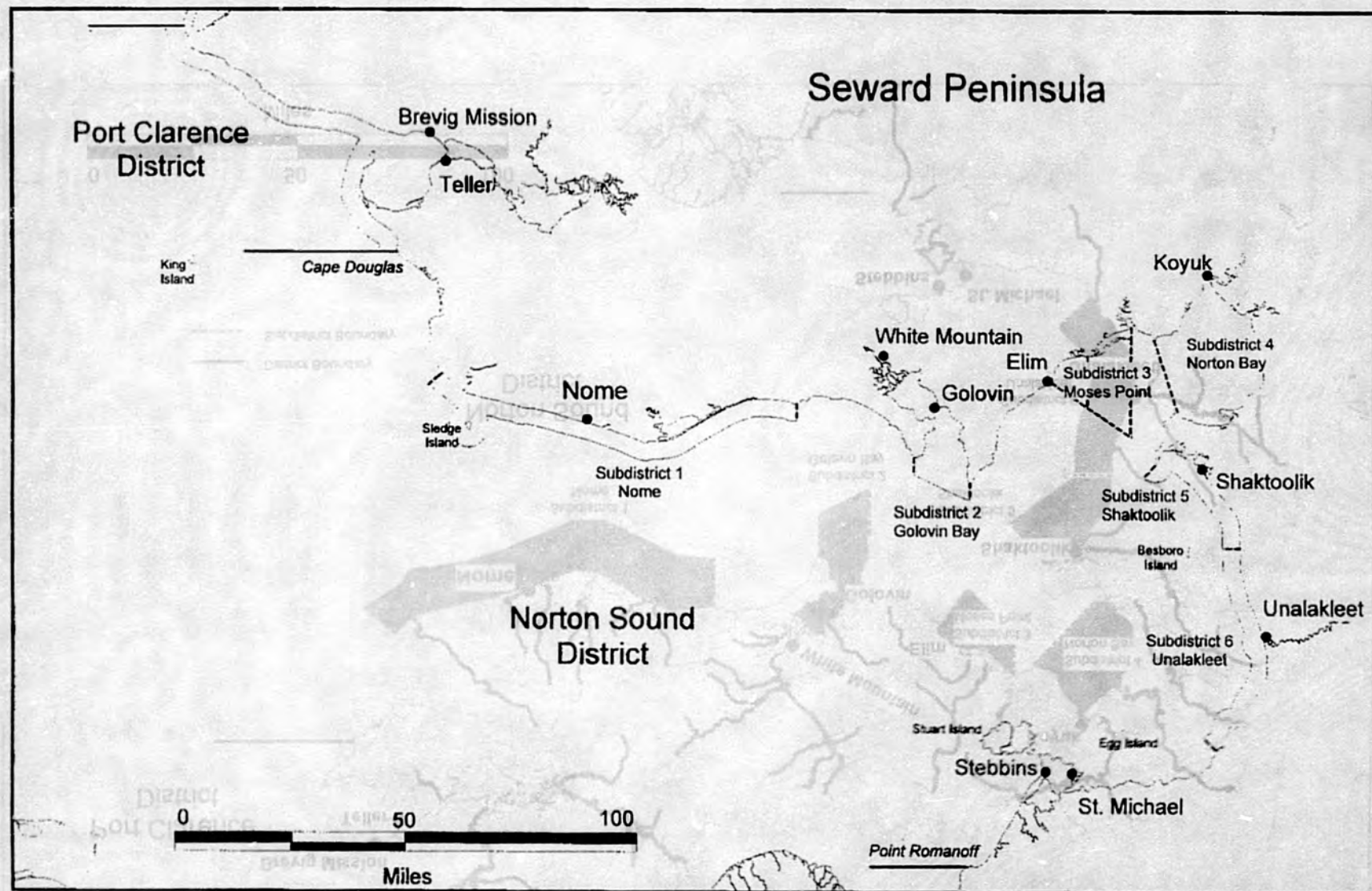


Figure 2. Map of Salmon Rivers in Norton Sound

