SCOMM

#7:4

STATE of ALASKA

MEMORANDUM

TO: Sue Johnston, Librarian
Legislative Reference Library

DATE: October 25, 1979

FILE NO:

TELEPHONE NO:

SUBJECT:

FROM: Betty Abel, Administrative Assistant
Subsistence Section
Department of Fish and Game

Enclosed are copies of the testimony given at Alaska Public Forum Workshops around the State. The workshops were held by the Interim Committee on Subsistence. These copies are for your files and were given to us by Dave Hoffman from the Interim Committee on Subsistence office. Dave also had tapes the Committee made during discussions on SCS CSHB 960 am S, 1978 establishing the Subsistence Section of the Department of Fish and Game. We are going to have these tapes duplicated onto cassettes and will forward a copy to you for your records.

01-A2LH

STATE OF ALASKA

OFFICE OF THE GOVERNOR
ALASKA GROWTH POLICY COUNCIL
ALASKA PUBLIC FORUM

JAY S. HAMMOND, Governor

Phone 276-5262
Loussac-Sogn Building
429 D Street, Suite 310
Anchorage, Alaska 99501

September 5, 1977

COMMISSIONER'S OFFICE
RECEIVED
SEP 6 1977
DEPARTMENT OF FISH AND GAME

Commissioner Skoog
Department of Fish and Game
Subport Building
Juneau, Alaska 99801

Dear Commissioner Skoog:

After what seems like 300 revisions of the subsistence questions by many different people, we feel perhaps the best way to approach this issue in the Public Forum is to leave the questions open-ended (i.e. give no options).

I have certainly appreciated all the help your department has given us in the preparation of questions and background material. I hope that the piece included, which is the rough draft of what will go into the Forum tabloid, covers most of the essential points.

As you well know, it is a complicated issue. I have tried to write it simply enough so that the majority of people will understand.

Very possibly I may have missed some crucial elements. Unfortunately, I can not give you much time for review and critical comments as our time schedule is extraordinarily tight. Following comments from the Growth Policy Council on Wednesday when they meet here to review the questions and background material, we will begin to do the final rewriting and editing of material so it will be ready for the typesetters on Monday.

I will need your comments by Thursday afternoon at the latest. Perhaps you can phone them to me? If comments are extensive and you and members of your department would like to write them out, perhaps someone who is flying to Anchorage Wednesday or Thursday will carry them up. I can pick them up at the airport or wherever.

I'm sorry there is not more time. Believe me, things are like a madhouse up here.

In haste,

Nan Elliot

Nan Elliot
Publication Specialist

NEE:rj

9/5/77

SUBSISTENCE

The Alaska Public Forum

Introduction

One of the most sensitive and controversial issues facing the State in the area of fish and wildlife management is subsistence use of the resources.

At the heart of the dilemma lie these questions:

-----What exactly do people mean when they use the term "subsistence"?

-----Most importantly, recognizing that fish and wildlife are not limitless, and that there may not be enough for everyone, what criteria ~~and management~~ scheme should we use to equitably determine who may use these resources for subsistence purposes? and what management system should be used to regulate such uses

There are no easy answers.

In any discussion of hunting and fishing, we must keep one critical element clearly in focus---the protection of healthy populations of fish and wildlife. If we pursue them to extinction, any further discussion will be purely academic.

Under the terms of the Alaska Constitution, these resources are the common property of all Alaska citizens. The responsibility for managing resident populations of fish and wildlife rests with the State.

As Alaska's population grows, pressures on the fish and wildlife resources increase and conflicts over who should be allowed to hunt and fish intensify.

While no one relishes the idea of personal restrictions ~~in~~ on the use of fish & game resources this arena, it is unrealistic to expect that today's dependence on the land can continue forever. In short, demand will exceed

supply. The State, as manager, has already begun to assign some priorities for use of the resources.

Governor Hammond recently stated that "To preserve the potential for the subsistence way of life is an extremely high priority of my administration".

In a policy statement in 1973, the Alaska Department of Fish and Game and the Alaska Board of Fish and Game recognized subsistence as the highest priority ~~among consumptive uses (i.e. recreational, commercial)~~ of the resources.

Few people, we imagine, would argue against the State ~~showing~~ preferential treatment to the person who relies solely on the land and sea to provide for his or her existence.

But the issue is far more complicated than that.

There are relatively few examples today in Alaska of "pure" subsistence living. ("Pure subsistence" being defined as total reliance on the land for food, clothing and shelter.) In most cases, modern conveniences and technology have infused such a lifestyle with varying degrees of dependence on a cash-based economy. In addition, recreational, cultural and commercial pursuits overlap with subsistence or are intimately interwoven into one's interpretation of that way of life. While it may be possible to quantify how many pounds of meat and fish are necessary to keep one alive, it is impossible to measure the psychological or spiritual benefits of following such a lifestyle.

Although the administration has assigned subsistence highest priority in the area of fish and wildlife management, there are many who contend that the State has not followed through on that policy.

Indeed, the difficulty lies not in the recognition of the problem but rather the extreme difficulty in determining who the subsistence users are and what program might best be implemented to provide for that use.

Through the Public Forum process we hope that more people will come to an understanding of the whole issue and perhaps with more minds working on the problem we shall begin to perceive some kind of equitable solution.

What is Subsistence?

Although there is a State law defining it and several Federal and State policies recognizing it, there is no universally accepted definition for subsistence use of the resources.

In the Alaska Statutes, "subsistence fishing" is defined as "the taking, fishing for, or possession of fish, shellfish or other fishery resources for personal use and not for sale or barter". "Subsistence hunting" means "the taking of game animals by a state resident for food or clothing for personal or immediate use."

In 1973, the Federal-State Land Use Planning Commission sponsored an informal conference on "Subsistence Uses of Fish and Game in Alaska". The participants concluded that an all-encompassing definition should include (1) to sustain life, (2) for economic benefit, (3) for relaxation and recreation, and (4) to maintain a lifestyle or culture. The majority felt that "to sustain life" should be the highest priority and "to sustain a lifestyle" the second priority.

Some may define subsistence activities as the direct use of fish and wildlife for food, clothing and shelter. Others may include some commercial pursuits, such as the sale of ivory, furs

Still others feel the taking of resources is a vital part of the individual's cultural and historical heritage and involves traditional diet, art, religion.

(Note: Perhaps here we might list examples of some subsistence uses for the purposes of discussion. i.e. Is the taking of walrus predominantly for the ivory which will provide cash to buy necessities a "subsistence" activity? Is guiding others on hunting and fishing trips "subsistence" activity? Is the taking of a moose or caribou to supplement diet a subsistence activity if one depends mostly on a job for pay?

In the next decade we may be faced with a question which is at once very difficult and very sa.. If there are not enough fish and wildlife for all ~~subsistence~~ purposes, who should be allowed to fish and hunt?

Some people have suggested that it depends on the user's (1) degree of economic dependence, (2) past cultural or historical use, (3) local residency and/or (4) use of traditional versus modern methods and means of harvest.

Degree of economic dependence. Most ~~native~~ peoples ~~as well as other Alaskans~~ living in rural areas spend much of their time hunting, fishing, trapping, berry-picking, and greens gathering. These food sources supply a major portion of their diet. Although commercialization of fish, ivory and fur introduced subsistence people in Alaska ~~years~~ many years ago to a cash economy in many villages and outposts of the state there still exists a lack of other employment opportunities. This forces ~~most~~ many rural Alaskans to depend on food gathering for a significant part of their livelihood.

Cultural or historical use. Activities which sustain life often have roots which go much deeper than that of purely satisfying a physical need. For centuries the Alaska native people lived closely with the land and sea in order to survive. Subsistence

is an intimate part of [illegible]

culture. Last year during the Public Forum workshop in Bethel the protection of subsistence lifestyle was raised as a vital concern. One young man explained, "The young people who went out to school, like myself, when we couldn't have subsistence foods, sometimes we get up from the table with tears. I mean, you couldn't help that. It is not only to fill yourself, your hungry stomach, but also to fill your being...to have a good feeling, to have mental health and employment. If subsistence is threatened, then you take away all these things".

However, subsistence is not an exclusive ethnic pursuit. Historically, many Alaskans, regardless of their origins, have ~~homesteaders and trappers and their families~~ lived predominantly from the land. While their reasons for continuing in such a lifestyle may not be cultural ones, they too have many strong psychological and historical ties with the land.

Some believe that only Alaska natives should be allowed to continue subsistence activities. They maintain it is the only possible solution for protecting their heritage and unique cultures. Others feel that qualification as a subsistence user should not be dependent or affected by race or ethnic origin for it would be contrary to the Alaska State Constitution which recognizes all citizens as equal under the law. Furthermore, a "natives only" policy does not address the matter of need which will vary between individuals, communities and geographical areas regardless of ancestry.

Local Residency

Many feel that the people who harvest the resources for subsistence purposes should be given first ~~preference~~ priority to hunt and fish in the area in which they live. ~~That would~~

~~of residency~~. However, residency would it be based on a certain number of years? Would it allow subsistence hunting and fishing to newly arrived residents? As communities expand, pressures on existing fish and wildlife in the area needed to support subsistence activities will undoubtedly increase.

Traditional versus modern methods and means of harvest.

Modern technology has changed the pattern of subsistence living. Modern tools, firearms, and transportation methods are becoming increasingly available to the subsistence hunter and fisherman and their families. With this technology available the subsistence user has the capability of taking more animals than his needs may dictate. Thus, his impact upon the fish and wildlife can be much greater now than was possible in the past.

Only a few years ago it was customary for residents of Fairbanks and Anchorage to drive out of the city in the fall to shoot a moose or caribou for the winter. But now, with growing populations, game animals have been so heavily hunted near these urban areas, particularly along the road system, that this is seldom possible. As a result, urban dwellers have sought more remote wildlife using chartered aircraft, off-road vehicles, or riverboats. These modes of travel have also allowed rural Alaskans to range further and take more game than in the past. As a result competition is increasing for often diminishing wildlife resources.

Some people feel that those who use older, more traditional methods and means of harvest - such as travelling by foot or dogsled and using harpoon or bow - should be given a preference in subsistence pursuits. This would limit the take of the resources. Others argue that this option is unrealistic and comparable to asking

the urban dweller to give up his automobile and return to the horse and buggy.

More realistically perhaps, can we distinguish between someone who hunts subsistence by snowmachine or someone who charters an airplane to subsistence hunt. Both modes of transportation are modern. ~~But one is more traditionally used for hunting in Alaska.~~

Management of Fish and Wildlife

The State of Alaska is responsible for the management of all resident fish and wildlife. ~~The~~ Management and enforcement of regulations in this area lies with the Department of Fish and Game. There are two citizen regulatory boards -- The Alaska Board of Game and the Alaska Board of Fisheries which are appointed by the Governor. Citizen participation is encouraged and provided through the existing 53 fish and game advisory committees in the state.

These committees have increased local involvement in fish and game matters as opposed to the time when no such boards existed. However, lack of funding, formal organization and other frustrations have caused many people to conclude that the present advisory committee system no longer adequately addresses such things as subsistence needs, resource allocation, or stock depletion.

Thus it seems evident that more significant participation at the local level is required. It has been suggested that the State should establish regional fish and game boards which might actually set regulations affecting fish and wildlife management for the region. Final adoption powers would rest with a State Fish and Game Board. Regional subsistence councils with the authority to make initial determinations on all qualified subsistence users have also been suggested.

Another possibility is to legislate specific laws addressing the subsistence question. Many people fear this solution because it does not allow flexibility in accommodating subsistence. As one government official said we cannot "rigidly institutionalize" the term "subsistence" through one piece of legislation. That approach would not truly meet the lifestyle or cultural needs of the majority of Alaskans. What is subsistence to one ~~place~~ person or group differs from the meaning or emphasis of another ~~place~~ person or group.

The subsistence lifestyle is an evolving, changing way of life, not something cast in concrete. Whatever management structure we adopt should reflect the changing times as well as changing patterns of ~~the~~ animal ~~and marine world~~ numbers and distribution.

Additionally, subsistence requirements will not make equal demands on all resources in all areas. Recreational, commercial and other uses are also important and should continue to the extent that they do not truly interfere with or jeopardize ~~the~~ subsistence resource use.

Through the Public Forum process we hope that a discussion of the subsistence issue will not only generate a greater understanding of the complexities of the problem, but supply new ideas or solutions as to how we may best refine our present management system to address this very critical issue.

9/5/77

SUBSISTENCE QUESTIONS

1. What do ~~people~~ you mean when ~~they~~ you use the term "subsistence"? And what subsistence uses of fish and wildlife should have highest priority?

2. If there are not enough fish and wildlife for all ~~subsistence~~ uses, what criteria should be the basis for deciding who may use these resources for subsistence purposes?

3. ~~What management scheme would best assure healthy populations of fish and wildlife and also provide for valid subsistence uses?~~

~~How would you both provide for valid subsistence uses, and assure healthy populations of fish and wildlife continue to exist~~

How would you ~~provide~~ assure ~~that~~ healthy populations of fish and wildlife as well as provide for valid subsistence uses.

STATE of ALASKA

MEMORANDUM

TO: Commissioners

DATE: September 9, 1977

FROM: Fran Ulmer
Director
Policy Development and Planning
Office of the Governor

SUBJECT:

Attached is a revised version of the Public Forum questions and background discussion papers. Some of you shared comments with us on the first draft; they were appreciated and hopefully, satisfactorily incorporated in this revision.

Any recommended changes which you might have on the attached, would be greatly appreciated. Next week is our last opportunity to make changes in the questions and disussion papers, as the material will be printed for distribution soon after that.

Let me invite and encourage you to participate in the Forum sessions this fall. Please let us know which ones you will be able to attend.

cc: Governor's Staff

FAU/dp

STATE OF ALASKA
Inter-Department Route Slip

TO:
MAIL STATION NUMBER 3101
DEPARTMENT Legislative Affairs
ATTENTION George Utermohle

☐ Approval	☐ Note & Return
☐ Signature	☐ Initial & Return
☐ Comment	☐ Return As Requested
☐ Contact Me	☐ Return For Approval
☐ Prepare Reply	☐ Necessary Action
☑ For Your File	☑ Your Information

Remarks:

I am xeroxing some "subsistence" information for you, the discussion paper used by the Forum.

FROM:
MAIL STATION NUMBER 0164
DEPARTMENT Governor
BY [signature] DATE 10/11
02-002 (REV.10/73)

STATE OF ALASKA
Inter-Department Route Slip

TO:
MAIL STATION NUMBER 3101
DEPARTMENT Legislative Affairs
ATTENTION George Utermohle

☐ Approval	☐ Note & Return
☐ Signature	☐ Initial & Return
☐ Comment	☐ Return As Requested
☐ Contact Me	☐ Return For Approval
☐ Prepare Reply	☐ Necessary Action
☑ For Your File	☑ Your Information

Remarks:

The final version of this draft can be obtained from Barry Quinn, Executive Director, Public Forum @ 276-5262

FROM:
MAIL STATION NUMBER 0164
DEPARTMENT Governor
BY [signature] DATE 10/11
02-002 (REV.10/73)

01-A2LH

STATE OF ALASKA

JAY S. HAMMOND, Governor

Phone 276-5262
Loussac-Sogn Building
429 D Street, Suite 310
Anchorage, Alaska 99501

OFFICE OF THE GOVERNOR

ALASKA GROWTH POLICY COUNCIL
ALASKA PUBLIC FORUM

1977 PUBLIC FORUM SCHEDULE

Dillingham	Monday	October 3
Togiak	Tuesday	October 4
Wainwright	Wednesday	October 5
Kotzebue	Wednesday	October 12
Noorvik	Thursday	October 13
Anchorage	Saturday	October 22
Nunapitchuk	Wednesday	October 26
Emmonak	Friday	October 28
Fairbanks	Saturday	November 5
Chalkyitsik	Tuesday	November 8
Kenai	Wednesday	November 9
A.F.N.	Friday	November 11
Galena	Thursday	November 17
Copper Center	Saturday	November 19
Cordova	Tuesday	November 29
Hoonah	Wednesday	November 30
Ketchikan	Saturday	December 3

8/25/77

Alaska State Legislature

House

JUNEAU ALASKA

INTERIM COMMITTEE ON SUBSISTENCE

PROPOSED TRAVEL SCHEDULE FOR MEETINGS/HEARINGS -- Subject to Change

Kipnuk, Alaska	Anderson, Akers, Larson	September 3,4,5
Kotzebue, Alaska	Rodey, Cowper, Schaeffer, Anderson Larson	September 13
Nome, Alaska	Hayes, Cotten, Nakak, Anderson Larson	September 14
Fairbanks/Nenana/ Copper Center,Alaska	Cowper, Rodey, Anderson, Larson	October 3,4,5
Kodiak, Alaska	Rodey, Hayes, Nakak, Anerson, Larson	October 17
Anchorage, Alaska	ALL COMMITTEE MEMBERS (AFN, Inc. Convention/Public Hearing)	November 10,11,12
Galena, Alaska	Cotten, Akers, Cowper, Anderson, Larson	November 21
Juneau, Alaska	Schaeffer, Akers, Anderson, Larson	December 9
Barrow, Alaska	Schaeffer, Cotten, Hayes, Anderson, Larson	December 12

Alaska State Legislature

House

JUNEAU ALASKA

INTERIM COMMITTEE ON SUBSISTENCE

The purpose of this committee is as follows:

1. Seek a consensus of subsistence by collecting all views on the subject by holding hearings and reviewing available information on the issue.
2. Refine information on the subject and make a proposal to the next legislature regarding what the term subsistence means.
3. Investigate hunting and fishing and quantify the amount of food taken from the land to determine the actual value of dependence by regions.
4. Determine the feasibility of having a subsistence economist on the staff of various departments involved with land management and resource management.
5. Determine the impact of the various D-2 land selection proposals on subsistence hunting and fishing.
6. Evaluate the compatibility of present and projected subsistence needs and activities with the State and Federal government fish & game management structures, policies, and regulations, investigate alternatives that are justified, and propose legislation that is required.

Rep. Vic D. Anderson Jr.

Alaska State Legislature

House

JUNEAU ALASKA

SUBSISTENCE

Many citizens of our State of Alaska are wrestling with the issue of subsistence. The word as commonly defined means the minimum of food and shelter necessary to support life or a source of means of obtaining the necessities of life.

Subsistence farming is a system of farming that provides all or almost all of the goods required by the farm family usually without surplus for sale. Alaskan people have harvested all of their food from the lands and waters of the State in the recent past. Even today much of the food on the tables of Alaskans comes from the land.

1. The Interim Committee on Subsistence would look at the Alaska lifestyle to determine how our citizens view the issue of subsistence. There is a vast storehouse of knowledge available on the subject which can be collected and analyzed for use in looking at land and water management policy. The idea would be to summarize existing information for developing a broader understanding of how subsistence impacts the lifestyle of all Alaskan residents.

2. Analysis of existing information would be necessary to refine the available information as seen through the eyes of an economist. Furthermore, the legislature would have a better understanding of what alternatives there are available to including subsistence in the development of a land and water management plan for the State. Finally, we would hope to bring to the legislature a better concensus of what the term "subsistence" in Alaska means to its people.

3. The Committee would gather available information to determine the amount of food taken from the land and waters of the State. Hearings would be held in several areas to hear urban and rural statements regarding their dependence on food taken from the land and waters of the State. An effort would be made to value an equivalent food replacement if it were purchased from store shelves.

4. State government does not have in its employ any staff to address subsistence as an economic base for its citizens. The Department of Fish and Game would be a candidate for an employee to deal with subsistence issues. Public statements regarding subsistence may fall on deaf ears unless a staff member can evaluate the impact of subsistence on new regulations regarding land and resource management.

Other departments which could benefit would be the Department of Natural Resources and the Department of Community and Regional Affairs. The Committee would take a close look at the need for subsistence staff and make recommendations to the legislature accordingly.

5. D-2 land considerations could have a dramatic affect on land and resource use by Alaska residents. Each resident who takes food from the land and waters of our State have a vested interest in protecting the source of their food supply. Fish, sea mammals, birds, berries, wood for fuel and building are important necessities that assist in supporting our citizens. A hard look at various D-2 proposals must be made and they should be examined to see that subsistence hunting, fishing and gathering activities are not preempted.

6. Our State must inform itself on the issue of subsistence to see that the concept is not destroyed before subsistence activities are curtailed by long range land and water management plans of the State and Federal government. The Committee would evaluate present and projected subsistence needs to see if they comply with the State and Federal governments' structures, policies and regulations.

Finally, the Committee would investigate various alternatives that are justified and propose legislation consistent with constitutional restraints.

NAA:agw

TABLE OF CONTENTS

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

[redacted]

STAFF

BETHEL FIELD OFFICE -- P. O. BOX 90
Michael D. Jonrowe (Kuskokwim Area Biologist)
Rae Baxter (Kuskokwim Research Biologist)

ANCHORAGE REGIONAL OFFICE -- 333 Raspberry Road
Gary Schaefer (Kuskokwim Research Biologist)

INDEX TO FIGURES AND TABLES

APPENDIX TABLES

APPENDIX TABLES (Continued)

PREFACE

This report presents all available information concerning the management of commercial and subsistence fisheries in the Kuskokwim district. Although data from many special research projects are included in this report, complete documentation of these projects and results will be presented in separate reports. All catch data tables are based upon field data.

Data presented in this report supercedes information found in previous management reports. An attempt has been made to correct errors in previous reports and previously unrecorded data have been incorporated into this report which are so indicated by appropriate footnotes.

This report is organized into the following major sections:

1. District Introduction. This is a general and brief description of the area, inhabitants, fishery resources, fisheries and management practices.
2. District Summary. This section summarizes current year data for the area and makes comparisons with previous years.
3. Subdistrict Reports. There are several unique and separate fisheries in the district and separate comprehensive reports are presented for each.

In order to facilitate use of this report, the tabular data has been separated into current year tables and appendix tables where annual comparisons are made. The text for each major section is followed by current year tables and then appendix tables.

The following is an explanation of how effort and catch per unit effort data, presented throughout this report, have been derived. Total boat (or fisherman) hours are computed by arbitrarily assuming that if a fishing boat delivers in any 24 hour fishing period, it fished the

Commercial Fishery

Although the Kuskokwim district commercial fishery is the oldest in the AYK region with catches reported as early as 1913, commercial fishing did not mature for a half-century. For many years, small commercial mild-cure operations were conducted in or near Kuskokwim Bay while the Kuskokwim River fishery remained virtually undeveloped. During the 1930's when dog teams were intensely utilized for freight hauling, a "quasi-commercial" fishery operated in the McGrath area for the sale of dried, subsistence caught salmon for dog food. However, this fishery declined with the dog teams and the Kuskokwim district experienced little additional commercial effort until Alaska became a state more than twenty years later.

Commercial salmon fishing activity has grown significantly since statehood as district fishermen have been making the difficult transition from a subsistence culture to a cash economy. This has affected fishing effort, resulting in a tremendous expansion in fishermen numbers and in increased, sustained effort. Fishing vessels have remained virtually unchanged over the years, but increased utilization of highly mobile nylon drift nets has greatly improved the efficiency of the fleet. Of course, the overall expansion of the commercial fishery could not have been accomplished without improvements in processing and tendering facilities that have occurred throughout the district (Appendix Table 1).

King, red, coho, pink and chum salmon are of primary commercial significance in the Kuskokwim district. Although these fish are commercially utilized locally to some extent, the vast majority are transported from the district as a fresh or frozen product. Sheefish and whitefish are harvested incidentally to the salmon catch, however, a limited fall and

winter "whitefish fishery" is conducted to satisfy local market requirements.

Subsistence Fishery

District residents have long depended upon the fishery resources as a source of food. Until relatively recently, traditional fishing methods and materials limited the size and scope of the fishery. Spears, dip nets, fish traps, and willow or caribou strip gill nets were slowly supplanted by more efficient linen gill nets enabling the fishery to expand tremendously. Whitefish, cisco, black fish, pike, burbot, and sheefish have been historically utilized along with salmon, particularly chum salmon. Recent improvements in fishing gear, notably the introduction of nylon gill net webbing, have increased the availability and importance of king salmon since statehood. Estimated peak subsistence salmon harvest levels were reached during the 1930's coincidentally with the quasi-commercial McGrath fishery, but harvest trends indicated a continuing decline into the 1940's. Little additional catch data is available for the twenty year span prior to statehood (Appendix Table 1).

Today the dependence on fish for personal use remains as important as money realized from the commercial fishery. However, several factors, as yet not totally defined, are affecting the complexion of the subsistence fishery. These factors include:

(1) Increasing commercialization of subsistence products.

(2) Cultural changes of local residents.

(3) Various State and Federal social-aid programs.

Any management of the Kuskokwim district fishery resources must take into account the growing - and changing - requirements of the subsistence fishery.

Subsistence Salmon Roe Fishery

The Governor approved legislation on May 29, 1975 allowing the sale of subsistence caught salmon roe within the AYK region. In order to administer the legislation, the Commissioner of Fish and Game issued an emergency regulation in June, 1975 which controlled the purchase and sale of subsistence roe in portions of the region. The key elements of the emergency regulation were:

1) Permits are required of all persons or companies purchasing or processing subsistence-caught roe.
2) Revocation of permits upon violation of permit terms, regulations or laws.
3) Strict reporting requirements in regard to amount of subsistence-caught roe in order that estimates of subsistence harvests can be made.
4) Prohibition of subsistence-caught roe sales when subsistence harvests are likely to exceed traditional personal use needs.
5) Prohibition of subsistence-caught roe sales in districts and subdistricts where salmon runs are especially vulnerable to overharvest or where subsistence catches in the past have been negligible.

Numbers of salmon were "back-calculated" from reported subsistence roe poundages by utilizing in-season sampling of the various runs. Therefore, estimates of the subsistence harvest were possible and were available for in-season management purposes. Attachment 1 presents a comprehensive review of the "subsistence roe fishery".

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of the commercial and

subsistence fisheries within the Kuskokwim district. The permanent staff assigned to this district includes one management biologist and two research biologists. In addition, 10-15 temporary summer employees are hired each season to assist the permanent staff in conducting various management and research studies.

The main objective of the Department's program is to manage the commercial salmon fisheries on a sustained yield basis in addition to obtaining needed information to determine the potential for commercial fisheries on under utilized species such as herring, char and whitefish. Present commercial salmon fishing regulations are still relatively restrictive in order to insure that sufficient salmon are provided for subsistence fishery and spawning ground requirements.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is normally allowed from 6 hours to four days a week during the open season, depending upon the sub-district and species involved. Fishing effort usually occurs during the entire run and not just during any particular segment of the run. Occasionally more, or less, fishing time is allowed, depending upon fishing conditions, the strength of the runs or spawning escapements as determined by special studies conducted by the Department.

Due to the vast size of the area and the turbid nature of many streams, accurate estimates of the size of salmon runs and the spawning escapements are difficult to obtain. Fishery management is also hampered by the relative lack of comparative catch and return information since all the fisheries were either initiated or expanded through regulation changes since 1961 and 1962. The management problem is further compounded by having to provide sufficient escapement after commercial fishing for the important subsistence fishery as well as for spawning purposes.

Subsistence Fishery

Methods: The annual survey of the Kuskokwim River subsistence fishery was initiated in 1960. During the early years, the Department utilized "smokehouse counts" to determine total utilization of subsistence-caught fish. In an effort to determine additional timing and magnitude data, the Department began using "subsistence catch calendars" which are distributed to fishermen prior to the fishing season. Subsistence fishermen enter their daily catches of salmon and non-salmon species on the calender. During July and August a Department crew utilizes a cabin skiff to travel more than 360 river miles (Eek to Swift River) to collect catch data from the individual fishermen in addition to recording certain information from non-fishing families. After the river survey is completed, catch questionaries are sent to those fishermen not individually contacted.

In the 1969 Annual Report, a review is presented regarding methods used to obtain subsistence harvest and related information. All subsistence information presented in tabular form in this report, except in Appendix Table 17 represents "expanded data". This includes those families known to have fished but for one reason or another were not personally contacted by the survey crew. Catch data for these families are assumed to be the same as the averages for the particular village and are included in most of the tables.

Reported coho salmon catches are very minimal as the coho salmon run occurs after the survey is completed. Most of the coho salmon catch data is obtained from the return of catch calenders. Prior to 1969, little effort was made to determine the coho salmon harvest. The coho salmon estimates are not included in the comparative catch tables.

Catch and Effort: The Kuskokwim River system's harvest included 57,917 king salmon and 223,792 chum salmon utilized by 672 fishing

families during 1976 (Table 11). The king salmon catch was the largest since 1970 and was 33 percent above the recent 15 year average (Appendix Table 13). The chum salmon harvest was 18 percent below the high 1974 catch, but 8 percent above the recent 16-year average (Appendix Table 14).

In order to evaluate the effect of snowmachines on the subsistence harvest, all fishing families interviewed since 1967 have been checked for the number of snowmachines they owned. The number of families owning snowmachines has more than doubled since 1969 (Appendix Table 15). Average numbers of snowmachines per fishing family during 1967-1975 are shown in Appendix Table 16.

The public relations aspect of the annual subsistence fishery survey is important to the success of the survey itself and the Department's management program. By any method tested, the results of the voluntary contribution of the people of this program are as accurate as the people are capable of giving. The major problem is that many of the fishermen are illiterate and speak only Eskimo and have to relay much of the catch information through their school-age children.

There is still a moderate sale or trading of dried salmon on the Kuskokwim River, but is not documented. People from the coastal delta villages still bring their pokes of seal oil to trade for dried fish. The lower river dried fish are now primarily being used for human consumption.

The use of the fishwheel to capture salmon is slowly disappearing from the Kuskokwim River. Only 8 fishwheels were used along the survey route in 1976, compared to 30 in 1965 and 65 in 1960. The fishwheel is being replaced by the much more mobile gill net, which involves a lot less time and effort to operate. The use of gill nets is a relatively new technique for most Kuskokwim River residents. The efficiency of the two types of gear is difficult to evaluate, as large catches are often made with both. Table 15 presents an overview of all the subsistence data conducted in 1976.

Escapement

Kuskokwim River drainage escapement estimates from aerial surveys have proved difficult and costly to obtain. Varying stream and weather conditions, in addition to pilot and observer skills, often make the data difficult to interpret (Appendix Table 18). Although aerial surveys will be continued for some streams, emphasis will be placed on obtaining accurate escapement figures by use of counting towers or weirs on several "key" spawning tributaries.

All the kuskokwim River aerial survey results for 1976 are presented in Table 12. Escapements of kings, chums and reds were generally above average as documented by aerial survey.

A counting tower has been operated yearly on the Kogrukluk River (Holitna River system) since 1969 (except 1971). The Kogrukluk River crew counted 3,261 kings, 9,170 chums, and 4,433 reds. The chum and red salmon counts were the highest on record, while the king count was average in magnitude.

QUINHAGAK (SUBDISTRICT 4)

Commercial Fishery

The Quinhagak fishery is one of two located south of the Kuskokwim River mouth (Figure 1). This fishery has traditionally been very sporadic due to unstable processing facilities, however, the commercial fishery has stabilized during the past few seasons.

Fishing regulations for this subdistrict are very similar to those found on the Kuskokwim River, except that there are no distinct fishing seasons. Beginning with the 1971 season, the basic fishing period was reduced from two 24-hour periods to two 12-hour periods per week. Commercial fishing is allowed only in Kuskokwim Bay waters. This is necessary to ensure escapement of adequate numbers of salmon up the

narrow Kanektok River. The vast majority of gear operated consists of drift gill nets that are fished at low tide in "gutters" located two to three miles off shore and next to shore at high tide. Most of the fishing takes place near the mouth of the Kanektok River.

The Kanektok River king salmon run is later than that of the Kuskokwim River and for this reason the Quinhagak fishery opening is delayed until mid-June. The delayed opening prevents possible interception of Kuskokwim River fish and aids in preventing overharvest of the king salmon run.

Fishermen were required to use small mesh gear (6-inch stretched mesh or smaller) during the entire commercial fishing season. This was necessary primarily to prevent selective harvesting of the larger, more productive king salmon by the large mesh nets. However, the mesh limitation was also designed to increase harvests of the more abundant "other salmon" species (i.e. red, pink, chum, and coho).

The commercial salmon season was opened on June 21 with two 12-hour fishing periods a week continuing until July 19 when an additional 12-hour period was added to the schedule. (Table 16). A total of 14,110 kings, 6,090 reds, 13,777 cohos, 31,412 pinks and 43,659 chums totalling 109,048 fish was taken. All catches were considerably above the recent 5 year averages with the exception of the red salmon catch (Appendix Table 3). Fishermen were placed on limit for much of the season by one of the major buyers. Commercial fishing effort totaled 181 fishermen, an 8 percent decrease from the record 1974 levels but still above average.

Subsistence Fishery

Accurate comparable subsistence data has been lacking for the Quinhagak subsistence fishery during recent years. However, observation by the staff indicates that dependence on subsistence fishing has not been high. Apparently the greatest amount of fishing effort occurs in

the Kanektok River after the commercial fishing season when mostly coho salmon are taken.

Methods used to tabulate catches made by Quinhagak fishermen were similar to those used for the Kuskokwim River survey. A total of 50 Quinhagak fishing families returning catch calendars reported catching 2,200 kings and 5,950 "other salmon"..

Appendix Table 17 shows comparative catch data for 1967-76.

Escapement

Escapement counts made during various aerial surveys of the Kanektok River system are shown in Table 17. Poor weather conditions frequently hampered aerial surveys in the Quinhagak subdistrict. The king salmon escapement appeared to be at least average in magnitude. Based on comparative catch data, escapement of all other species was probably average also.

GOODNEWS BAY (SUBDISTRICT 5)

Commercial Fishery

Traditionally, the male residents from the villages of Goodnews Bay and Platinum have gone to Bristol Bay each summer to fish or work in the canneries, leaving the women and children home to fish for subsistence purposes. Prior to 1968, there are no records indicating that commercial salmon harvests were ever made in Goodnews Bay. The Department held public meetings in the area during the early 1960's regarding the possibility of initiation of a commercial fishery, but the negative response from village residents plus the absence of salmon buyers precluded this development.

In late August of 1968, the commercial salmon fishing was opened by emergency order in Goodnews Bay. This commercial fishery was created as

a result of a request from area residents and Department surveys, which indicated that a small harvestable supply of salmon was available. The fishery has been sporadic in nature due to inconsistent processing capabilities and inclement weather.

The commercial salmon season was opened June 21. The harvest was composed of 4,417 kings, 5,575 reds, 9,852 cohos, 8,453 pinks and 10,354 chums, totaling 38,651 fish. The king salmon catch was 51 percent above the 1975 harvest and 56 percent above the recent five-year average. Numbers of reds were 40 percent below the 1974 record level but were 22 percent above the recent average. The coho salmon harvest was 54 percent below 1974 record but 6 percent above the five-year average, while the chum salmon harvest was 37 percent below the 1974 record and 36 percent above the recent average. Commercial fishing terminated on September 11 when buyers left the subdistrict (Table 18).

A total of 40 fishermen made commercial landings in 1976, a decrease of 24 fisherman below 1975 levels.

This fishery has an important potential enforcement problem, indicated by fishermen's reports of illegal commercial fishing in the Goodnews River. Department personnel held several meetings in Goodnews Bay to discuss the fishing activities, and toward the end of the season, illegal fishing in the Goodnews River abated somewhat.

Subsistence Fishery:

Subsistence information from Goodnews Bay was very sparse for 1976. Subsistence catches from the subdistrict are always minimal.

Escapement:

Escapements of all species in the Goodnews River appeared adequate.

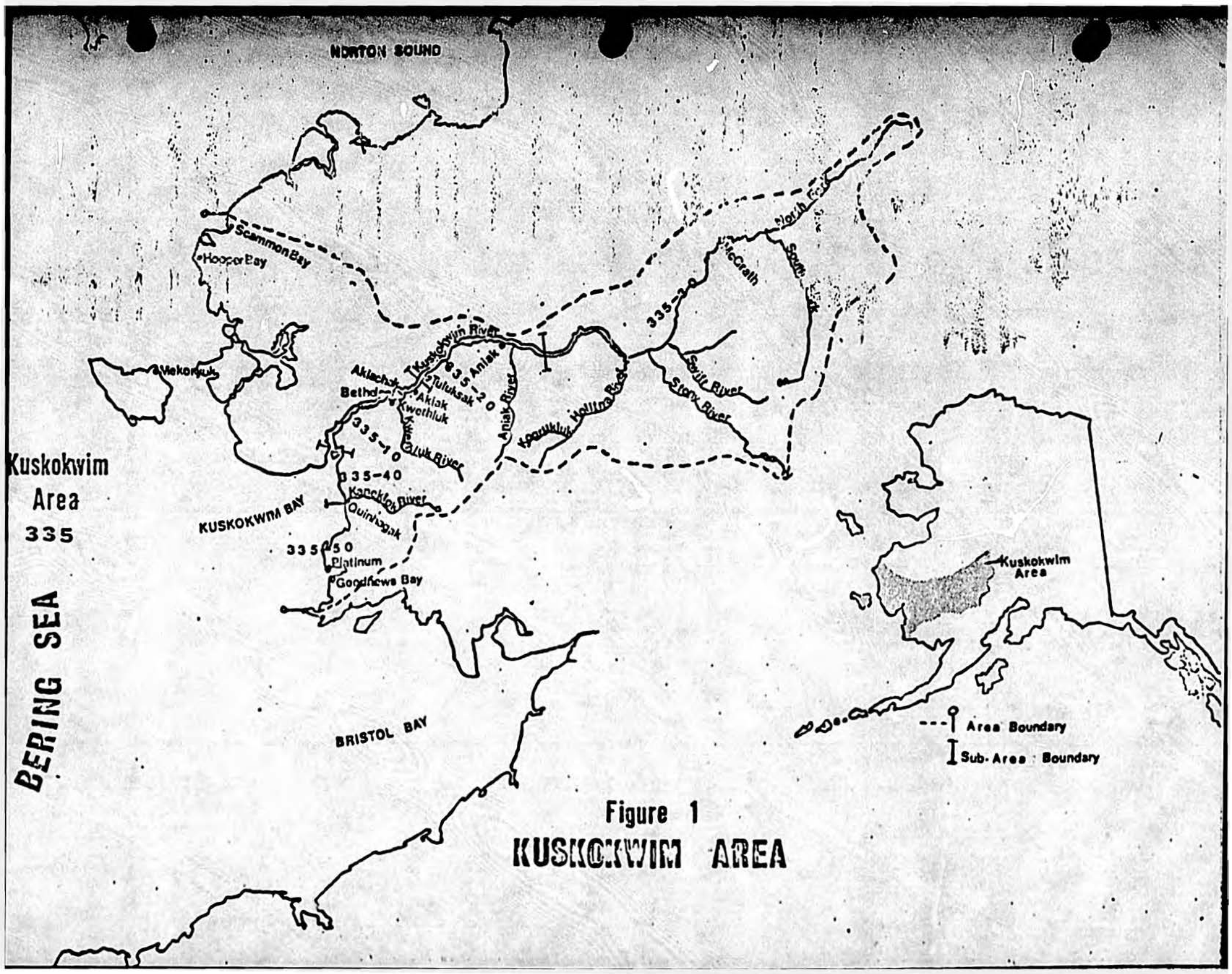


Figure 1

KUSKOKWIM AREA

Table 8. Commercial and subsistence salmon catches by species and statistical area, Kuskokwim district, 1976.

Subdistrict	King	Red	Coho	Pink	Chum 1/	Total
335-10 Lower Kuskokwim						
Commercial	27,418	2,971	87,933	133	176,727	295,182
Subsistence 2/	46,522	-	- 3/	-	140,258	186,780
Total	73,940	2,971	87,933	133	316,985	481,962
335-20 Middle Kuskokwim						
Commercial	3,317		568		1,137	5,022
Subsistence 2/	9,507		- 3/		58,537	68,044
Total	12,824		568		59,674	73,066
335-30 Upper Kuskokwim						
Commercial	0		0		0	0
Subsistence 2/	1,888		- 3/		24,997	26,885
Total	1,888		0		24,997	26,885
Subtotal Kuskokwim River						
Commercial	30,735	2,971	88,501	133	177,864	300,204
Subsistence 2/	57,917	-	- 3/	-	223,792	281,709
Total	88,652	2,971	88,501	133	401,656	581,913
335-40 Quinhagak						
Commercial	14,110	6,090	13,777	31,412	43,659	109,048
Subsistence 2/	2,217	-	- 3/	-	5,930	8,147
Total	16,327	6,090	13,777	31,412	49,589	117,195
335-50 Goodnews Bay						
Commercial	4,417	5,575	9,852	8,453	10,354	38,651
Subsistence	201	-	- 3/	-	1,428	1,629
Total	4,618	5,575	9,852	8,453	11,782	40,280
Total Kuskokwim District						
Commercial	49,262	14,636	112,130	39,998	231,877	447,903
Subsistence 2/	60,335	-	- 3/	-	231,150	291,485
Total	109,597	14,636	112,130	39,998	463,027	739,388

1/ Subsistence catches contain small numbers of red and pink salmon.

2/ Expanded data.

3/ Insufficient data for valid determination.

Table 15. Kuskokwim River subsistence fishery data, 1976.

Village	Fishing Family Data				Estimated Salmon catch 1/			Units of Gear		
	Families	People	Dogs	Snow-Machines	King	Other 2/ Salmon	Coho 3/	8-1/2" Nets	5-1/2" Nets	Fish Wheels
Kipnuk										
Kwigillingok					75	463				
Kongigonak					122	439				
Eek	24	134	75	28	3232	3637	788	19	15	
Tuntutuliak	29	183	112	36	4807	8390	50	27	25	
Kasigluk	29	240	8	37	1613	4044	6	19	19	
Nunapitchuk	33	223	134	54	2578	6466	85	23	23	
Atmauthluak	13	82	33	15	1159	3361	85	12	10	
Napakiak	34	204	83	42	3330	9265	212	32	31	
Oscarville	7	45	31	7	623	2376	40	7	3	
Napaskiak	18	121	63	22	3566	21380	138	18	19	
Bethel	97	720	258	105	13215	26533	437	83	78	
Kwethluk	43	245	203	58	4193	26443	677	41	40	
Akiachak	29	209	91	43	4915	15298	752	26	25	
Akiak	22	135	207	28	3076	12163	174	23	25	
Tuluksak	22	169	98	30	1411	11673	160	19	23	
Lower Kalskag	23	139	105	26	4536	17158	11	18	20	
Upper Kalskag	15	83	73	15	1413	8527	167	11	13	
Aniak	14	73	47	13	1490	13355	152	10	7	2
Chuathbaluk	9	58	26	26	657	7824	143	8	8	
Napaimute	2	7	8	2	420	1636	17		2	1
Georgetown										
Crooked Creek	5	35	20	3	264	3236		2	4	1
Red Devil	3	15	13	3	195	4231		1	3	1
Sleetmute	13	57	50	5	356	7571	57	3	13	
Stony River	6	30	36	9	620	5523		2	7	3
Lime Village	4	18	33		33	2800	161		6	
Totals	494	3225	1880	607	57917	223792	4312	404	419	8

1/ Expanded data.

2/ Mostly chum with lesser number of reds, pinks, and a few small kings.

3/ Data is very fragmented and minimal.

Appendix Table 8. Total utilization of Kuskokwim River king salmon, 1960-1976.

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960	5,969	20,361	26,330
1961	18,918	30,910	49,828
1962	15,341	14,642	29,983
1963	12,016	37,246	49,262
1964	17,149	29,017	46,166
1965	21,989	27,143	49,132
1966	25,545	49,606	75,151
1967	29,986	57,875	87,861
1968	34,278	30,230	64,508
1969	43,997	40,138	84,135
1970	39,290	69,204	108,494
1971	40,274	42,926	83,200
1972	39,454	40,145	79,599
1973	32,838	38,526	71,365
1974	18,664	26,665	45,329
1975	21,720	47,784	69,504
1976	30,735	57,917	88,652
5 year average	30,590	39,209	69,799

1/ Subdistricts 335-10, 335-20 and 335-30.
2/ Catches are expanded and include all villages surveyed each year. Data includes a few villages not included in comparative catch tables.

Appendix Table 10. Total utilization of Kuskokwim River chum salmon, 1960-1976

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960		327,297	327,297
1961		185,447	185,447
1962		165,626	165,626
1963		141,550	141,550
1964		189,660	189,660
1965		283,459	283,459
1966		174,660	174,660
1967	148	205,263	205,411
1968	187	260,023	260,210
1969	7,165	198,628	205,793
1970	1,664	245,550	247,214
1971	68,914	116,391	185,305
1972	78,619	120,316	198,935
1973	148,746	179,259	328,005
1974	171,887	277,170	449,057
1975	181,840	176,389	358,229
1976	177,864	223,792	401,656
5 yr. average	130,001	173,905	303,906

1/ Subdistricts 335-10 and 335-20.
2/ Catches are expanded and include all villages surveyed each year, 335-10, 335-20 and 335-30.

Appendix Table 13. Comparative Kuskokwim River king salmon subsistence catches by village, 1960-1976

Village	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kwigillingok, Kipnuk, Kongiganak	250	283	54	229	414	0[1]	205	957	70	385	1,111
Eek	1,474[3]	2,238[3]	1,060[3]	2,697[3]	1,857	2,737	2,872	4,375	2,760	2,037	2,065
Tuntutuliak	226	2,226	842	2,853	1,826	1,978	3,061	3,338	2,026	2,195	3,558
Kasigluk	135	1,215	127	1,302	[4]	513	1,875	2,766	1,360	2,888	3,931
Nunapitchuk	683	2,042	848	1,874	636	490	2,875	1,926	1,360	2,279	4,680
Atmauthluak[6]											1,205
Napakiak	1,830	2,573	2,191	3,148	2,677	1,670	3,592	3,922	2,317	3,546	4,960
Oscarville	1,968	282	75	309	339	678	301	1,327	393	457	542
Napaskiak	536	1,258	759	1,569	2,201	1,412	2,935	3,091	1,647	2,227	3,446
Bethel	1,923	4,150	1,378	7,019	4,114	3,342	7,604	11,772	4,900	7,472	17,026
Kwethluk	2,692	3,763	2,329	5,050	3,262	4,538	6,135	6,889	3,549	3,187	7,932
Akiakchak	1,626	3,052	1,800	2,533	3,488	3,952	4,957	5,543	3,415	2,602	7,022
Akiak	1,865	3,159	906	2,869	2,495	1,774	3,941	3,790	1,332	1,275	3,290
Tuluksak	737	1,486	493	1,295	572	1,019	1,559	1,710	1,048	1,131	1,995
Lower Kalskag	961	571	805	2,661	710	841	1,918	1,733	1,463	2,083	2,146
Upper Kalskag	667	1,049	[7]	[7]	1,143	719	1,333	1,699	1,404	1,623	734
Aniak	1,057	688	185	602	1,104	494	2,002	1,415	467	1,406	2,136
Chuathbaluk	64	54	10	30	74	29	139	217	40	180	219
Napamute	20	16	44	52	134	2	78	60	100	19	22
Crooked Creek	747	518	561	859	1,358	363	1,249	638	77	541	684
Georgetown	[10]	[10]	[10]	[10]	[10]	[10]	12	[10]	[10]	9	2
Red Devil	[10]	40	144	228	314	[10]	182	[10]	111	142	232
Sleetmute	465	222	[9]	[9]	[9]	491	149	343	200	267	161
Stony River	435	25	31	67	299	101	632	364	191	2,187	105
Totals	20,361	30,910	14,642	37,246	29,017	27,143	49,606	57,875	30,230	40,138	69,204

Village	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974-1976 Average
Kwigillingok, Kipnuk, Kongiganak	241	10	75	[10]	[10]	197	330	65.67
Eek	1,882	1,969	1,981	2,356	2,110	3,232	2,286	2,566
Tuntutuliak	1,841	3,214	2,859	1,577	3,492	4,807	2,289	3,292
Kasigluk	1,645	1,292	1,864	1,411	1,713	1,613	1,609	1,579
Nunapitchuk	1,970	2,496	2,663	1,165	2,092	2,578	1,916	1,945
Atmauthluak[6]	548	864	1,106	382	1,042	1,159	931	861
Napakiak	1,868	2,009	1,763	1,224	2,864	3,330	2,719	2,473
Oscarville	570	196	586	180	891	623	573	565
Napaskiak	1,916	1,578	2,048	900	2,308	3,566	1,902	2,258
Bethel	8,731	8,371	8,898	4,631	11,688	13,215	6,907	9,845
Kwethluk	5,564	5,137	3,444	2,694	3,179	4,193	4,534	3,355
Akiakchak	4,818	3,872	2,592	1,726	3,534	4,915	3,662	3,392
Akiak	2,688	1,899	1,895	1,292	2,837	3,076	2,366	2,402
Tuluksak	1,280	1,318	1,322	883	1,338	1,411	1,212	1,211
Lower Kalskag	2,355	2,604	1,309	1,586	2,755	4,536	1,583	2,959
Upper Kalskag	601	401	938	463	1,752	1,431	1,026	1,215
Aniak	1,076	2,105	1,030	1,952	1,391	1,490	1,126	1,611
Chuathbaluk	179	261	942	674	594	657	174	642
Napamute	17	20	13	6	226	420	43	217
Crooked Creek	291	183	269	650	238	264	596	384
Georgetown	0	0	0	[9]	[10]	[10]	4	[10]
Red Devil	135	182	138	205	623	195	168	341
Sleetmute	181	69	504	269	256	356	277	294
Stony River	2,521[11]	95	287	439	861	653[11]	524	651
Totals	42,926	40,145	38,526	26,665	47,784	57,917	38,757	44,122

1/ Included with other villages.
2/ Does not include 1965
3/ Estimates based on catch data through 1969
4/ Included with Eek
5/ Does not include 1964
6/ New village of Atmauthluak segregated in 1970 from parent village of Nunapitchuk.
7/ Included with Lower Kalskag
8/ Does not include 1962 and 1963
9/ Included with Red Devil
10/ Data not available
11/ Includes Lime Village

ndix Table 14. Comparative Kuskokwim River "other salmon" subsistence catches by village, 1960-1975.[1/2/]

age	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974 1976 Average
uk, Kongiganak, KWINHE																			
igillingok, KWIG···	1,430	3,279 4/	1,990 4/	2,562 4/	2,323	0	680	2,846	2,800	2,481	3,937	1,110	1,284	807	9/	9/	902	1,966	902
EEK	4,094 4/	2,321 4/	2,072 4/	1,771 4/	3,151	2,898	1,324	1,922	3,503	3,436	4,855	2,213	783	2,401	4,227	2,754	4,425	2,625	3,802
utuliak, TUNT···	4,101	8,526	9,692	6,791	8,421	18,993	9,747	11,531	14,090	17,462	10,600	9,964	11,103	13,572	28,321	7,429	8,440	11,042	14,730
gluk KASIGLUK	1,400	3,657	1,705	1,020	5/	4,041	3,058	2,309	4,311	3,308	5,731	2,043	1,934	6,090	6,773	3,708	4,050	3,124	4,843
pitchuk NUNAP···	2,743	4,868	7,474	2,462	1,171	4,251	4,145	6,278	7,731	6,934	11,412	3,375	5,600	7,663	12,498	5,447	6,551	5,436	8,165
uthluak ATMAUTH···											1,191	1,197	947	2,818	4,585	2,524	3,446	1,538	3,518
ekok NAPAKIAK	19,888	5,789	6,167	3,711	12,312	12,928	9,275	12,685	12,700	12,390	16,371	4,427	5,191	8,461	21,494	11,630	9,477	10,164	14,200
uitte OSCARVILLE	3,948	1,680	1,723	1,025	487	8,010	407	2,580	2,104	2,743	4,669	1,675	498	3,081	6,617	3,237	2,416	2,474	3,756
ktak NAPAKIAK	5,199	4,286	5,546	3,584	6,275	26,206	8,743	8,585	12,409	11,655	11,169	7,039	8,858	8,478	20,467	12,930	21,518	9,145	18,305
T BETHEL	12,972	12,845	8,470	8,623	15,623	19,099	14,011	14,055	28,603	14,613	33,475	9,905	16,885	33,930	34,892	26,808	26,970	17,365	29,223
luk KWETHLUK	32,975	21,106	22,788	13,188	19,186	37,780	18,707	23,872	36,645	23,462	27,702	13,941	11,721	19,565	39,747	19,183	27,120	23,046	28,763
ktak OKIAKCHAK	15,932	12,518	10,521	6,725	10,096	25,138	15,049	13,584	19,461	10,306	29,776	12,298	9,266	9,864	15,108	14,008	16,050	14,324	15,055
AKIAK	13,061	8,205	6,551	8,478	9,659	12,297	10,622	9,332	13,775	9,854	13,003	9,264	5,108	6,118	18,424	18,890	12,337	9,666	16,553
ksak TOKLIKSUK	19,261	7,928	8,526	10,289	9,777	12,820	11,670	8,898	11,114	6,058	7,626	5,115	5,145	5,948	13,261	7,819	11,833	9,298	10,971
r Kalskag LOWER	11,563	7,764	16,478	23,249	9,472	21,906	10,346	16,018	8,114	8,468	11,158	3,509	3,490	2,873	12,265	9,823	17,169	11,029	13,085
r Kalskag UPPER	38,398	27,149	7/	7/	11,391	11,970	6,236	8,364	9,733	9,413	5,309	3,530	1,460	5,607	9,631	6,904	8,694	11,547	8,409
k ANIAK	36,673	15,935	10,120	10,608	17,874	11,353	12,484	16,788	17,341	15,127	10,030	4,933	5,243	13,547	9,305	9,597	13,507	14,147	10,803
tnbaluk CHUATH····	22,370	2,922	3,784	2,629	5,059	6,507	5,625	7,249	11,588	7,523	10,971	5,632	8,509	14,171	4,287	561	7,967	8,181	4,271
Pute NUNAPITCHUK	11,017	6,235	3,898	5,192	4,873	704	3,704	5,750	1,774	1,453	1,224	1,862	4,645	3,451	76	226	1,653	3,504	651
ed Creek, CROOKED	41,263	17,558	27,259	23,166	32,550	18,986	19,467	14,365	12,704	6,810	9,216	3,094	3,658	1,981	4,954	2,461	3,236	16,577	3,550
ycetown GEORGETOWN	9/	9/	9/	9/	9/	9/	70	9/	2,030	3,664	800	0	0	10	9/	9/	9/	939	9/
Devil RED DEVIL	9/	1,350	9,007	5,367	5,706	9/	2,746	9/	2,400	1,130	2,454	1,067	1,695	2,782	2,688	4,481	4,231	3,246	3,800
nute SLEETMUTE	17,259	6,884	10/	10/	10/	11,707	2,611	6,875	11,218	8,258	4,464	3,203 11/	4,293	2,168	4,212	5,761	7,628	7,176	5,867
r River STONY	11,750	2,642	1,855	1,110	4,254	15,865	3,933	11,377	13,875	12,080	8,407	5,995 11/	3,000	3,875	4,328	5,202	8,484 11/	7,144	6,004
ls	327,297	185,447	165,626	141,550	189,660	283,459	174,660	205,263	260,023	198,628	245,550	116,391	120,316	179,259	277,170	176,389	228,104	205,183	229,246

Catches include a majority of chum salmon but include small numbers of red, coho, pink and small king salmon.
1965 to 1972 catches do not include late coho salmon catches.
Does not include 1965.
Estimate based on catch data through 1970.
Included with Eek.
Does not include 1964.
Included with Lower Kalskag.
Does not include 1962 and 1963.
Data not available.
Included with Red Devil.
Includes Lime Village.

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/

Year	Families	People	Dogs	Snow-machines	Average per family					
					People	Dogs	Snow-machines	Kings	Other Salmon	Percent fam with snowma
1967										
With snowmachine	59	410	288	63	6.95	4.88	1.07	143	355	14
Without snowmachine	359	2,264	1,963	0	6.31	5.47	0	101	404	
1968										
With snowmachine	159	1,100	808	182	6.92	5.08	1.14	70	382	30
Without snowmachine	374	2,247	2,052	0	6.01	5.49	0	51	493	
1969										
With snowmachine	158	1,097	876	189	6.94	5.54	1.20	78	306	45
Without snowmachine	191	1,208	1,173	0	6.32	6.14	0	71	425	
1970										
With snowmachine	287	1,962	1,413	375	6.84	4.92	1.31	121	380	58
Without snowmachine	212	1,201	972	0	5.66	4.58	0	87	413	
1971										
With snowmachine	361	2,459	1,504	494	6.79	4.16	1.37	89	243	74
Without snowmachine	128	734	601	0	5.73	4.70	0	84	278	
1972										
With snowmachine	278	2,096	949	385	7.54	3.41	1.38	76	220	77
Without snowmachine	85	508	328	0	5.98	3.86	0	48	247	
1973										
With snowmachine	343	2,246	1,375	506	6.55	4.00	1.48	79	362	81
Without snowmachine	81	429	283	0	5.15	3.49	0	47	254	
1974										
With snowmachine	337	2,153	1,339	491	6.39	3.97	1.46	47	495	88
Without snowmachine	68	350	158	0	5.15	2.32	0	29	342	

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/ (Continued)

Year	Families	People	Dogs	Snow-machines	Average per family					Percent families with snowmachines
					People	Dogs	Snow-machines	Kings	Other Salmon	
1975										
With snowmachine	313	2,029	1,252	482	6.55	4.00	1.54	79	309	84
Without snowmachine	59	313	126	0	5.30	2.13	0	62	301	
1976										
With snowmachine	416	2,815	1,578	607	6.77	3.79	1.46	91	340	81
Without snowmachine	78	410	302	0	5.26	3.87	0	60	306	

1/ Unexpanded data.

Appendix Table 16. Comparative Kuskokwim River subsistence fishery data, 1960-1976 4/

Year	Fishing families surveyed	Mean numbers per fishing family					
		People	Dogs	Snow-machines 1/	King Salmon	Other salmon 3/	Fishwheels
1960	247	5.89	6.66		60	1,074	2/
1961	342	6.02	6.33		39	453	.19
1962	349	6.50	6.30		79	470	.18
1963	405	6.14	5.29		87	351	.11
1964	394	6.33	5.44		70	454	.10
1965	332	5.95	5.45		64	669	.08
1966	492	5.91	4.49		91	320	.06
1967	472	6.36	5.22	.18	106	375	.06
1968	567	6.23	5.31	.35	53	447	.06
1969	376	6.49	5.51	.53	78	385	.05
1970	514	6.33	4.65	.75	108	384	.02
1971	488	6.53	4.30	1.01	88	238	.01
1972	576	6.78	3.08	1.00	51	166	.02
1973	408	6.55	3.84	1.48	81	356	.02
1974	596	6.24	3.61	1.12	45	466	.02
1975	437	6.41	3.99	1.35	79	310	.02
1976	494	6.53	3.81	1.23	86	335	.02

1/ Snowmachine count started in 1967.
2/ Information not available.
3/ Does not include coho salmon.
4/ Unexpanded data.

Appendix Table 17. Quinhagak subsistence fishery data, 1967-1976 1/

		Averages Per Fishing Family							
Year	Total Fishing Families	People	Dogs	Snow-machines	King Salmon	Dog Dalmon	Coho Salmon	8 1/2" Nets	5 1/2" Nets
1967	19	6.43	4.00		71	231		.86	1.00
1968	46	5.59	4.07	.28	88	234	380	.48	.54
1969	59	5.38	3.41	.46	27	29	179	.72	.28
1970	46	6.02	2.76	.74	47	110		.64	.69
1971	41	5.83	2.37	.73	55	87	36	.54	.73
1972	54	6.41	2.30	.80	56	116	9	.44	1.00
1973	44	5.80	2.07	.98	61	98	83	1.02	.98
1974	47	5.53	2.31	1.17	46	78	87	.63	.74
1975	46	5.86	1.85	1.13	71	88		1.00	.93
1976	50	5.62	2.2	1.42	44	119		0.84	1.24

1/ Expanded data.

Table of Contents

Alaska Department of Fish & Game
Division of Commercial Fisheries

[redacted]

Staff

Nome Field Office-P.O. Box 862
Frederic W. Kuhlmann (Norton Sound-Kotzebue Area Biologist)

Index to Figures, Tables and Appendix Tables

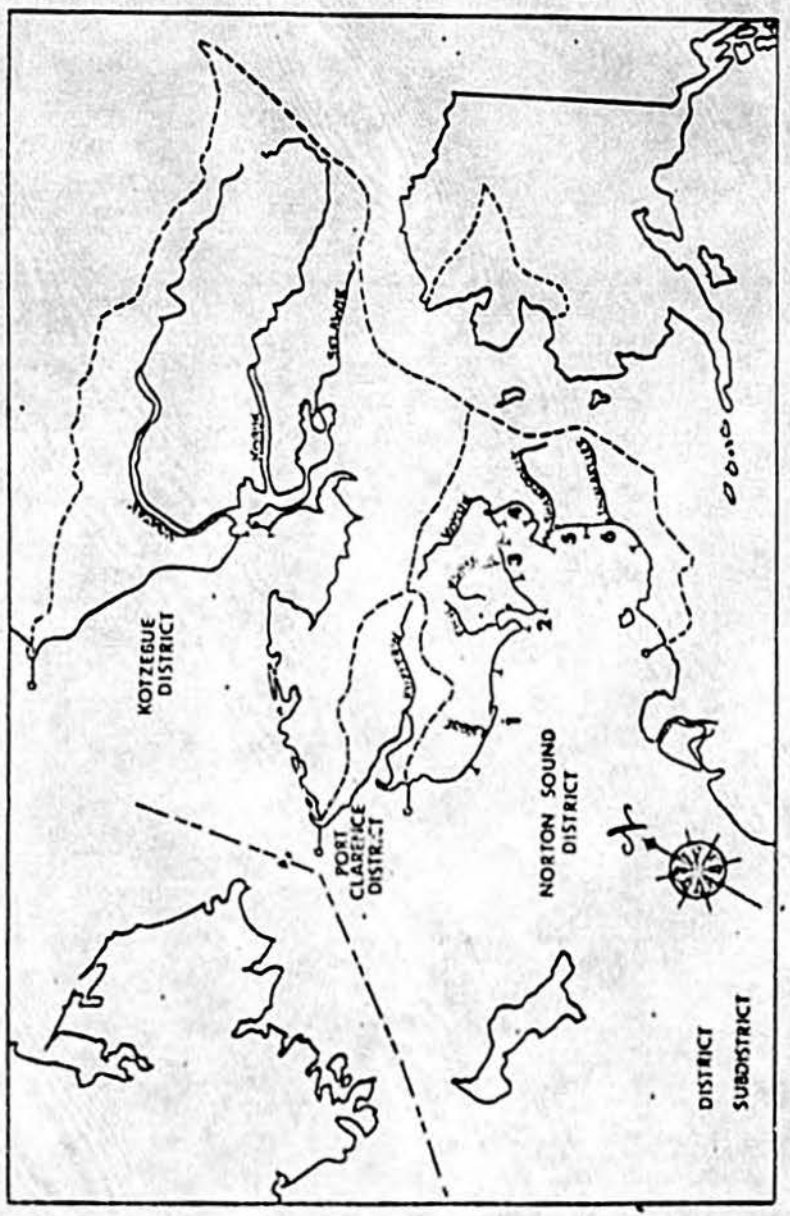


Figure 1. Norton Sound-Port Clarence-Kotzebue Districts.

Subsistence catch information has been derived from interviews of subsistence fishermen, actual counts of subsistence fish and subsistence catch forms distributed to fishermen. Subsistence salmon catches in the Nome subdistrict (subdistrict 1) have been determined from the return of catch forms as required under a permit system.

Sound. A small red salmon (O. nerka) population exists in Salmon Lake on the Seward Peninsula and in Kelly Lake on the Noatak River near Kotzebue.

Other species common to the freshwater and coastal marine habitats are: sheefish, whitefish, Arctic char, lake trout, arctic grayling, burbot, suckers, sculpins, blackfish, sticklebacks, lampreys, smelt, herring, cods, flounders, crabs, shrimps and mollusks.

Water quality

Except for sections of the Seward Peninsula, water quality and spawning habitats in the area have been largely preserved in their original condition because land development activities have been minimal or non-existent. The future impact of oil development, mining activities, road construction and gravel removals on water quality and area fishery resources remains to be seen.

Commercial fishing

In 1959 and 1960, Department biologists conducted reconnaissance surveys which indicated harvestable surpluses of salmon were available in several districts and were not being commercially utilized. The Department liberalized various regulations and encouraged processors to explore and develop new fishing grounds. As a result, commercial salmon fishing activity has grown significantly since statehood, enabling many area residents to obtain a cash income.

NORTON SOUND-PORT CLARENCE-KOTZEBUE DISTRICT

Introduction

The Norton Sound-Port Clarence-Kotzebue management district includes all coastal waters from Canal Point Light in southern Norton Sound to Point Hope, approximately 160 miles northwest of Kotzebue and includes St. Lawrence Island (Figure 1). This management area comprises over 65,000 square miles with a coastline exceeding that of California, Oregon and Washington combined.

Fishery resources

All five species of Pacific salmon are indigenous to the area with chum salmon (Oncorhynchus keta) being the most abundant. Although chum and pink salmon have been found as far north as Barrow and in the Beaufort Sea adjacent to the mouth of the Sagavanirktok River, these species become relatively rare north of the Kotzebue Sound drainage. The largest spawning runs of king salmon (O. tshawytscha) occur in Norton Sound. King salmon are uncommon north of the Shaktoolik River in Norton Sound but have been found as far north as the Wulik River, located about 100 miles northwest of Kotzebue. Coho salmon (O. kisutch) are uncommon north of Norton Sound, but have been found in Kotzebue

Nearly all area commercial fishermen and processing plant workers are resident Eskimos. Commercial fishermen operate set gill nets to capture salmon from outboard powered skiffs. All commercial salmon fishing is done in coastal marine waters.

Declines in subsistence salmon utilization have made increases in commercial utilization possible during recent years. Additionally, there have been increased demands from Japanese markets for fresh, frozen and cured salmon, especially chums. These trends are expected to continue and should result in moderate increases in production and economic value of the commercial fishery over the next few years.

Chum and pink salmon are commercially significant species in Norton Sound, while chum salmon are the mainstay of the Kotzebue commercial fishery. Although these fish are commercially utilized in local markets to some extent, the majority are transported from the districts as a fresh or frozen product.

Char and whitefish are harvested incidentally to the salmon catch in Norton Sound, while sheefish and char provide the main incidental catch in the Kotzebue district. Limited commercial fisheries are also conducted by permit for sheefish, whitefish and char.

Subsistence utilization

There are approximately 18,000 Eskimo people in the area; the majority residing in more than 26 small villages scattered along the coast and the major river systems. Nearly all of these native people are dependent to varying degrees on the fish and game resources for their livelihood.

Subsistence fishermen operate fish nets in the main rivers and, to a lesser extent, in the coastal marine waters capturing mainly salmon, whitefish, Arctic char and sheefish. Beach seines are occasionally used near the spawning grounds to catch schooling or spawning salmon and other species of fish. Sheefish, pike, char, smelt, saffron cod and king crab are frequently taken through the ice by handlines for subsistence and recreational purposes.

There is very little wastage of any portion of the fish taken for subsistence purposes. The major portion of the fish is sun-dried or smoked for later consumption, while the head and viscera are usually fed to dogs.

The Department has conducted annual surveys of the important subsistence salmon fisheries since the early 1960's. The majority of salmon taken are chums. Subsistence harvest information prior to 1960 is incomplete or entirely lacking for many years. There are some records indicating that in excess of 75 thousand salmon

were taken in some years during the early 1960's.

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of commercial and subsistence fisheries in this vast area. The permanent staff assigned to this area consists of one management-research biologist and one clerk-typist assigned to the Nome field office. In addition, from 7 to 12 summer employees are hired each season to assist in conducting various management and research studies.

Operating expenses for the Norton Sound-Kotzebue area management and research program from July 1,1975 through June 30,1976 were approximately $99,000. Of the total, state and federal funds provided $77,000 and $22,000, respectively.

The main objective of the Department's program is to manage the commercial salmon fisheries on a sustained yield basis. In addition, information is obtained to determine the potential for commercial fisheries of under-utilized species such as herring, char and whitefish. Present commercial salmon fishing regulations are still relatively restrictive in order to insure that sufficient salmon are provided for subsistence fishery and spawning ground requirements.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is normally allowed for a total of four days a week during the open season. Fishing effort usually occurs during the entire run and not just during a particualr segment of the run. Occasionally fishing time is increased or decreased, depending upon fishing conditions and the strength of the runs or spawning escapements, as determined by special studies conducted by the Department.

Due to the vast size of the area accurate estimates of the size of salmon runs and the spawning escapements are difficult to obtain. Fishery management is also hampered by the relative lack of comparative catch and return information, since the fisheries were initiated or expanded through regulation changes only since 1961 or 1962. Management problems are further compounded by having to provide sufficient escapement after commercial fishing for the important subsistence fishery as well as for spawning purposes.

The Alaska Department of Fish and Game policy has been to maintain current levels of commercial utilization indefinitely until positive trends in subsistence utilization are established and more information is obtained on the relationship between the salmon catches, escapements and returns.

#3-X-02-76 (Kotzebue)	July 29	Correct fishing times by rescinding previous emergency order.	Incorrect fishing schedule listed in 3-X-01-76.
#3-X-03-76 (Kotzebue)	August 26	Close Kotzebue district to commercial fishing.	Below average chum salmon escapements.

Figure 2. Norton Sound District.

per pound for king salmon (Appendix Table 4).

Norton Sound fishermen received approximately $285,203 from buyers for their 1976 catches (Appendix Table 5).

Six processors operated in Norton Sound in 1976. Three fishermen's co-operatives with shore facilities operated in Golovin (subdistrict 2), Moses Point (subdistrict 3) and Unalakleet (subdistrict 6), while three independent operators purchased fish in Nome(subdistrict 1) and Moses Point.

A list of processors operating in Norton Sound is presented in Attachment 1.

A total of 1,053,966 pounds of fresh or frozen salmon was processed in 1976 (Appendix Table 6).

Subsistence fishery

A total of 133 subsistence fishermen interviewed reported catching 203 king; 1,004 coho; 18,409 pink and 7,867 chum salmon for a total subsistence harvest of 26,973 salmon (Table 1). This subsistence catch was approximately equal to the recent 5-year average annual subsistence harvest level of 27,600, but was 24% below the recent 10-year average annual harvest. These subsistence harvest totals may provide evidence of a continued declining trend

in the subsistence utilization of the salmon resource. The formation of commercial fishermen's co-operatives, the decreased dependence upon sled dogs for transportation and increased year round employment are all factors in the declining subsistence harvest. An exception may be noted for subdistrict 1, Nome, where increased access to salmon streams may cause increased subsistence harvests.

Escapement

Table 2 presents salmon escapement data obtained in the district during 1976. Comparative annual escapements for selected streams are shown in Appendix Table 7.. Kwiniuk River escapements since 1965 have been obtained by a counting tower project. Escapement data for the Chirosky River, a Unalakleet River tributary, were also obtained by a counting tower project initiated in 1975. Other escapement data represents indices of abundance obtained by aerial surveys.

For all of Norton Sound, pink salmon escapements were average to above average. The chum salmon escapement was judged below average except for a better than average return to the Golovin subdistrict. The Kwiniuk River of the Moses Point subdistrict had the poorest return of chum salmon since a counting tower project was initiated in 1965.

The 1976 escapements relative to brood year escapements were below average for pink salmon and chum salmon.

Although pink salmon were abundant in the Nome subdistrict, the commercial fishery targeted chum salmon stocks, as indicated by the chum/pink salmon catch ratio of 5.5:1.0. The commercial fishery was closed on July 8 due to apparent milling of salmon stocks and resulting high commercial chum salmon catches and lagging escapements. The fishery was re-opened for one 36-hour period on July 15 and then closed until July 25. Comparative commercial catch data are presented in Appendix Table 8.

Subsistence fishery

A regulation change instituted at the fall 1974 meeting of the Board of Fish & Game placed all streams of the Nome subdistrict under a permit system. This regulation requires a subsistence fisherman to secure a permit in order to fish for subsistence purposes. This procedure was initiated to accurately determine subsistence fishing effort and harvest which has been sustained at high levels since 1968.

In 1976, 113 permits were issued to Nome subdistrict subsistence fishermen. A total of 101 (87.1%) permits were returned with catch information. Of the 101 returned permits, 24 indicated the fisherman "did not fish". The seventy-seven subsistence fishermen who reportedly engaged in subsistence fishing caught a total of 7,399 salmon,

Subdistrict Summaries, 1976

Nome (Subdistrict 1)

Commercial fishery

Twenty-eight vessels and gill nets were registered to fish in the Nome subdistrict, representing a 48% decrease from the record of 54 in 1975 (Appendix Table 1).

Twenty-one commercial fishermen caught 2 king, 10 red, 1,340 pink and 7,477 chum salmon, totaling 8,837 salmon (Table 3). The catch was purchased locally by two buyers.

Fish were chilled and flown in the round to processors and markets elsewhere in the State. Some of the catch was purchased and marketed fresh in Nome.

The 1976 chum salmon commercial harvest was the second highest recorded for this subdistrict since active commercial fishing was initiated in 1964 (Appendix Table 2). The harvest was equal to the recent 5-year average annual average harvest, but was 1.5 times the recent 10-year average annual harvest of 3,500 fish.

Pink salmon catches were 29.8 percent above the recent 5-year average annual harvest, but 33.3 percent below the recent 10-year average annual harvest.

which included 13 king, 180 coho, 5,492 pink and 1,705 chum salmon (Table 1 and Appendix Table 2). Due to high subsistence effort in the Nome River during 1975, individual permit quotas were reduced and fishermen were asked to voluntarily fish other streams in the Nome subdistrict; as a consequence, 80 permits were issued for the Nome River in 1976, a 20% reduction from 1975 levels.

Escapement

Aerial surveys conducted of key streams in the Nome subdistrict indicated a peak escapement index of 12,161 pink and 2,667 chum salmon (Table 2). The escapement indices of both pink and chum salmon were judged to be average.

Golovin Bay (Subdistrict 2)

Commercial fishery

A total of 25 vessels and 23 gill nets was registered for the Golovin subdistrict, representing decreases of 40% and 46%, respectively, from record 1975 licensing (Appendix Table 1).

Twenty-two commercial fishermen harvested 11 king, 1,311 coho, 24,230 pink and 30,614 chum salmon, totaling 56,166 fish (Table 4). This catch was 20.1% above the recent 5-year average annual harvest of 42,000 salmon.

The catch was purchased locally in Golovin by a fishermen's co-operative, dressed, frozen and shipped to markets in Seattle, Washington via freezerboat..

The commercial chum salmon catch was 10.2% below the recent 5-year average annual harvest of 34,000 fish, but was 8.2% above the recent 10-year average of 28,000 salmon.

The pink salmon harvest was the second largest ever made and was 98% above recent 5-year and 10-year average annual harvests of 12,000 pink salmon. The coho salmon catch was the largest on record, due primarily to unusually high fishing effort during the month of August. Comparative commercial catch data and aerial survey information indicated the 1976 Golovin subdistrict chum and pink salmon runs were at least average in magnitude. Consequently, the commercial season remained open on a normal four-day per week fishing schedule from June 15 to August 31. Comparative commercial catch data are presented in Appendix Table 9.

Subsistence fishery

The catches of 8 subsistence fishermen from White Mountain and Golovin included 2,356 pink and 1,277 chum salmon, totaling 3,633 salmon (Table 1 and Appendix Table 2). Growing numbers of fishermen are placing increased reliance upon the commercial fishery and community development to provide a base of income.

Escapement

Aerial surveys conducted of the Fish River and Niukluk Rivers yielded estimates of 23,040 pink, 12,520 chum salmon and 8,500 pink and chums combined (ie. indistinguishable by species)(Table 2). Salmon escapement indices were judged to be average for both pink and chum salmon. Escapements for both species were approximately equal to their respective parent year escapements of 1974 and 1972 (Appendix Table 7).

Moses Point (Subdistrict 3)

Commercial fishery

A total of 50 vessels and 49 nets were registered representing decreases of 25.4% and 26.9%, respectively, from record 1975 levels (Appendix Table 1).

A commercial catch of 16,137 salmon was made by 54 fishermen. The catch was comprised of 19 king, 5,072 pink, 10,813 chum and 233 coho salmon (Table 5). The harvest was 66.4% below the recent 5-year average annual harvest of 48,000 salmon.

Commercial catches were purchased by two buyers. One buyer shipped fish in the round from the subdistrict, while the local fishermen's co-operative processed and chilled fish prior to shipment.

The commercial chum salmon harvest was 74.6% below the recent 5-year average annual harvest of 41,000 fish, while the pink salmon catch was 22.4% below the recent 5-year average annual harvest of 6,500 salmon.

Aerial surveys and a Department counting tower confirmed poor chum salmon escapements to the Kwiniuk River, while aerial surveys indicated poor chum escapements to the neighboring Tubutulik River also. Kwiniuk River counting tower figures were the lowest since the project's inception in 1965 and represented the second consecutive year of below average escapements. Comparison of the commercial chum/pink catch ratios (2.1:1.0) and Kwiniuk River counting tower escapement sample ratios (0.2:1.0) indicate continued targeting of chums by the commercial fisher The commercial season was closed on July 8 due to poor chum salmon escapements and was re-opened on July 25. Comparative catch statistics for the Moses Point subdistrict are presented in Appendix Table 10.

Subsistence fishery

The subsistence catches of 9 fishermen from the village of Elim included 22 kings, 5,016 pink and 1,548 chum for a total of 6,586 salmon. The 1976 subsistence harvest demonstrates a continuing decline in subsistence use. Growing numbers of fishermen are placing increasing emphasis upon community development and commercial

fishing to provide a base of income (Table 1 and Appendix Table 2).

Escapement

The Kwiniuk and Tubutulik Rivers are the main spawning grounds for fish entering this subdistrict. An aerial survey index count of the Tubutulik River of 1,095 chum, 6,065 pink salmon and 2,600 "salmon" (not identified by species) indicated the smallest return on record for chum salmon and a slightly below average return for pink salmon. The total expanded escapement enumerated by a tower into the Kwiniuk River in 1976 was 12 king, 6,834 chum, 28,431 pink and 12 coho salmon. Pink salmon escapements decreased 30% from the 1975 brood year escapement, while chum escapement were 80% below the 1972 escapement (Table 2 and Appendix Table 7).

Norton Bay (Subdistrict 4)

Commercial fishery

A total of 23 vessels and 21 gear licenses were issued, representing decreases of 41% and 50%, respectively, from record 1975 levels (Appendix Table 1).

Twenty-seven commercial fishermen caught 103 king, 4,389 pink, 95 coho and 7,135 chum salmon, totaling 11,722 salmon (Table 6). This total harvest was 28.9% above the recent 4-year average

annual harvest, but was 57% below the 1975 harvest total.

Norton Bay fish were flown, in the round, via light aircraft to the fishermen's co-operative in Unalakleet or tendered to Moses Point for processing.

Commercial chum salmon catches were 15.2% below the recent 4-year average annual harvest, while pink salmon harvests were 2.4 times the recent 4-year average.

This fishery is the most sporadic of the subdistrict fisheries in Norton Sound. The remoteness of the fishing grounds from the buying stations and difficulties with operating tenders in the shallow waters of Norton Bay account for the thus far limited character of this fishery. Due to average escapements and light commercial fishing effort, the commercial season remained open on a normal 4-day per week fishing schedule from June 15 to August 31. Comparative commercial catch data are presented in Appendix Table 11.

Subsistence fishery

The subsistence catches of 4 fishermen from the village of Koyuk included 2 king, 41 pink and 236 chum for a total of 279 salmon (Table 1).

Escapement

The Koyuk, Ungalik and Inglutalik Rivers are the main spawning

ground for fish entering this subdistrict. In 1976 an aerial index survey conducted of the Ungalik River resulted in a count of 5,753 chum, 982 pink and 1,600 salmon (not identified by species). A total of 115 pink and 247 chum were counted in the Koyuk River and 4,674 pink, 1,394 chum and 117 king salmon were counted in the Inglutalik River (Table 2).

Shaktoolik (Subdistrict 5)

Commercial fishery

Vessel licenses decreased 12.9% from 1975 levels, while gill net licenses increased 3.9%.

Thirty-seven commercial fishermen harvested 886 king, 129 coho, 15,740 pink and 15,727 chum, totaling 32,482 salmon (Table 7). This catch was 18.9% above the recent 5-year average annual harvest of 27,000 fish and 72.9% above the recent 10-year average annual harvest of 18,750 salmon.

Salmon were tendered to facilities at Unalakleet (subdistrict 6) to be dressed, chilled or frozen and flown to markets elsewhere in the state.

The chum salmon harvest was 32% below the recent 5-year average annual harvest of 23,000 fish and equal to the 10-year

average annual harvest.

Pink salmon catches were 4.7 times the recent 5-year average annual harvest of 3,300 fish, while the king salmon harvest was 2.0 times the recent 5-year average of 450 salmon.

Aerial survey information and commercial catch data indicated a possible below average run of chum salmon to the Shaktoolik River, resulting in a reduction in fishing time on July 15 and a closure on July 19. The commercial season was not re-opened until July 25. Comparative commercial catch data are presented in Appendix Table 12.

Subsistence fishery

Five subsistence fishermen caught 24 king, 121 coho, 1,188 pink and 269 chum salmon totaling 1,602 salmon. The bulk of this harvest came from subsistence fishing activities on the Shaktoolik River. This harvest was the lowest on record and may be attributed to the growing numbers of fishermen engaged in the commercial fishery (Table 1 and Appendix Table 2).

Escapement

In 1976, the Shaktoolik River, the main spawning stream in this subdistrict, was aerially surveyed with an escapement count of 139 king, 12,175 pink and 1,736 chum salmon (Table 2).

Coho salmon catches were 1.5 times the recent 5-year average of 3,400 fish, while the king salmon harvest was 37.2% below the recent 5-year harvest average of 1,900 salmon (Appendix Table 2).

Comparative commercial catch information and aerial survey data indicated a below average chum salmon run to the Unalakleet River in 1976. Less conclusive data from the Chirosky River counting tower also seemed to point towards a below average run and corresponding escapements. Commercial fishing time was reduced on July 15 and a closure was instituted on July 19. The season was re-opened on July 25. Comparative commercial catch data are presented in Appendix Table 13.

It should be noted that in response to Department encouragement to fishermen to harvest abundant pink salmon, increasing amounts of pink salmon gear was utilized during the 1976 season.

A total of 2,891 char were captured incidentally to the commercial salmon fishery.

Subsistence fishery

Thirty subsistence fishermen in this subdistrict harvested 142 king, 694 coho, 4,316 pink and 2,832 chum totaling 7,894 salmon. This catch was the second smallest subdistrict harvest recorded and may be attributed to growing numbers of fishermen

Unalakleet (Subdistrict 6).

Commercial fishery

A total of 59 vessels and 59 gear licenses were issued representing reductions of 11.9% and 1.7%, respectively, from 1975 levels.

A total of 60 participating commercial fishermen harvested 1,198 king, 5,148 coho, 37,113 pink and 24,484 chum salmon for a total of 67,943 salmon (Table 8). This total harvest was equal to the recent 5-year average annual harvest of 69,000 but 10% above the 10-year average annual harvest of 61,500 fish.

All fish caught were purchased in Unalakleet by the fishermen's co-operative. The salmon catch was dressed, iced or chilled at the shore based facility, and later flown to markets and processors elsewhere in the state.

The commercial chum salmon harvest was 20% below the recent 5-year average annual harvest of 34,000 fish and 9.6% below the recent 10-year average annual harvest of 27,000 salmon.

The pink salmon harvest exceeded the previous 5-year average annual harvest by 1.2 times and was 34.3% above the recent 10-year average of 27,600 salmon.

and individuals placing more reliance upon commercial fishing and associated industries to provide a base of income (Table 1 and Appendix Table 2).

Escapement

Aerial surveys of the Unalakleet River, North River and Egavik Creek, in addition to Chirosky River tower counts documented approximately 363 king, 79,290 pink and 6,477 chum salmon in streams of this subdistrict. Escapements for king salmon were judged to be poor, whereas pink and chum salmon escapements were above average and below average respectively (Table 2).

Norton Sound District Outlook for 1977

Insufficient data is available to enable accepted forecasting methods to be employed in Norton Sound. The 1977 "Outlook" is based upon analysis of comparative commercial catch and escapement information, age data and subjective determinations. The "Outlook" is presented only as an indicator of possible 1977 run strength.

Norton Sound pink salmon do not demonstrate a strong odd/even year cycle and run strength is difficult to predict. The pink salmon return to Norton Sound in 1977 will be produced from the 1975 brood year. Pink salmon escapements in 1975 were average, but were notably strong in subdistrict 3, Moses Point. Therefore, overall pink salmon returns are expected to be of average magnitude in 1977.

The 1977 Norton Sound chum salmon return will be produced by the 1972-1974 escapements, with the bulk of the run composed of the four-year-old age class from the 1973 escapement. Inspection of 1976 age data tends to indicate below average recruitment from the 1972 brood year in some subdistricts. This may indicate below average returns of age 5_1 chums this year. Chum salmon escapements in 1972 were judged to be average; 1973 escapements were below average and 1974 escapements were average. Overall, Norton Sound chum salmon returns are anticipated to be of below average to average magnitude in 1977.

Commercial fishing effort, in terms of gear licenses, decreased 29% in 1976 from previous record 1975 levels; however, 1976 gear license totals were very similar to previous record levels set in 1973 and 1974. The 1975 levels are believed to have increased due to anticipated implementation of the "limited entry" program. Last year's license registration level is believed to be representative of "normal" fishing effort and is not expected to change greatly in 1977.

Table 1. Norton Sound district subsistence catches, 1976.

Village	No. of Fishermen Interviewed	Kings	Reds	Cohos	Pink	Chum	TOTAL SALMON
Unalakleet	30	142	-	694	4316	2332	7,934
Shaktoolik	5	24	-	121	1163	269	1,602
Koyuk	4	2	-	--	41	235	279
Elim	9	22	-	--	5916	1518	6,556
Golovin	6	--	-	--	1995	1128	3,123
White Mountain	2	--	-	--	361	149	510
Nome	77	13	-	189	5432	1735	7,399
District TOTAL 1976	133	203	-	1,004	18,409	7857	27,483
District TOTAL 1975	133	186	-	152	15,203	8124	24,305
District TOTAL 1974	117	420	-	1,064	16,426	3953	21,863
District TOTAL 1973	79	392	-	520	14,770	7185	22,867

Appendix Table 2. Commercial and subsistence catches by species by subdistrict, Norton Sound District, 1961-1976

Year	Commercial						Subsistence					Combined					
	King	Red	Coho	Pink	Chum	Total	King	Coho	Pink	Chum	Total	King	Red	Coho	Pink	Chum	Total
NOME (SUBDISTRICT 1)																	
1964	5	-	-	1	1,194	1,200	-	-	-	-	-	5	-	-	1	1,194	1,200
1965	1	-	-	193	1,941	2,135	-	-	780	1,825	2,605	1	-	-	973	3,766	4,740
1966	1	-	32	1	581	615	12	192	1,794	1,762	3,760	13	-	224	1,795	2,343	4,375
1967	-	-	-	72	406	478	11	36	349	627	1,023	11	-	36	421	1,033	1,501
1968	-	-	-	56	102	162	7	103	6,567	621	7,243	7	-	103	6,567	723	7,405
1969	-	-	63	330	601	994	2	27	3,649	508	4,186	2	-	90	3,979	1,109	5,180
1970	-	-	6	55	960	1,019	-	35	5,001	458	5,494	-	-	39	5,056	1,418	6,513
1971	11	-	-	14	2,315	2,340	-	122	5,457	2,900	8,479	11	-	122	5,471	5,215	10,819
1972	15	-	-	12	2,643	2,670	19	57	4,686	315	5,070	34	-	57	4,698	2,958	7,740
1973	-	-	-	321	1,132	1,453	14	120	5,169	1,862	7,114	14	-	129	5,429	2,986	8,567
1974	19	-	123	7722	10,431	18,295	8	9	3,818	183	4,014	27	-	128	11,540	10,614	22,309
1975	2		319	2163	8,304	10,849	2	97	6,267	2,858	9,224	5	-	416	8,430	11,222	19,073
1976	2	10	-	1348	7,477	8,837	13	189	5,492	1,709	7,399	15	10	189	6,840	9,182	16,236
GOLOVIN BAY (SUBDISTRICT 2)																	
1962	45	11	264	10,276	68,720	79,316	-	-	-	-	-	45	11	264	10,276	68,720	79,316
1963	40	40	-	19,677	49,890	69,647	-	118	5,702	9,319	15,139	40	40	118	24,779	59,209	84,786
1964	27	40	3	7,236	58,301	65,607	-	-	-	-	-	27	40	3	7,236	58,301	65,607
1965	-	-	-	-	-	-	2	49	1,623	3,847	5,421	2	-	49	1,623	3,847	5,421
1966	17	14	584	4,665	29,791	35,071	4	176	1,573	3,520	5,273	21	14	760	6,238	33,311	40,344
1967	10	-	747	5,790	31,193	37,740	3	185	2,774	4,803	7,765	13	-	932	8,564	35,996	45,505
1968	12	-	705	18,478	10,011	29,654	4	181	4,955	1,744	6,886	16	-	886	23,383	11,755	36,540
1969	24	-	1,224	23,708	20,949	45,409	2	190	2,760	2,514	5,466	30	-	1,414	25,668	23,463	50,875
1970	13	-	3	18,771	20,566	39,303	4	353	1,054	2,614	4,017	17	-	356	21,767	23,180	45,320
1971	17	-	197	2,735	33,824	36,793	7	191	1,944	1,936	3,678	44	-	388	4,679	35,760	40,471
1972	36	-	20	6,562	27,097	33,715	4	62	1,735	2,028	3,829	40	-	82	8,297	29,125	37,544
1973	70	-	183	14,145	41,699	56,097	1	43	9	74	132	71	-	231	14,154	41,765	56,219
1974	30	-	3	28,380	30,173	58,586	3	-	967	206	1,176	33	-	3	29,307	30,379	59,722
1975	17	-	206	10,770	41,761	52,754	-	1	2,011	2,025	4,037	17	-	207	12,781	43,786	56,771
1976	11	-	1,311	24,230	30,614	56,166	-	-	1,595	1,128	3,123	11	-	1,311	26,225	31,742	59,289
ESKIMO POINT (SUBDISTRICT 3)																	
1962	27	-	-	11,100	50,683	61,810	-	-	-	-	-	27	-	-	11,100	50,683	61,810
1963	15	-	-	2,549	54,274	56,838	5	-	5,808	8,316	14,129	20	-	-	8,357	62,590	70,967
1964	32	3	-	3,372	28,568	31,975	-	-	63	348	411	32	3	-	3,435	28,916	32,386
1965	-	-	-	-	-	-	16	72	1,325	9,857	11,270	16	-	72	1,325	9,857	11,270
1966	17	-	-	2,745	24,741	27,503	14	250	2,511	5,509	8,284	31	-	250	5,256	30,150	35,687
1967	-	-	-	-	-	-	39	116	1,322	9,913	11,390	39	-	116	1,322	9,913	11,390
1968	12	-	1	9,012	17,908	26,933	2	80	6,135	2,527	8,744	14	-	81	15,147	20,435	35,677
1969	29	-	-	11,807	24,594	36,430	9	109	1,790	1,681	3,211	38	-	109	13,597	26,275	39,641
1970	39	-	-	13,052	29,726	42,817	16	160	4,661	6,960	11,797	55	-	160	17,713	36,686	54,614
1971	95	-	4	922	43,831	44,852	16	271	1,046	2,227	3,560	111	-	275	1,968	46,058	48,412
1972	145	-	11	5,866	30,919	36,956	44	108	1,579	2,070	3,801	234	-	119	7,445	32,989	40,757
1973	134	-	-	10,603	31,389	42,126	2	-	-	298	300	136	-	-	10,603	31,687	42,426
1974	193	-	9	12,821	55,276	68,304	3	-	2,302	1,723	4,101	201	-	9	15,203	56,999	72,412
1975	16	-	-	4,307	46,692	51,122	7	6	1,230	503	1,796	18	-	6	5,687	47,507	53,418
1976	19	-	233	5,072	10,813	16,137	22	-	5,016	1,548	6,586	41	-	233	10,088	12,361	22,723
NORTON BAY (SUBDISTRICT 4)																	
1962	387	7	40	4,402	24,380	29,216	-	-	-	-	-	387	7	40	4,402	24,380	29,216
1963	137	2	-	17,676	12,469	30,284	-	-	5,097	-	5,097	137	2	-	22,773	12,469	35,381
1964	50	3	-	988	5,916	6,957	-	-	-	-	-	50	3	-	988	5,916	6,957
1965	-	-	-	-	-	-	4	22	252	3,032	3,310	4	-	22	252	3,032	3,310
1966	-	-	-	-	-	-	7	41	929	3,612	4,589	7	-	41	929	3,612	4,589
1967	-	-	-	-	-	-	12	14	1,097	2,955	4,068	12	-	14	1,097	2,955	4,068
1968	-	-	-	-	-	-	28	71	1,916	1,672	3,687	28	-	71	1,916	1,672	3,687
1969	26	-	-	4,849	3,974	8,849	59	169	2,115	1,655	4,018	85	-	169	6,964	5,629	12,867
1970	-	-	-	-	-	-	3	10	840	3,500	4,353	3	-	10	840	3,500	4,353
1971	-	-	-	-	-	-	5	47	92	2,619	2,763	5	-	47	92	2,619	2,763
1972	43	-	-	1,713	7,799	9,555	30	44	2,639	2,022	4,185	73	-	44	3,802	9,821	13,740
1973	28	-	-	1,645	4,672	6,345	1	-	10	130	141	29	-	-	1,655	4,802	6,486
1974	21	-	-	654	3,826	4,501	-	-	17	900	917	21	-	-	671	4,726	5,418
1975	60	-	89	1,117	17,389	18,674	1	-	93	361	455	60	-	89	1,210	17,750	19,129
1976	103	-	95	4,389	7,135	11,727	2	-	41	236	279	105	-	95	4,430	7,371	12,006

Appendix Table 2. (Continued) Commercial and subsistence catches by species by subdistrict, Norton Sound district, 1961-1976

Year	Commercial						Subsistence					Combined					
	King	Red	Coho	Pink	Chum	Total	King	Coho	Pink	Chum	Total	King	Red	Coho	Pink	Chum	Total
SHAKTOOLIK (SUBDISTRICT																	
1961	140	-	-	29,075	24,746	53,961	-	-	-	-	-	140	-	-	29,075	24,746	53,961
1962	1,738	-	2,113	640	8,718	13,209	-	-	-	-	-	1,738	-	2,113	640	8,718	13,209
1963	480	11	563	5,183	19,153	25,390	-	-	-	-	-	480	11	563	5,183	19,153	25,390
1964	611	79	16	1,969	35,272	37,967	77	340	2,132	5,412	7,961	708	79	356	4,101	40,684	45,928
1965	127	30	-	3	8,356	8,516	31	107	3,767	3,470	7,321	158	30	107	3,744	11,774	15,837
1966	310	-	956	344	8,292	9,902	142	762	1,445	4,183	6,532	452	-	1,718	1,789	12,475	16,434
1967	43	-	88	1,050	1,656	2,849	262	387	2,010	4,436	7,095	305	-	475	3,066	6,091	9,937
1968	61	-	130	2,205	2,584	4,980	10	458	6,355	1,915	8,738	71	-	588	8,560	4,419	13,638
1969	33	-	276	6,197	8,645	15,151	40	193	4,018	3,439	7,690	73	-	469	10,215	12,084	22,841
1970	197	-	155	2,301	15,751	18,404	43	210	2,475	2,016	4,744	240	-	365	4,776	17,769	23,150
1971	284	-	238	28	13,849	14,399	87	329	494	5,060	5,970	371	-	567	522	18,909	20,369
1972	419	-	11	2,798	12,022	15,250	64	235	939	3,399	4,637	483	-	246	3,737	15,421	19,887
1973	289	-	177	6,450	14,568	21,484	51	130	3,410	1,397	4,988	340	-	307	9,860	15,907	26,472
1974	583	-	175	5,650	26,391	32,809	93	353	1,501	358	2,705	676	-	532	7,551	26,749	35,514
1975	651	2	.	1,774	49,536	52,775	18	14	1,394	334	1,760	669	2	870	3,168	49,870	54,535
1976	866	-	129	15,740	15,727	32,482	24	121	1,168	269	1,602	910	-	250	16,928	15,996	34,084
UNALAKLEET (SUBDISTRICT																	
1961	5,160	35	13,807	5,162	23,586	47,750	-	-	-	-	-	5,160	35	13,807	5,162	23,586	47,750
1962	5,089	-	6,739	6,769	30,283	48,880	-	-	-	-	-	5,089	-	6,739	6,769	30,283	48,880
1963	5,941	18	16,202	11,140	27,003	60,304	-	-	-	-	-	5,941	18	16,202	11,140	27,003	60,304
1964	1,273	1	79	1	19,411	20,965	488	2,227	7,010	6,776	16,471	1,761	1	2,306	7,011	26,337	37,436
1965	1,321	-	2,040	24	26,498	29,873	521	4,562	11,488	8,791	25,362	1,842	-	6,592	11,512	35,289	55,235
1966	1,208	-	4,183	5,023	16,840	27,254	90	789	6,683	3,387	10,349	1,298	-	4,972	11,106	20,227	37,603
1967	1,751	-	1,544	21,961	8,502	33,758	490	484	9,964	-	10,938	2,241	-	2,028	31,925	8,502	44,696
1968	960	-	4,549	41,474	14,865	63,848	186	1,493	11,044	2,982	15,705	1,146	-	8,042	52,518	17,847	79,553
1969	2,276	-	5,273	40,558	27,012	70,179	324	1,483	4,230	4,196	10,233	2,600	-	6,756	44,788	26,228	80,372
1970	1,606	-	4,261	30,779	40,029	76,673	493	3,907	10,101	7,214	21,721	2,099	-	8,168	40,883	47,244	98,394
1971	2,166	-	2,688	1,196	37,543	43,593	911	3,137	2,230	7,073	13,351	3,077	-	5,825	3,426	44,616	56,944
1972	2,235	-	412	28,231	20,440	51,318	643	1,818	3,132	4,132	9,725	2,878	-	2,230	31,363	24,572	61,043
1973	1,397	-	8,922	13,335	25,716	49,370	323	213	6,233	3,426	10,195	1,720	-	9,135	19,568	29,142	59,565
1974	2,100	-	1,778	93,332	36,170	133,380	313	706	7,341	588	8,948	2,413	-	2,484	100,673	36,758	142,328
1975	1,638	-	3,167	12,137	48,740	65,682	163	74	4,758	2,038	7,033	1,801	-	3,241	16,895	50,778	72,715
1976	1,198	1	5,148	37,113	24,484	67,944	142	694	4,316	2,832	7,984	1,340	1	5,842	41,429	27,316	75,928
ALL SUBDISTRICTS																	
1961	5,300	35	13,807	34,237	48,332	101,711	-	-	-	-	-	5,300	35	13,807	34,237	48,332	101,711
1962	7,286	18	9,156	33,187	182,784	232,431	-	-	-	-	-	7,286	18	9,156	33,187	182,784	232,431
1963	6,618	71	16,765	55,625	154,789	233,868	5	118	16,607	17,635	34,365	6,618	71	16,883	72,232	172,424	268,228
1964	2,018	124	94	13,567	144,662	164,671	565	2,567	9,225	12,486	24,843	2,583	124	2,665	22,792	161,348	189,514
1965	1,449	30	2,040	220	36,795	40,534	574	4,812	19,111	30,772	55,269	2,023	30	4,842	19,351	67,567	95,813
1966	1,553	14	5,755	12,278	80,245	100,345	269	2,210	14,335	21,873	38,687	1,822	14	7,965	27,113	102,118	139,032
1967	1,804	-	9,179	28,879	41,756	81,618	817	1,222	17,516	22,724	42,279	2,621	-	11,601	46,395	64,480	123,897
1968	1,065	-	6,885	71,179	45,708	124,837	237	2,391	36,917	11,661	51,206	1,262	-	9,276	108,091	57,641	176,043
1969	2,392	-	6,836	66,949	82,795	178,972	436	2,191	18,562	15,615	36,804	2,828	-	9,027	105,511	98,410	215,776
1970	1,853	-	4,423	64,508	107,034	178,218	561	4,475	26,123	22,764	53,126	2,414	-	9,098	91,035	129,797	231,344
1971	2,593	-	3,123	4,895	131,362	141,973	1,026	4,097	10,863	21,812	37,801	3,619	-	7,224	15,758	153,177	179,778
1972	2,938	-	454	45,182	100,920	149,494	806	2,319	14,158	11,966	29,249	3,742	-	2,773	59,340	114,886	180,741
1973	1,918	-	9,787	46,499	119,093	176,797	392	570	14,775	7,105	22,842	2,310	-	9,802	61,769	126,243	199,639
1974	2,951	-	2,692	144,519	162,767	315,029	823	1,054	16,426	3,964	21,268	3,371	-	3,156	164,945	166,726	337,197
1975	2,393	2	4,553	52,388	212,480	271,816	186	192	15,883	8,143	24,305	2,579	2	4,745	68,191	220,623	296,121
1976	2,219	11	6,916	87,892	96,250	193,288	703	1,004	18,048	7,718	26,973	2,922	11	7,920	105,940	103,968	220,261

1/ Includes 197 recorded red salmon in all subdistricts.
2/ Includes 93 recorded red salmon in all subdistricts.
3/ Includes 11 recorded red salmon in all subdistricts.

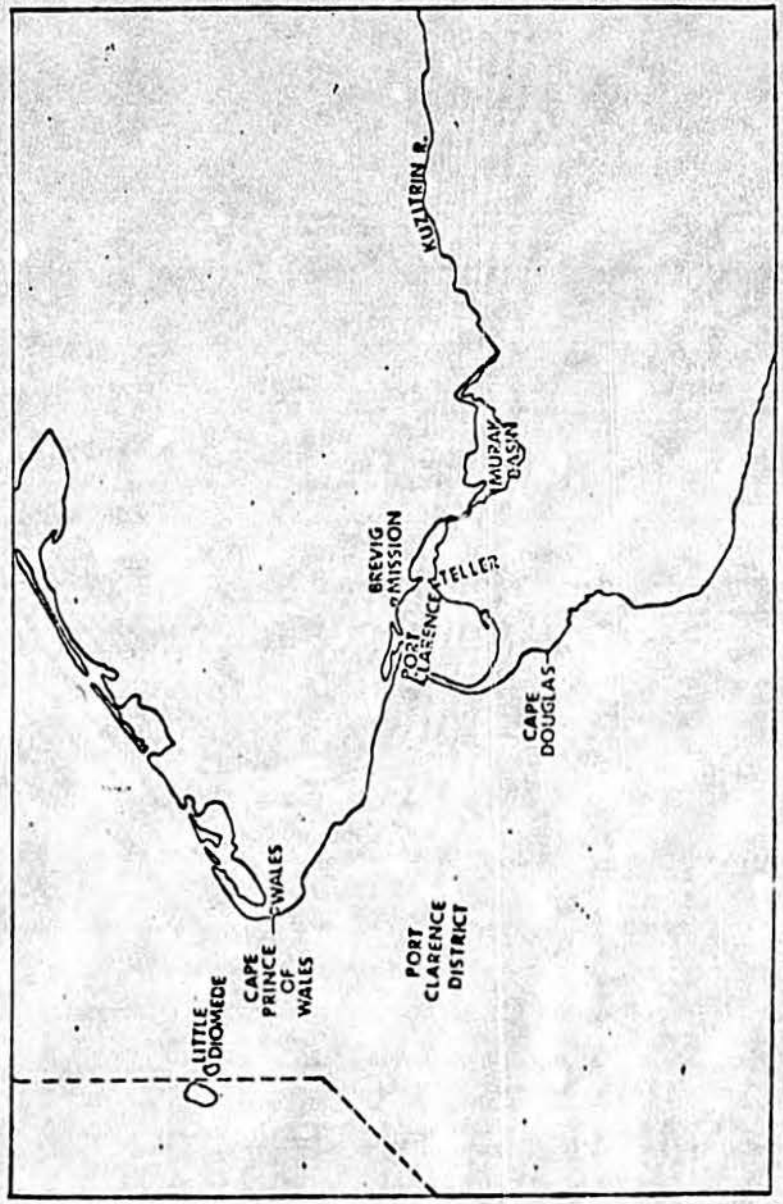


Figure 3. Port Clarence District.

PORT CLARENCE DISTRICT

District boundaries

The Port Clarence district encompasses all waters from Cape Douglas to Cape Prince of Wales (Figure 3). A unique feature of this district is the Pilgrim River-Salmon Lake red salmon run which is one of the northern most occurrences of this species on the continent.

Commercial fishery

Commercial fishing in freshwater is prohibited. In 1966 a total of 1,216 salmon consisting of 93 reds, 131 pinks and 992 chums was taken commercially in the Grantley Harbor-Tuksuk Channel area. This was the only bona fide commercial fishery in the district, but a few salmon are probably sold or bartered each year in Teller and Nome. In 1974 the Board of Fish & Game officially closed the Port Clarence district to commercial salmon fishing.

Subsistence fishery

Red salmon bound for the Salmon Lake-Grand Central River spawning grounds must pass through Port Clarence, Grantley Harbor, Tuksuk Channel, Imuruk Basin and Pilgrim River. Teller and

Brevig Mission subsistence fishermen take an unrestricted harvest of all species of salmon, mainly in the Grantley Harbor and Tuksuk Channel areas. Subsistence fishermen from Nome fish for all species of salmon in the Pilgrim River and Salmon Lake areas under special permits.

The subsistence salmon fishery in the Tuksuk Channel-Grantley Harbor area is a traditional fishery probably dating back hundreds of years. Subsistence fishing in Salmon Lake dates back at least to the 1930's. The Pilgrim River was not fished until 1962.

It is likely that the traditional subsistence fishery in the area had been harvesting this run at or near its maximum sustained yield for many years. Easier access to Salmon Lake and Pilgrim River due to road construction in 1957 increased subsistence utilization by Nome fishermen in these areas and resulted in overharvest by the combined subsistence fisheries. The red salmon in this district are currently at threshold population levels.

Since 1964 the subsistence fishery in the Pilgrim River-Salmon Lake area has been made more restrictive. A summary of the important restrictions, in chronological order, is presented below:

1. Beginning with the 1964 season, a permit was required under which numbers of salmon taken could be limited. Fishermen were also required to record daily catches.

2. In 1964 the Grand Central River was closed to subsistence fishing for salmon.

3. No salmon gill net or fishing device can obstruct one-half of any salmon migration waterway or spawning stream. This took effect in 1964.

4. Subsistence fishing for salmon was prohibited within 300 feet of a marker placed at the outlet of Salmon Lake. This also took effect in 1964.

5. In 1966 fishermen were restricted to a total salmon take of either 25 or 50 fish (all species combined), depending on need. The effort in the Salmon Lake-Pilgrim area decreased by 50 percent that year (Appendix Table 14).

6. Beginning with the 1969 season, fishermen were restricted to a total of 25 salmon of all species. Failure to return their daily catch records would result in not being able to receive a permit the following year.

7. Beginning with the 1971 season, the following regulation went into effect: a set gill net may obstruct no more than one-half the width of any fish stream. A stationary fishing device

Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976).

Location	No. of Fishermen	Catch/ Fisherman	King	Red	Coho	Pink	Chum	TOTAL
				1963				
Pilgrim River	7	246	0	303	0	805	419	1,727
Salmon Lake	9	303	0	3,283	25	0	0	3,308
TOTAL	16	315	0	3,586	25	805	419	5,035
Teller	3	802	9	1,280	0	256	860	2,405
DISTRICT TOTAL	19	392	9	4,866	25	1,061	1,279	7,440
				1964				
Pilgrim River	14	197	17	1,266	174	312	986	2,755
Salmon Lake	8	48	0	209	53	59	63	384
TOTAL	22	143	17	1,475	227	371	1,049	3,139
Teller-no survey								
DISTRICT TOTAL	22	143	17	1,475	227	371	1,049	3,139
				1965				
Pilgrim River	12	101	11	305	64	199	628	1,207
Salmon Lake	11	103	1	962	100	23	43	1,129
TOTAL	23	102	12	1,267	164	222	671	2,336
Teller	6	600	24	537	475	1,632	931	3,599
DISTRICT TOTAL	29	205	36	1,804	639	1,854	1,602	5,935

in gradual increases in run magnitudes over the next few years. However, it is also possible that the run has suffered such a significant decline that it cannot be restored to former levels by management techniques alone. It may be necessary to initiate an expensive rehabilitation program and prohibit all subsistence fishing. One problem concerning a blanket subsistence closure is that other harvestable species such as pink and chum salmon migrate concurrently with the red salmon. To prohibit the taking of red salmon would prohibit, or at least seriously limit, the taking of these other species as well. An alternative management policy would be to subject the subsistence fishery to open and closed periods in order to increase escapement and still allow a subsistence harvest. This latter policy was initiated during the 1972 season.

Appendix Table 14. (continued) Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976)

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
			1969					
Pilgrim River	3	5	0	4	0	10	0	14
Salmon Lake	4	13	0	51	0	0	0	51
TOTAL	7	9	0	55	0	10	0	65
Teller	6	270	2	128	27	538	932	1,617
DISTRICT TOTAL	13	122	2	180	27	548	922	1,582
			1970					
Pilgrim River	3	20	0	32	0	2	25	59
Salmon Lake	4	22	0	30	6	23	30	89
TOTAL	7	21	0	62	6	25	55	148
Teller	9	710	4	481	1,040	1,261	3,601	6,387
Brevig Mission	2	334	0	45	25	22	575	667
TOTAL	11	641	4	526	1,065	1,283	4,176	7,054
DISTRICT TOTAL	18	400	4	583	1,071	1,308	4,231	7,202
			1971					
Pilgrim River	4	21	3	37	3	0	39	82
Salmon Lake	4	30	4	90	2	14	10	120
TOTAL	8	25	7	127	5	14	49	202
Teller	12	531	23	683	899	1,155	3,605	6,370
Brevig Mission	2	104	1	35	55	2	115	208
TOTAL	14	470	23	723	954	1,157	3,720	6,578
DISTRICT TOTAL	22	308	31	850	959	1,171	3,769	6,780

Appendix Table 14. (continued) Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976).

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
			1966					
Pilgrim River	7	58	5	7	14	84	295	405
Salmon Lake	4	32	0	123	2	0	2	127
TOTAL	11	48	5	130	16	84	297	532
Teller	13	348	2	702	785	645	2,393	4,527
Brevig Mission	2	291	3	168	95	130	185	581
TOTAL	15	341	5	870	880	775	2,578	5,108
DISTRICT TOTAL	26	217	10	1,000	896	859	2,875	5,640
			1967					
Pilgrim River	4	22	7	51	4	5	21	88
Salmon Lake	9	32	0	286	2	0	0	288
TOTAL	13	34	7	337	6	5	21	376
Teller	6	629	5	1,731	226	762	1,051	3,776
DISTRICT TOTAL	19	244	12	2,068	232	767	1,073	4,152
			1968					
Pilgrim River	3	22	3	34	4	7	19	67
Salmon Lake	3	25	0	73	1	0	0	74
TOTAL	6	24	3	107	5	7	19	141
Teller	11	249	25	361	75	1,542	738	2,741
Brevig Mission	7	113	12	220	53	537	147	789
TOTAL	18	196	37	581	128	1,899	885	3,530
DISTRICT TOTAL	24	153	40	688	133	1,906	904	3,671

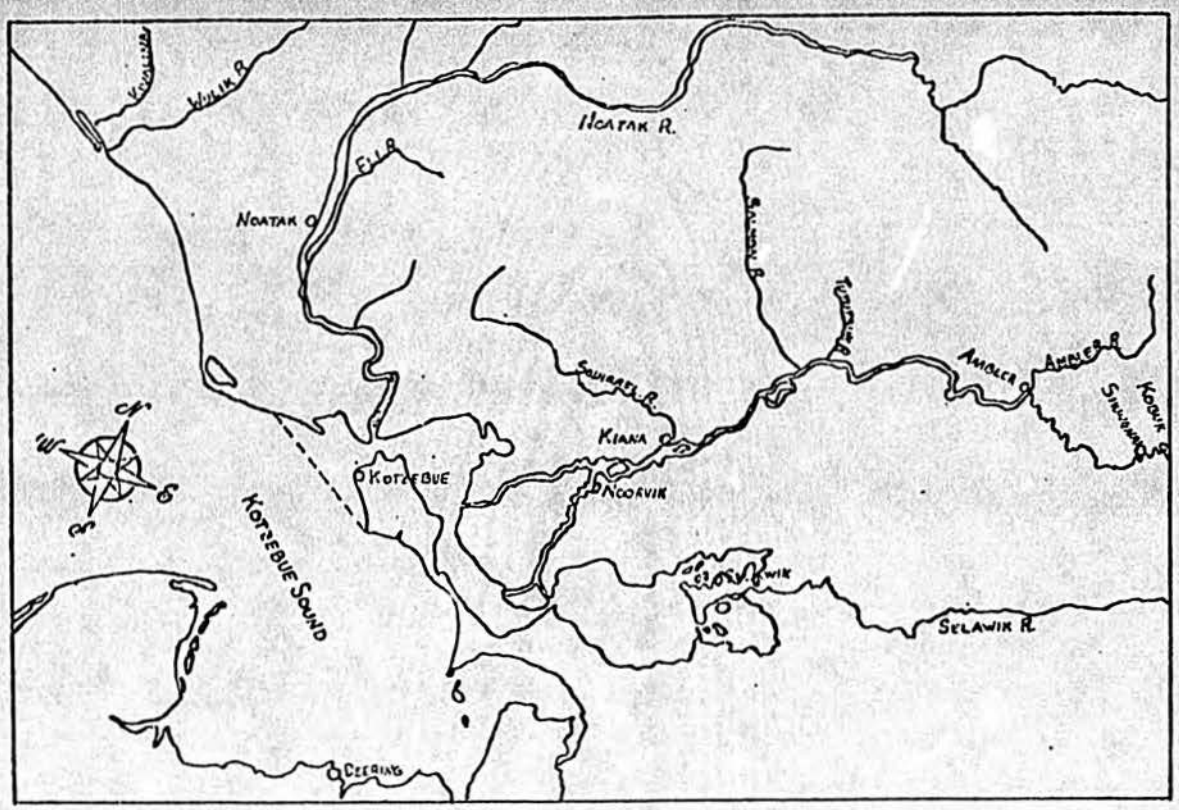
Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake and Teller, (1963-1976) (continued)

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
				1976				
Teller	6	1,034	4	200	0	200	5,800	6,204
Brevig Mission								
TOTAL	6	1,034	4	200	0	200	5,800	6,204
Pilgrim River	8	67	2	53	20	236	226	537
Salmon Lake	1	39	1	38	0	0	0	39
TOTAL	9	106	3	91	20	236	226	576
DISTRICT TOTAL	15	452	7	291	20	436	6,026	6,780

Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake and Teller, (1963-1976). (continued)

Location	No.of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	Total
				1972				
Teller 7	7	442	0	63	287	75	2,661	3,091
Brevig Mission	1	250	4	0	101	0	145	250
DISTRICT TOTAL	8	418	4	68	388	75	2,806	3,341
				1973				
Teller	4	584	22	46	280	424	1,562	2,334
Brevig Mission	0	0	0	0	0	0	0	0
DISTRICT TOTAL	4	584	22	46	280	424	1,562	2,334
				1974				
Teller	7	218	0	0	62	12	1,445	1,529
Salmon Lake	4	7	0	28	0	0	0	28
Brevig Mission	2	605	0	0	0	2	1,208	1,210
DISTRICT TOTAL	13	213	0	28	62	14	2,663	2,767
				1975				
Teller	7	310	0	216	5	743	1,209	2,173
Brevig Mission	2	153	0	0	0	0	305	305
TOTAL	9	275	0	216	5	743	1,514	2,478
Pilgrim River	2	38	0	1	0	0	75	76
Salmon Lake	6	5	0	27	0	0	0	27
TOTAL	8	13	0	28	0	0	75	103
DISTRICT TOTAL	17	152	0	244	5	743	1,589	2,581

Figure 4. Kotzebue District, [illegible]



Appendix Table 15. Comparative red salmon aerial survey counts and subsistence catches, Port Clarence District, 1963-1976.

Year	Aerial Survey Counts: Salmon Lake	Aerial Survey Counts: Grand Central River	Aerial Survey Counts: Total	Subsistence Catch: Pilgrim River Drainage	Subsistence Catch: Teller Brevig Mission	Subsistence Catch: Total
1963	866	620	1,486	3,586	1,280	4,866
1964	76	590	666	1,475	0	1,475
1965	250	160	410	1,267	537	1,804
1966	1,120	370	1,490	130	870	1,000
1967	129	280	409	337	1,731	2,068
1968	830	645	1,475	107	581	688
1969	24	171	195	55	128	183
1970	1/	1/	1/	62	526	588
1971	538	512	1,050	127	723	850
1972	600	300 2/	980	0	68	68
1973	1,747	607	2,354	0	46	46
1974	820	0	820	28	0	28
1975	537	123	660	28	216	244
1976	132	22	154	53	291	344

1/ No survey made.
2/ Boat survey.

Commercial Fishery-other species

Other species of fish that are harvested commercially include sheefish and Arctic char. The Arctic char fishery is incidental to the commercial salmon fishery. In 1976 no commercial landings of incidentally caught Arctic char were recorded. There were Arctic char being caught during the last week of the commercial salmon fishery, but the fishermen utilized them for personal use.

The sheefish fishery is generally considered a winter fishery. This fishery is regulated by permit and area to be fished with an area quota of 25,000 pounds in effect. During the winter of 1975-1976, 556 sheefish, averaging 9.0 pounds, were harvested. The bulk of this harvest was marketed and sold locally with some sheefish flown in the round to marketing outlets in Fairbanks and Anchorage (Table 23).

Subsistence Fishery-salmon

Subsistence salmon fishing has long been an important food gathering activity for the Eskimo people of the Kotzebue district. Remnants of salmon spears and nets have been found in old village sites on the Kobuk River that date back to 1250 A.D.. At present, subsistence fishermen use set gill nets and beach seines to catch salmon in the bays and rivers. Nearly all of the catch is

consumed as dried fish. All portions are utilized, e.g. the flesh is dried and used for both human and animal consumption, while the head and viscera are fed to dogs.

It is difficult to calculate the value of the subsistence fishery in terms of dollars to the residents of this area. However, if subsistence fishermen had to purchase a protein food in the place of their subsistence salmon catch, this fishery would probably rival the value of the commercial fishery. In some years the numbers of salmon taken for subsistence in the Kotzebue Sound area exceeds the commercial catch. Subsistence catches of salmon and other fish were especially important in 1976 due to reduced numbers of caribou.

All available subsistence chum salmon catches are presented in Appendix Table 23. The 1957 studies of Raleigh document estimates of average annual subsistence catches for recent years prior to 1957. The methods and completeness of this survey were not fully documented. The catch estimates were obtained from interviews of a certain percentage of each village population. The interview data was then expended to include the entire village. Possible large errors in the estimation of total catches could have occurred.

this is expected to result in less subsistence fishing effort in the future.

In 1976, 15,765 chum salmon were harvested for subsistence purposes by 91 fishermen. The subsistence harvest is annually assessed either by personal interviews or catch calendars. The personal interview is the predominant means of gathering this information. Appendix Table 24 presents mean catches per fisherman (fishing family) for the seven villages surveyed annually since 1962.

The 1976 subsistence harvest of 15,765 chum salmon represented a decrease from the 1975 harvest. The 1976 harvest was approximately 32% below the recent 5-year average of 23,264 (Appendix Table 25).

Escapements

During 1976, aerial surveys were conducted of key tributaries as well as the main streams of the Kobuk and Noatak River systems and the Inmachuk River of southern Kotzebue Sound. Aerial and foot survey counts of spawning chum salmon in 1976 are presented in Table 10.

Chum salmon escapements indices recorded for the Noatak and Kobuk River systems were respectively 32% and 78% below primary brood year abundance indices. The Noatak River escapement indexes for 1976 was 52% below comparable annual average indices. Appendix Table 26 represents comparative escapements for the 1962-1976 period.

Catches during the period 1962-1976 were obtained by the Alaska Department of Fish and Game. The catches were tabulated by direct counts of salmon, interviews, or by the return of catch forms that were distributed to the fishermen who are not contacted by interviewers. On the basis of observations and analysis of catch records, it was estimated that the recorded catches represented at least 70 percent of the actual harvest. The villages of Deering, Buckland, Candle and Shishmaref were not surveyed until the 1965 season.

The estimated average annual catch, both commercial and subsistence, of chum salmon in the Kotzebue Sound drainage during the 1962-1976 period was slightly less than one-half of that for the 1957 study. There is insufficient information to determine whether this apparent decline in catch is a result of less fishing effort, fewer available salmon, errors in catch estimates or a combination of all of these factors.

Although there is no fishing effort or other data available, there is some indication that the dependence on subsistence fishing has declined in this region during recent years as a result of increased welfare payments and more employment opportunities. Motorized snow vehicles are beginning to replace sled dogs and

Appendix Table 23. Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976. (continued)

Village	1971 Fishermen Interviewed	1971 Number of Sheefish	1972 Fishermen Interviewed	1972 Number of Sheefish
SUBSISTENCE				
Noorvik	32	5,975	21	2,213
Kiana	25	1,060	17	307
Ambler	13	711	6	350
Shungnak	20	671	10	639
Kobuk	5	1,068	7	12
Subtotal	95	9,485	61	3,521
Selawik	27	3,416	-	--
Kotzebue	33	682	18	311
Totals	155	13,583	79	3,832
COMMERCIAL				
Kotzebue	5	456	11	2,325
Combined TOTALS	160	14,039	90	6,157

SUBSISTENCE	1973		1974	
Noorvik	19	4,334	21	519
Kiana	25	--	15	51
Ambler	5	83	10	257
Shungnak	9	195	7	127
Kobuk	7	226	5	108
Subtotal	65	4,888	58	1,062
Selawik	-	--	-	--
Kotzebue	-	--	-	--
Totals	65	4,888	58	1,062
COMMERCIAL				
Kotzebue	6	--	-	--
Combined TOTALS	71	4,888	58	1,062

Appendix Table 23. Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976.

Village	1966-1967 Fishermen Interviewed	1966-1967 Number of Sheefish	1967-1968 Fishermen Interviewed	1967-1968 Number of Sheefish
SUBSISTENCE				
Noorvik	28	3,792	35	1,910
Kiana	19	925	25	766
Ambler	11	194	14	559
Shungnak	11	166	13	837
Kobuk	7	99	5	270
Subtotal	76	5,176(6-10/67)	92	4,342(6-10/68)
Selawik	29	7,164(3-11/67)	38	5,080(4-11/68)
Kotzebue	30	10,060(10/66-5/67)	48	21,871(10/67-7/68)
Totals	135	22,400	178	31,293
COMMERCIAL				
Kotzebue	10	922(10/66-5/67)	17	2,375(10/67-9/68)
Combined TOTALS	145	23,322	195	33,668

SUBSISTENCE	1968-1969		1970	
Noorvik	20	1,324	46	7,126
Kiana	22	409	25	790
Ambler	20	554	12	125
Shungnak	17	530	19	608
Kobuk	11	553	4	158
Subtotal	90	3,370(10/68-12/69)	106	8,807
Selawik	35	4,140(3-11/69)	29	1,601
Kotzebue	19	4,362(10/68-12/69)	33	3,520
Totals	144	11,872	168	13,928
COMMERCIAL				
Kotzebue	-	2,206(10/68-12/69)	4	350(1/70-12/70)
Combined TOTALS	144	14,078)	172	14,278

Appendix Table 24. Subsistence chum salmon catch per fisherman, Kotzebue district, 1962-1976.

Village	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kotzebue	1/	650	515	400	158	202	135	98	187
Noatak	1,190	800	710	810	820	914	220	760	242
Noorvik	665	160	220	220	137	90	84	163	132
Kiana	350	2/	260	265	62	68	96	223	138
Ambler	1/	94	310	190	76	49	33	235	242
Shungnak	1/	2/	2/	220	45	125	114	318	182
Kobuk	335	67	205	145	104	35	206	206	150

1/ No survey.
2/ Number of fishermen unknown.

Appendix Table 23. Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976. (Continued)

Village	1975 Fishermen Interviewed	1975 Number of Sheefish	1976 Fishermen Interviewed	1976 Number of Sheefish
SUBSISTENCE				
Noorvik	22	660	6	210
Kiana	15	68	20	58
Ambler	12	114	8	60
Shungnak	14	540	15	539
Kobuk	6	255	8	99
Subtotal	69	1,637	57	966
Selawik	-	--	-	--
Kotzebue	-	--	-	--
Totals	69	1,637	57	966
COMMERCIAL				
Kotzebue	14	2,633(12/74-6/75)	2	566
Combined TOTALS	83	4,270	59	1,522

SUBSISTENCE
Noorvik
Kiana
Ambler
Shungnak
Kobuk
Subtotal

Selawik
Kotzebue
Totals

COMMERCIAL
Kotzebue

Combined TOTALS

Appendix Table 25. Kotzebue district subsistence chum salmon catches, 196[illegible]76.

Village	1962	1963	1964	1965	1966	1967	1968	1969
Noorvik	15,934	4,304	2,167	5,596	3,141	2,350	2,424	1,301
Kiana	3,139	1,973	783	1,598	433	1,489	2,488	2,458
Ambler	1/	755	2,142	1,340	912	679	457	3,525
Shungnak	1/	1,240	3,134	2,160	899	1,500	1,600	2,550
Kobuk	2,321	200	1,020	877	625	175	1,030	1,655
Kobuk River TOTAL	21,393	8,472	9,246	11,571	6,010	6,193	7,999	11,489
Noatak River TOTAL 2/	48,890	16,762	12,763	5,671	19,700	26,512	5,490	14,458
Kotzebue	-	5,835	7,753	8,058	8,640	4,032	4,324	1,768
Deering	-	-	-	5,200	6,238	3,098	2,838	1,897
Buckland	-	-	-	-	-	162	37	-
Candle	-	-	-	-	-	11	89	200
Shishmaref	-	-	-	-	-	100	37	-
DISTRICT TOTAL	70,283	31,069	29,762	30,500	35,583	40,108	20,814	29,812

1/ Not surveyed.
2/ Represents catches of the village of Noatak; 40,693 chums taken during 1961.

119.

Appendix Table 24. Subsistence chum salmon catch per fisherman, Kotzebue district, 1962-1976. (continued)

Village	1971	1972	1973	1974	1975	1976
Kotzebue	53	63	195	1/	1/	1/
Noatak	148	74	36	393	133	212
Noorvik	223	84	121	324	210	259
Kiana	207	84	178	181	288	79
Ambler	177	244	305	165	282	250
Shungnak	133	266	469	891	647	281
Kobuk	386	302	273	450	293	70

1/ No survey.
2/ Number of fishermen unknown.

118.

Appendix Table 26. Comparative chum salmon aerial survey counts, Kotzebue district, 1962-1976.

	1962	1963	1964	1965	1966	1967	1968
Noatak River System							
Noatak River(below Kelly River	168,000	1,970 1/	89,798	4,177 1/	101,640	28,620	39,394
Eli River	9,000	35 1/	-	-	12 1/	-	5,502
Kelly River&Lake	1,818	600	-	3,155	570	225	375
TOTAL	178,818	2,605 1/	89,798	7,332 1/	102,222	28,845	45,271 1/
Kobuk River System							
Main Kobuk River							
Mouth toKobuk	-	-	7,985	-	-	-	-
Kobuk to Pah River	-	-	-	1,000	266	-	530
Pah River to just below Selby River	-	400	-	-	-	-	50
Selby River mouth and Slough	-	2,575	-	1,750	630	1,625	70
Selby River mouth to just below Beaver R.	-	-	-	-	-	75	170
Beaver River mouth	-	1,095	-	-	460	795	1,550
Above Beaver River	-	465	-	-	118	-	-
TOTAL Main Kobuk River	23,150 2/	4,535	7,985	2,750	1,474	2,495	2,370
Squirrel River	16,050	2,200	8,009	7,230	1,350	3,332	6,746
Salmon River	12,936	1,535	9,353	1,500 1/	3,957	2,117	3,367
Tutuksuk River	10,841	670	2,635	-	1,303	169	823 1/
TOTAL KOBUK R. System	62,977 2/	8,940	28,032	11,480	8,164	8,113 3/	13,306

1/ Poor survey conditions or incomplete survey.
2/ Probably represents over-estimate and includes some sheefish.
3/ Counts have been revised and are now correct.

Appendix Table 25. Kotzebue district subsistence chum salmon catches, 1962-1976. (continued)

Village	1970	1971	1972	1973	1974	1975	1976	Fishermen Interviewed(1976)
Noorvik	6,077	7,144	1,774	2,312	6,609	4,620	1,555	6
Kiana	3,457	5,177	1,435	4,470	2,726	4,320	1,579	20
Ambler	2,899	2,299	1,469	1,529	1,651	3,390	2,000	8
Shungnak	3,450	2,653	2,665	4,406	6,243	9,060	4,213	15
Kobuk	600	1,931	2,119	1,917	2,251	1,755	562	8
Kobuk River TOTAL	16,483	19,204	9,462	14,634	19,480	23,145	9,909	57
Noatak River TOTAL 2/	4,120	9,919	741	216	4,330	1,515	4,448	21
Kotzebue	6,184	1,737	1,151	1,172	1/	1/		1/
Deering	1,242	763	369	1,093	1,880	1,175	1,358	12
Buckland	344	155	59	1,722	639	1,540		
Candle	113	50	15	1/	1/	1/	50	1
Shishmaref	-	131	29	100	200	230		
DISTRICT TOTAL	28,486	31,959	11,085	18,942	26,729	27,605	15,765	91

1/ Not surveyed.
2/ Represents catches of the village of Noatak; 40,693 chums taken during 1961.

Table of Contents

Alaska Department of Fish & Game
Division of Commercial Fisheries

[redacted]

Norton Sound-Port Clarence-Kotzebue

Staff

Nome Field Office-P.O. Box 862
Frederic W. Kuhlmann (Norton Sound-Kotzebue Area Biologist)

Index to Figures, Tables and Appendix Tables

Subsistence catch information has been derived from interviews of subsistence fishermen, actual counts of subsistence fish and subsistence catch forms distributed to fishermen. Subsistence salmon catches in the Nome subdistrict (subdistrict 1) have been determined from the return of catch forms as required under a permit system.

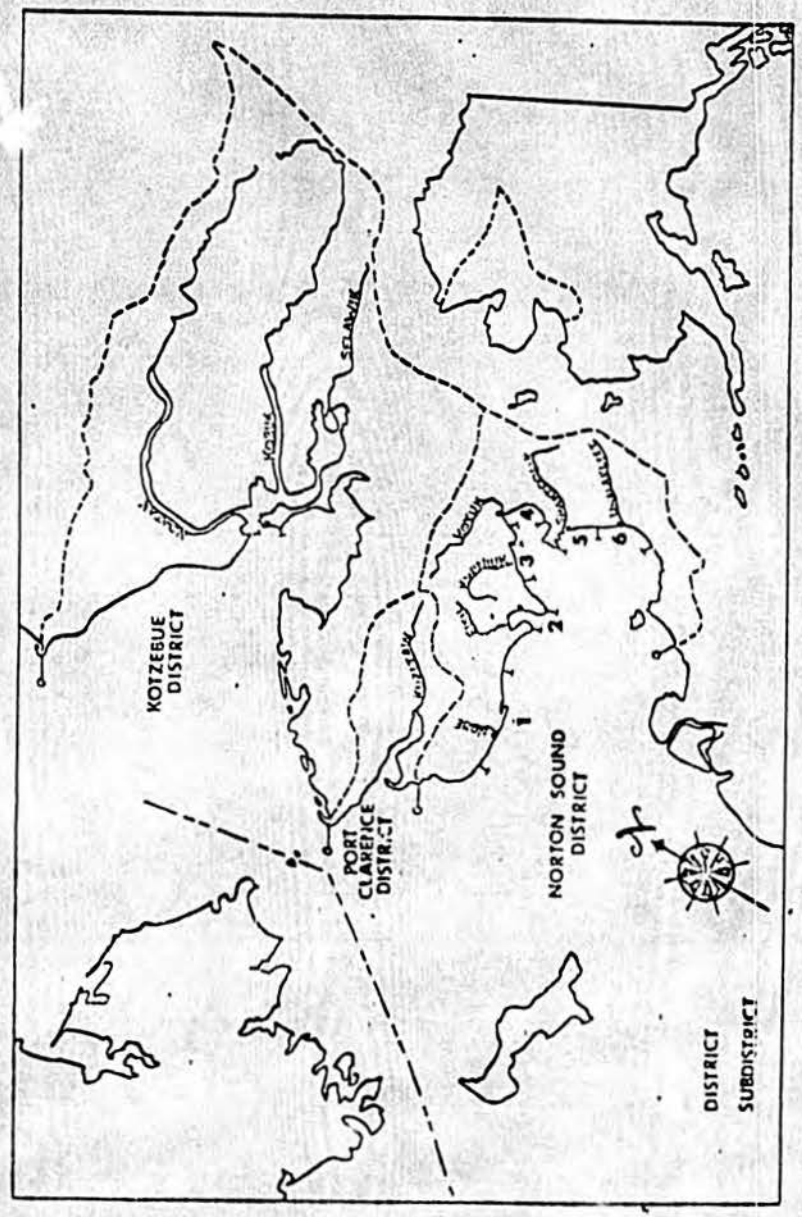


Figure 1. Norton Sound-Port Clarence-Kotzebue Districts.

Sound. A small red salmon (O. nerka) population exists in Salmon Lake on the Seward Peninsula and in Kelly Lake on the Noatak River near Kotzebue.

Other species common to the freshwater and coastal marine habitats are: sheefish, whitefish, Arctic char, lake trout, arctic grayling, burbot, suckers, sculpins, blackfish, sticklebacks, lampreys, smelt, herring, cods, flounders, crabs, shrimps and mollusks.

Water quality

Except for sections of the Seward Peninsula, water quality and spawning habitats in the area have been largely preserved in their original condition because land development activities have been minimal or non-existent. The future impact of oil development, mining activities, road construction and gravel removals on water quality and area fishery resources remains to be seen.

Commercial fishing

In 1959 and 1960, Department biologists conducted reconnaissance surveys which indicated harvestable surpluses of salmon were available in several districts and were not being commercially utilized. The Department liberalized various regulations and encouraged processors to explore and develop new fishing grounds. As a result, commercial salmon fishing activity has grown significantly since statehood, enabling many area residents to obtain a cash income.

NORTON SOUND-PORT CLARENCE-KOTZEBUE DISTRICT

Introduction

The Norton Sound-Port Clarence-Kotzebue management district includes all coastal waters from Canal Point Light in southern Norton Sound to Point Hope, approximately 160 miles northwest of Kotzebue and includes St. Lawrence Island (Figure 1). This management area comprises over 65,000 square miles with a coastline exceeding that of California, Oregon and Washington combined.

Fishery resources

All five species of Pacific salmon are indigenous to the area with chum salmon (Oncorhynchus keta) being the most abundant. Although chum and pink salmon have been found as far north as Barrow and in the Beaufort Sea adjacent to the mouth of the Sagavanirktok River, these species become relatively rare north of the Kotzebue Sound drainage. The largest spawning runs of king salmon (O. tshawytscha) occur in Norton Sound. King salmon are uncommon north of the Shaktoolik River in Norton Sound but have been found as far north as the Wulik River, located about 100 miles northwest of Kotzebue. Coho salmon (O. kisutch)are uncommon north of Norton Sound, but have been found in Kotzebue

Subsistence utilization

There are approximately 18,000 Eskimo people in the area; the majority residing in more than 26 small villages scattered along the coast and the major river systems. Nearly all of these native people are dependent to varying degrees on the fish and game resources for their livelihood.

Subsistence fishermen operate fish nets in the main rivers and, to a lesser extent, in the coastal marine waters capturing mainly salmon, whitefish, Arctic char and sheefish. Beach seines are occasionally used near the spawning grounds to catch schooling or spawning salmon and other species of fish. Sheefish, pike, char, smelt, saffron cod and king crab are frequently taken through the ice by handlines for subsistence and recreational purposes.

There is very little wastage of any portion of the fish taken for subsistence purposes. The major portion of the fish is sun-dried or smoked for later consumption, while the head and viscera are usually fed to dogs.

The Department has conducted annual surveys of the important subsistence salmon fisheries since the early 1960's. The majority of salmon taken are chums. Subsistence harvest information prior to 1960 is incomplete or entirely lacking for many years. There are some records indicating that in excess of 75 thousand salmon

Nearly all area commercial fishermen and processing plant workers are resident Eskimos. Commercial fishermen operate set gill nets to capture salmon from outboard powered skiffs. All commercial salmon fishing is done in coastal marine waters.

Declines in subsistence salmon utilization have made increases in commercial utilization possible during recent years. Additionally, there have been increased demands from Japanese markets for fresh, frozen and cured salmon, especially chums. These trends are expected to continue and should result in moderate increases in production and economic value of the commercial fishery over the next few years.

Chum and pink salmon are commercially significant species in Norton Sound, while chum salmon are the mainstay of the Kotzebue commercial fishery. Although these fish are commercially utilized in local markets to some extent, the majority are transported from the districts as a fresh or frozen product.

Char and whitefish are harvested incidentally to the salmon catch in Norton Sound, while sheefish and char provide the main incidental catch in the Kotzebue district. Limited commercial fisheries are also conducted by permit for sheefish, whitefish and char.

were taken in some years during the early 1960's.

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of commercial and subsistence fisheries in this vast area. The permanent staff assigned to this area consists of one management-research biologist and one clerk-typist assigned to the Nome field office. In addition, from 7 to 12 summer employees are hired each season to assist in conducting various management and research studies.

Operating expenses for the Norton Sound-Kotzebue area management and research program from July 1,1975 through June 30,1976 were approximately $99,000. Of the total, state and federal funds provided $77,000 and $22,000, respectively.

The main objective of the Department's program is to manage the commercial salmon fisheries on a sustained yield basis. In addition, information is obtained to determine the potential for commercial fisheries of under-utilized species such as herring, char and whitefish. Present commercial salmon fishing regulations are still relatively restrictive in order to insure that sufficient salmon are provided for subsistence fishery and spawning ground requirements.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is normally allowed for a total of four days a week during the open season. Fishing effort usually occurs during the entire run and not just during a particualr segment of the run. Occasionally fishing time is increased or decreased, depending upon fishing conditions and the strength of the runs or spawning escapements, as determined by special studies conducted by the Department.

Due to the vast size of the area accurate estimates of the size of salmon runs and the spawning escapements are difficult to obtain. Fishery management is also hampered by the relative lack of comparative catch and return information, since the fisheries were initiated or expanded through regulation changes only since 1961 or 1962. Management problems are further compounded by having to provide sufficient escapement after commercial fishing for the important subsistence fishery as well as for spawning purposes.

The Alaska Department of Fish and Game policy has been to maintain current levels of commercial utilization indefinitely until positive trends in subsistence utilization are established and more information is obtained on the relationship between the salmon catches, escapements and returns.

#3-X-02-76 (Kotzebue)	July 29	Correct fishing times by rescinding previous emergency order.	Incorrect fishing schedule listed in 3-X-01-76.
#3-X-03-76 (Kotzebue)	August 26	Close Kotzebue district to commercial fishing.	Below average chum salmon escapements.

per pound for king salmon (Appendix Table 4).

Norton Sound fishermen received approximately $285,203 from buyers for their 1976 catches (Appendix Table 5).

Six processors operated in Norton Sound in 1976. Three fishermen's co-operatives with shore facilities operated in Golovin (subdistrict 2), Moses Point (subdistrict 3) and Unalakleet (subdistrict 6), while three independent operators purchased fish in Nome(subdistrict 1) and Moses Point.

A list of processors operating in Norton Sound is presented in Attachment 1.

A total of 1,053,966 pounds of fresh or frozen salmon was processed in 1976 (Appendix Table 6).

Subsistence fishery

A total of 133 subsistence fishermen interviewed reported catching 203 king; 1,004 coho; 18,409 pink and 7,867 chum salmon for a total subsistence harvest of 26,973 salmon (Table 1). This subsistence catch was approximately equal to the recent 5-year average annual subsistence harvest level of 27,600, but was 24% below the recent 10-year average annual harvest. These subsistence harvest totals may provide evidence of a continued declining trend

in the subsistence utilization of the salmon resource. The formation of commercial fishermen's co-operatives, the decreased dependence upon sled dogs for transportation and increased year round employment are all factors in the declining subsistence harvest. An exception may be noted for subdistrict 1, Nome, where increased access to salmon streams may cause increased subsistence harvests.

Escapement

Table 2 presents salmon escapement data obtained in the district during 1976. Comparative annual escapements for selected streams are shown in Appendix Table 7.. Kwiniuk River escapements since 1965 have been obtained by a counting tower project. Escapement data for the Chirosky River, a Unalakleet River tributary, were also obtained by a counting tower project initiated in 1975. Other escapement data represents indices of abundance obtained by aerial surveys.

For all of Norton Sound, pink salmon escapements were average to above average. The chum salmon escapement was judged below average except for a better than average return to the Golovin subdistrict. The Kwiniuk River of the Moses Point subdistrict had the poorest return of chum salmon since a counting tower project was initiated in 1965.

The 1976 escapements relative to brood year escapements were below average for pink salmon and chum salmon.

Although pink salmon were abundant in the Nome subdistrict, the commercial fishery targeted chum salmon stocks, as indicated by the chum/pink salmon catch ratio of 5.5:1.0. The commercial fishery was closed on July 8 due to apparent milling of salmon stocks and resulting high commercial chum salmon catches and lagging escapements. The fishery was re-opened for one 36-hour period on July 15 and then closed until July 25. Comparative commercial catch data are presented in Appendix Table 8.

Subsistence fishery

A regulation change instituted at the fall 1974 meeting of the Board of Fish & Game placed all streams of the Nome subdistrict under a permit system. This regulation requires a subsistence fisherman to secure a permit in order to fish for subsistence purposes. This procedure was initiated to accurately determine subsistence fishing effort and harvest which has been sustained at high levels since 1968.

In 1976, 113 permits were issued to Nome subdistrict subsistence fishermen. A total of 101 (87.1%) permits were returned with catch information. Of the 101 returned permits, 24 indicated the fisherman "did not fish". The seventy-seven subsistence fishermen who reportedly engaged in subsistence fishing caught a total of 7,399 salmon.

Subdistrict Summaries, 1976

Nome (Subdistrict 1)

Commercial fishery

Twenty-eight vessels and gill nets were registered to fish in the Nome subdistrict, representing a 48% decrease from the record of 54 in 1975 Appendix Table 1).

Twenty-one commercial fishermen caught 2 king, 10 red, 1,348 pink and 7,477 chum salmon, totaling 8,837 salmon (Table 3). The catch was purchased locally by two buyers.

Fish were chilled and flown in the round to processors and markets elsewhere in the State. Some of the catch was purchased and marketed fresh in Nome.

The 1976 chum salmon commercial harvest was the second highest recorded for this subdistrict since active commercial fishing was initiated in 1964 (Appendix Table 2). The harvest was equal to the recent 5-year average annual average harvest, but was 1.5 times the recent 10-year average annual harvest of 3,500 fish.

Pink salmon catches were 29.8 percent above the recent 5-year average annual harvest, but 33.3 percent below the recent 10-year average annual harvest.

which included 13 king, 180 coho, 5,492 pink and 1,705 chum salmon (Table 1 and Appendix Table 2). Due to high subsistence effort in the Nome River during 1975, individual permit quotas were reduced and fishermen were asked to voluntarily fish other streams in the Nome subdistrict; as a consequence, 80 permits were issued for the Nome River in 1976, a 20% reduction from 1975 levels.

Escapement

Aerial surveys conducted of key streams in the Nome subdistrict indicated a peak escapement index of 12,161 pink and 2,667 chum salmon (Table 2). The escapement indices of both pink and chum salmon were judged to be average.

Golovin Bay (Subdistrict 2)

Commercial fishery

A total of 25 vessels and 23 gill nets was registered for the Golovin subdistrict, representing decreases of 40% and 46%, respectively, from record 1975 licensing (Appendix Table 1).

Twenty-two commercial fishermen harvested11 king, 1,311 coho, 24,230 pink and 30,614 chum salmon, totaling 56,166 fish (Table 4). This catch was 20.1% above the recent 5-year average annual harvest of 42,000 salmon.

The catch was purchased locally in Golovin by a fishermen's co-operative, dressed, frozen and shipped to markets in Seattle, Washington via freezerboat..

The commercial chum salmon catch was 10.2% below the recent 5-year average annual harvest of 34,000 fish, but was 8.2% above the recent 10-year average of 28,000 salmon.

The pink salmon harvest was the second largest ever made and was 98% above recent 5-year and 10-year average annual harvests of 12,000 pink salmon. The coho salmon catch was the largest on record, due primarily to unusually high fishing effort during the month of August. Comparative commercial catch data and aerial survey information indicated the 1976 Golovin subdistrict chum and pink salmon runs were at least average in magnitude. Consequently, the commercial season remained open on a normal four-day per week fishing schedule from June 15 to August 31. Comparative commercial catch data are presented in Appendix Table 9.

Subsistence fishery

The catches of 8 subsistence fishermen from White Mountain and Golovin included 2,356 pink and 1,277 chum salmon, totaling 3,633 salmon (Table 1 and Appendix Table 2). Growing numbers of fishermen are placing increased reliance upon the commercial fishery and community development to provide a base of income.

Escapement

Aerial surveys conducted of the Fish River and Niukluk Rivers yielded estimates of 23,040 pink, 12,520 chum salmon and 8,500 pink and chums combined (ie. indistinguishable by species)(Table 2). Salmon escapement indices were judged to be average for both pink and chum salmon. Escapements for both species were approximately equal to their respective parent year escapements of 1974 and 1972 (Appendix Table 7).

Moses Point (Subdistrict 3)

Commercial fishery

A total of 50 vessels and 49 nets were registered representing decreases of 25.4% and 26.9%, respectively, from record 1975 levels (Appendix Table 1).

A commercial catch of 16,137 salmon was made by 54 fishermen. The catch was comp 'sed of 19 king, 5,072 pink, 10,813 chum and 233 coho salmon (Table 5). The harvest was 66.4% below the recent 5-year average annual harvest of 48,000 salmon.

Commercial catches were purchased by two buyers. One buyer shipped fish in the round from the subdistrict, while the local fishermen's co-operative processed and chilled fish prior to shipment.

The commercial chum salmon harvest was 74.6% below the recent 5-year average annual harvest of 41,000 fish, while the pink salmon catch was 22.4% below the recent 5-year average annual harvest of 6,500 salmon.

Aerial surveys and a Department counting tower confirmed poor chum salmon escapements to the Kwiniuk River, while aerial surveys indicated poor chum escapements to the neighboring Tubutulik River also. Kwiniuk River counting tower figures were the lowest since the project's inception in 1965 and represented the second consecutive year of below average escapements. Comparison of the commercial chum/pink catch ratios (2.1:1.0) and Kwiniuk River counting tower escapement sample ratios (0.2:1.0) indicate continued targeting of chums by the commercial fishery. The commercial season was closed on July 8 due to poor chum salmon escapements and was re-opened on July 25. Comparative catch statistics for the Moses Point subdistrict are presented in Appendix Table 10.

Subsistence fishery

The subsistence catches of 9 fishermen from the village of Elim included 22 kings, 5,016 pink and 1,548 chum for a total of 6,586 salmon. The 1976 subsistence harvest demonstrates a continuing decline in subsistence use. Growing numbers of fishermen are placing increasing emphasis upon community development and commercial

fishing to provide a base of income (Table 1 and Appendix Table 2).

Escapement

The Kwiniuk and Tubutulik Rivers are the main spawning grounds for fish entering this subdistrict. An aerial survey index count of the Tubutulik River of 1,095 chum, 6,065 pink salmon and 2,600 "salmon" (not identified by species) indicated the smallest return on record for chum salmon and a slightly below average return for pink salmon. The total expanded escapement enumerated by a tower into the Kwiniuk River in 1976 was 12 king, 6,834 chum, 28,431 pink and 12 coho salmon. Pink salmon escapements decreased 30% from the 1975 brood year escapement, while chum escapement were 80% below the 1972 escapement (Table 2 and Appendix Table 7).

Norton Bay (Subdistrict 4)

Commercial fishery

A total of 23 vessels and 21 gear licenses were issued, representing decreases of 41% and 50%, respectively, from record 1975 levels (Appendix Table 1).

Twenty-seven commercial fishermen caught 103 king, 4,399 pink, 95 coho and 7,135 chum salmon, totaling 11,722 salmon (Table 6). This total harvest was 28.9% above the recent 4-year average

annual harvest, but was 57% below the 1975 harvest total.

Norton Bay fish were flown, in the round, via light aircraft to the fishermen's co-operative in Unalakleet or tendered to Moses Point for processing.

Commercial chum salmon catches were 15.2% below the recent 4-year average annual harvest, while pink salmon harvests were 2.4 times the recent 4-year average.

This fishery is the most sporadic of the subdistrict fisheries in Norton Sound. The remoteness of the fishing grounds from the buying stations and difficulties with operating tenders in the shallow waters of Norton Bay account for the thus far limited character of this fishery. Due to average escapements and light commercial fishing effort, the commercial season remained open on a normal 4-day per week fishing schedule from June 15 to August 31. Comparative commercial catch data are presented in Appendix Table 11.

Subsistence fishery

The subsistence catches of 4 fishermen from the village of Koyuk included 2 king, 41 pink and 236 chum for a total of 279 salmon (Table 1).

Escapement

The Koyuk, Ungalik and Inglutalik Rivers are the main spawning

ground for fish entering this subdistrict. In 1976 an aerial index survey conducted of the Ungalik River resulted in a count of 5,753 chum, 982 pink and 1,600 salmon (not identified by species). A total of 115 pink and 247 chum were counted in the Koyuk River and 4,674 pink, 1,394 chum and 117 king salmon were counted in the Inglutalik River (Table 2).

Shaktoolik (Subdistrict 5)

Commercial fishery

Vessel licenses decreased 12.9% from 1975 levels, while gill net licenses increased 3.9%.

Thirty-seven commercial fishermen harvested 806 king, 129 coho, 15,740 pink and 15,727 chum, totaling 32,482 salmon (Table 7). This catch was 18.9% above the recent 5-year average annual harvest of 27,000 fish and 72.9% above the recent 10-year average annual harvest of 18,750 salmon.

Salmon were tendered to facilities at Unalakleet (subdistrict 6) to be dressed, chilled or frozen and flown to markets elsewhere in the state.

The chum salmon harvest was 32% below the recent 5-year average annual harvest of 23,000 fish and equal to the 10-year

average annual harvest.

Pink salmon catches were 4.7 times the recent 5-year average annual harvest of 3,300 fish, while the king salmon harvest was 2.0 times the recent 5-year average of 450 salmon.

Aerial survey information and commercial catch data indicated a possible below average run of chum salmon to the Shaktoolik River, resulting in a reduction in fishing time on July 15 and a closure on July 19. The commercial season was not re-opened until July 25. Comparative commercial catch data are presented in Appendix Table 12.

Subsistence fishery

Five subsistence fishermen caught 24 king, 121 coho, 1,188 pink and 269 chum salmon totaling 1,602 salmon. The bulk of this harvest came from subsistence fishing activities on the Shaktoolik River. This harvest was the lowest on record and may be attributed to the growing numbers of fishermen engaged in the commercial fishery (Table 1 and Appendix Table 2).

Escapement

In 1976, the Shaktoolik River, the main spawning stream in this subdistrict, was aerially surveyed with an escapement count of 139 king, 12,175 pink and 1,736 chum salmon (Table 2).

Unalakleet (Subdistrict 6).

Commercial fishery

A total of 59 vessels and 59 gear licenses were issued representing reductions of 11.9% and 1.7%, respectively, from 1975 levels.

A total of 60 participating commercial fishermen harvested 1,198 king, 5,148 coho, 37,113 pink and 24,484 chum salmon for a total of 67,943 salmon (Table 8). This total harvest was equal to the recent 5-year average annual harvest of 69,000 but 10% above the 10-year average annual harvest of 61,500 fish.

All fish caught were purchased in Unalakleet by the fishermen's co-operative. The salmon catch was dressed, iced or chilled at the shore based facility, and later flown to markets and processors elsewhere in the state.

The commercial chum salmon harvest was 28% below the recent 5-year average annual harvest of 34,000 fish and 9.6% below the recent 10-year average annual harvest of 27,000 salmon.

The pink salmon harvest exceeded the previous 5-year average annual harvest by 1.2 times and was 34.3% above the recent 10-year average of 27,600 salmon.

Coho salmon catches were 1.5 times the recent 5-year average of 3,400 fish, while the king salmon harvest was 37.2% below the recent 5-year harvest average of 1,900 salmon (Appendix Table 2).

Comparative commercial catch information and aerial survey data indicated a below average chum salmon run to the Unalakleet River in 1976. Less conclusive data from the Chirosky River counting tower also seemed to point towards a below average run and corresponding escapements. Commercial fishing time was reduced on July 15 and a closure was instituted on July 19. The season was re-opened on July 25. Comparative commercial catch data are presented in Appendix Table 13.

It should be noted that in response to Department encouragement to fishermen to harvest abundant pink salmon, increasing amounts of pink salmon gear was utilized during the 1976 season.

A total of 2,891 char were captured incidentally to the commercial salmon fishery.

Subsistence fishery

Thirty subsistence fishermen in this subdistrict harvested 142 king, 694 coho, 4,316 pink and 2,832 chum totaling 7,894 salmon. This catch was the second smallest subdistrict harvest recorded and may be attributed to growing numbers of fishermen

and individuals placing more reliance upon commercial fishing and associated industries to provide a base of income (Table 1 and Appendix Table 2).

Escapement

Aerial surveys of the Unalakleet River, North River and Egavik Creek, in addition to Chirosky River tower counts documented approximately 363 king, 79,290 pink and 6,477 chum salmon in streams of this subdistrict. Escapements for king salmon were judged to be poor, whereas pink and chum salmon escapements were above average and below average respectively (Table 2).

Norton Sound District Outlook for 1977

Insufficient data is available to enable accepted forecasting methods to be employed in Norton Sound. The 1977 "Outlook" is based upon analysis of comparative commercial catch and escapement information, age data and subjective determinations. The "Outlook" is presented only as an indicator of possible 1977 run strength.

Norton Sound pink salmon do not demonstrate a strong odd/even year cycle and run strength is difficult to predict. The pink salmon return to Norton Sound in 1977 will be produced from the 1975 brood year. Pink salmon escapements in 1975 were average, but were notably strong in subdistrict 3, Moses Point. Therefore, overall pink salmon returns are expected to be of average magnitude in 1977.

The 1977 Norton Sound chum salmon return will be produced by the 1972-1974 escapements, with the bulk of the run composed of the four-year-old age class from the 1973 escapement. Inspection of 1976 age data tends to indicate below average recruitment from the 1972 brood year in some subdistricts. This may indicate below average returns of age 5_1 chums this year. Chum salmon escapements in 1972 were judged to be average; 1973 escapements were below average and 1974 escapements were average. Overall, Norton Sound chum salmon returns are anticipated to be of below average to average magnitude in 1977.

Table 1. Norton Sound district subsistence catches, 1976.

Village	No. of Fishermen Interviewed	Kings	Reds	Coho	Pink	Chum	TOTAL SALMON
Unalakleet	30	142	-	694	4316	2832	7,984
Shaktoolik	5	24	-	121	1108	269	1,602
Koyuk	4	2	-	--	41	236	279
Elim	9	22	-	--	5016	1548	6,586
Golovin	6	--	-	--	1995	1128	3,123
White Mountain	2	--	-	--	361	149	510
Nome	77	13	-	189	5492	1705	7,399
District TOTAL 1976	133	203	-	1,004	18,409	7867	27,483
District TOTAL 1975	133	186	-	192	15,803	8124	24,305
District TOTAL 1974	117	420	-	1,004	16,426	3953	21,868
District TOTAL 1973	79	392	-	520	14,770	7135	22,867

Commercial fishing effort, in terms of gear licenses, decreased 29% in 1976 from previous record 1975 levels; however, 1976 gear license totals were very similar to previous record levels set in 1973 and 1974. The 1975 levels are believed to have increased due to anticipated implementation of the "limited entry" program. Last year's license registration level is believed to be representative of "normal" fishing effort and is not expected to change greatly in 1977.

Appendix Table 7. Commercial and subsistence catches by species by subdistrict, Norton Sound district, 1961-1976

Year	Commercial						Subsistence					Combined					
	King	Red	Coho	Pink	Chum	Total	King	Coho	Pink	Chum	Total	King	Red	Coho	Pink	Chum	Total
NOME (SUBDISTRICT 1)																	
1964	5	-	-	1	1,194	1,200	-	-	-	-	-	5	-	-	1	1,194	1,200
1965	1	-	-	193	1,941	2,135	-	-	780	1,825	2,605	1	-	-	973	3,766	4,740
1966	1	-	32	1	581	615	12	192	1,794	1,762	3,760	13	-	224	1,795	2,343	4,375
1967	-	-	-	72	406	478	11	36	349	627	1,023	11	-	36	421	1,033	1,501
1968	-	-	-	56	102	162	7	103	6,507	621	7,243	7	-	105	6,567	723	7,405
1969	-	-	63	330	601	994	2	27	3,649	508	4,186	2	-	90	3,979	1,109	5,180
1970	-	-	6	55	960	1,019	-	35	5,001	458	5,494	-	-	39	5,056	1,418	6,513
1971	11	-	-	14	2,315	2,340	-	122	5,457	2,900	8,479	11	-	122	5,471	5,215	10,819
1972	15	-	-	12	2,643	2,670	19	57	4,684	315	5,075	34	-	52	4,696	2,958	7,746
1973	-	-	-	321	1,132	1,453	14	120	5,108	1,362	7,114	14	-	129	5,429	2,494	8,567
1974	19	-	123	7722	10,431	18,295	8	5	3,818	183	4,014	27	-	128	11,540	10,614	22,309
1975	2		319	2163	8,364	10,869	2	97	6,267	2,358	8,724	5	-	416	8,430	11,722	19,593
1976	2	10	-	1368	7,477	8,837	13	189	5,492	1,709	7,399	15	10	189	6,860	9,382	16,236
GOLOVIN BAY (SUBDISTRICT 2)																	
1962	45	11	264	10,276	68,720	79,316	-	-	-	-	-	45	11	264	10,276	68,720	79,316
1963	40	40	-	19,677	49,850	69,047	-	118	5,762	9,319	15,139	40	40	118	24,779	59,569	84,186
1964	27	40	3	7,236	56,301	63,607	-	-	-	-	-	27	40	3	7,236	56,301	63,607
1965	-	-	-	-	-	-	2	49	1,523	3,847	5,421	2	-	49	1,523	3,847	5,421
1966	17	14	584	4,665	29,791	35,071	4	176	1,573	3,520	5,273	21	14	760	6,238	33,311	40,344
1967	10	-	747	5,790	31,193	37,740	3	165	2,774	4,803	7,765	13	-	932	8,564	35,996	45,505
1968	12	-	205	18,498	10,011	28,656	4	181	4,955	1,744	6,884	16	-	386	23,383	11,755	35,540
1969	28	-	1,224	23,266	20,949	45,409	2	190	2,760	2,514	5,466	30	-	1,414	26,026	23,463	50,875
1970	13	-	3	18,771	20,566	39,305	4	353	3,056	2,604	6,017	17	-	356	21,827	23,170	45,322
1971	17	-	197	2,735	33,824	36,793	7	191	1,444	1,936	3,578	44	-	388	4,179	35,760	40,371
1972	36	-	20	6,562	27,097	33,715	4	62	1,735	2,028	3,829	40	-	82	8,297	29,125	37,544
1973	70	-	183	14,145	41,699	56,097	1	43	9	74	132	71	-	231	14,154	41,765	56,229
1974	30	-	3	28,340	30,173	58,546	3	-	967	206	1,176	33	-	3	29,307	30,379	59,722
1975	17	-	206	10,770	41,761	52,754	-	1	2,011	2,025	4,037	17	-	207	12,781	43,786	56,791
1976	11	-	1,311	24,220	30,614	56,166	-	-	1,995	1,128	3,123	11	-	1,311	26,225	31,742	59,289
MOSES POINT (SUBDISTRICT 3)																	
1962	27	-	-	11,100	50,683	61,810	-	-	-	-	-	27	-	-	11,100	50,683	61,810
1963	15	-	-	2,549	46,274	48,838	5	-	5,808	8,316	14,129	20	-	-	8,357	54,590	62,967
1964	32	3	-	3,372	28,568	31,975	-	-	63	348	411	32	3	-	3,435	28,916	32,386
1965	-	-	-	-	-	-	16	72	1,325	9,857	11,270	16	-	72	1,325	9,857	11,270
1965	17	-	-	2,745	24,741	27,503	14	250	2,511	5,409	8,184	31	-	250	5,256	30,150	35,687
1967	-	-	-	-	-	-	39	116	1,322	9,913	11,390	39	-	116	1,322	9,913	11,390
1968	12	-	1	9,012	17,908	26,933	2	80	6,135	2,527	8,744	14	-	81	15,147	20,435	35,677
1969	29	-	-	11,607	26,595	38,430	9	109	1,798	1,403	3,211	38	-	109	13,397	27,997	41,641
1970	39	-	-	13,052	29,726	42,817	16	160	4,661	6,960	11,797	55	-	160	17,713	36,686	54,614
1971	95	-	4	922	43,831	44,852	16	271	1,656	2,727	4,560	111	-	275	1,968	46,858	49,412
1972	195	-	11	5,866	30,919	36,986	44	108	1,579	2,070	3,801	239	-	119	7,445	32,989	40,787
1973	134	-	-	10,603	31,369	42,176	2	-	-	298	300	136	-	-	10,603	31,667	42,476
1974	193	-	9	12,821	55,276	68,304	3	-	2,382	1,723	4,108	201	-	9	15,203	56,999	72,412
1975	16	-	-	4,497	46,699	51,122	7	6	1,280	503	1,796	18	-	6	5,687	47,247	52,918
1976	19	-	233	5,072	10,813	16,137	22	-	5,016	1,548	6,586	41	-	233	10,088	12,361	22,723
NORTON BAY (SUBDISTRICT 4)																	
1962	387	7	40	4,402	24,380	29,216	-	-	-	-	-	387	7	40	4,402	24,380	29,216
1963	137	2	-	17,476	12,469	30,284	-	-	5,097	-	5,097	137	2	-	22,773	12,469	35,381
1964	50	3	-	988	5,916	6,957	-	-	-	-	-	50	3	-	988	5,916	6,957
1965	-	-	-	-	-	-	4	22	252	3,032	3,310	4	-	22	252	3,032	3,310
1966	-	-	-	-	-	-	7	41	929	3,612	4,589	7	-	41	929	3,612	4,589
1967	-	-	-	-	-	-	12	14	1,097	2,945	4,068	12	-	14	1,097	2,945	4,068
1968	-	-	-	-	-	-	28	71	1,916	1,872	3,887	28	-	71	1,916	1,872	3,887
1969	26	-	-	4,849	3,974	8,849	59	189	2,115	1,655	4,018	85	-	189	6,964	5,629	12,867
1970	-	-	-	-	-	-	3	10	840	3,500	4,353	3	-	10	840	3,500	4,353
1971	-	-	-	-	-	-	5	47	92	2,672	2,763	5	-	47	92	2,672	2,763
1972	43	-	-	1,713	7,799	9,555	30	44	2,039	2,022	4,185	73	-	44	3,802	9,821	13,740
1973	28	-	-	1,645	4,672	6,345	1	-	10	130	141	29	-	-	1,655	4,802	6,486
1974	21	-	-	654	3,826	4,501	-	-	17	900	917	21	-	-	671	4,726	5,418
1975	60	-	89	1,137	17,385	18,670	1	-	93	361	455	69	-	89	1,230	17,746	19,133
1976	103	-	95	4,389	7,135	11,722	2	-	41	236	279	105	-	95	4,430	7,371	12,001

Appendix Table 2. (Continued) Commercial and subsistence catches by species by subdistrict, Norton Sound district, 1961-1976

	Commercial						Subsistence					Combined					
Year	King	Red	Coho	Pink	Chum	Total	King	Coho	Pink	Chum	Total	King	Red	Coho	Pink	Chum	Total
							SHAKTOOLIK (SUBDISTRICT										
1961	140	-	-	29,075	24,746	53,961	-	-	-	-	-	140	-	-	29,075	24,746	53,961
1962	1,738	-	2,113	640	8,718	13,209	-	-	-	-	-	1,738	-	2,113	640	8,718	13,209
1963	480	11	563	5,183	19,153	25,390	-	-	-	-	-	480	11	563	5,183	19,153	25,390
1964	631	79	16	1,969	35,272	37,967	77	340	2,132	5,412	7,961	708	79	356	4,101	40,684	45,928
1965	127	30	-	3	8,356	8,516	31	107	3,763	3,420	7,321	158	30	107	3,766	11,776	15,837
1966	310	-	956	344	8,292	9,902	142	762	1,445	4,183	6,532	452	-	1,718	1,789	12,475	16,434
1967	43	-	88	1,056	1,655	2,842	262	387	2,010	4,436	7,095	305	-	475	3,066	6,091	9,937
1968	61	-	130	2,205	2,504	4,900	10	458	6,355	1,915	8,738	71	-	588	8,560	4,419	13,638
1969	33	-	276	6,197	8,645	15,151	40	193	4,018	3,439	7,690	73	-	469	10,215	12,084	22,841
1970	197	-	155	2,301	15,753	18,406	43	210	2,475	2,016	4,744	240	-	365	4,776	17,769	23,150
1971	284	-	238	28	13,849	14,399	87	329	494	5,060	5,970	371	-	567	522	18,909	20,369
1972	419	-	11	2,798	12,022	15,250	64	235	939	3,399	4,637	483	-	246	3,737	15,421	19,887
1973	289	-	177	6,450	14,500	21,416	51	130	3,410	1,397	4,988	340	-	307	9,860	15,897	26,404
1974	583	-	179	5,650	26,391	32,803	93	353	1,901	358	2,705	676	-	532	7,551	26,749	35,508
1975	651	2		1,774	49,536	52,775	18	14	1,394	334	1,760	669	2	876	3,168	49,870	54,535
1976	866	-	129	15,740	15,727	32,482	24	121	1,188	269	1,602	910	-	250	16,928	15,996	34,034
							UNALAKLEET (SUBDISTRICT										
1961	5,160	35	13,807	5,162	23,586	47,750	-	-	-	-	-	5,160	35	13,807	5,162	23,586	47,750
1962	5,089	-	6,739	6,769	30,283	48,880	-	-	-	-	-	5,089	-	6,739	6,769	30,283	48,880
1963	5,941	18	16,202	11,140	27,003	60,304	-	-	-	-	-	5,941	18	16,202	11,140	27,003	60,304
1964	1,273	1	79	1	19,611	20,965	488	2,727	7,030	6,776	16,471	1,761	1	2,306	7,031	26,337	37,436
1965	1,321	-	2,030	24	26,498	29,873	521	4,562	11,488	8,791	25,362	1,842	-	6,592	11,512	35,289	55,235
1966	1,208	-	4,183	5,023	16,840	27,254	90	789	6,083	3,387	10,349	1,298	-	4,972	11,106	20,227	37,603
1967	1,751	-	1,544	21,961	8,502	33,758	490	484	9,964	-	10,938	2,241	-	2,028	31,925	8,502	44,696
1968	960	-	6,549	41,474	14,865	63,848	186	1,493	11,044	2,982	15,705	1,146	-	8,042	52,518	17,847	79,553
1969	2,276	-	5,273	40,558	27,032	70,139	324	1,483	4,230	4,196	10,233	2,600	-	6,756	44,788	26,228	80,372
1970	1,604	-	4,261	30,779	40,029	76,673	495	3,907	10,105	7,214	21,721	2,099	-	8,168	40,883	47,244	98,394
1971	2,166	-	2,688	1,196	37,543	43,593	911	3,137	2,230	7,073	13,351	3,077	-	5,825	3,426	44,616	56,944
1972	2,235	-	412	28,231	20,440	51,318	643	3,818	3,132	4,132	9,725	2,878	-	2,230	31,363	24,572	61,043
1973	1,397	-	8,922	13,335	25,716	49,370	323	213	6,233	3,426	10,195	1,720	-	9,135	19,568	29,142	59,565
1974	2,100	-	1,778	93,332	36,170	133,380	313	706	7,341	588	8,948	2,413	-	2,484	100,673	36,758	142,328
1975	1,638	-	3,167	12,137	48,740	65,682	163	74	4,750	2,038	7,033	1,801	-	3,241	16,895	50,778	72,715
1976	1,193	1	5,148	37,113	24,484	67,944	142	694	4,316	2,832	7,984	1,340	1	5,842	41,429	27,316	76,928
							ALL SUBDISTRICTS										
1961	5,300	35	13,807	34,237	48,332	101,711	-	-	-	-	-	5,300	35	13,807	34,237	48,332	101,711
1962	7,286	18	9,156	33,387	182,784	232,431	-	-	-	-	-	7,286	18	9,156	33,387	182,784	232,431
1963	6,613	71	16,765	55,625	154,789	233,863	5	118	16,607	17,635	34,365	6,618	71	16,883	72,232	172,424	268,228
1964	2,018	126	98	13,567	148,862	164,671	565	2,567	9,225	12,486	24,843	2,583	126	2,665	22,792	161,348	189,514
1965	1,449	30	2,030	270	36,795	40,574	574	4,812	19,131	30,772	55,289	2,023	30	6,842	19,351	67,567	95,813
1966	1,553	14	5,755	12,778	80,745	100,345	269	2,210	14,335	21,873	38,687	1,822	14	7,965	27,113	102,118	139,032
1967	1,804	-	2,379	28,879	41,756	74,818	817	1,222	17,516	22,724	42,279	2,621	-	3,601	46,395	64,480	117,097
1968	1,045	-	6,885	71,179	45,390	124,499	237	2,391	36,912	11,661	51,201	1,282	-	9,276	108,091	57,051	175,700
1969	2,392	-	6,836	66,949	82,795	178,972	436	2,191	18,562	15,615	36,804	2,828	-	9,027	105,511	98,410	215,776
1970	1,853	-	4,423	64,908	107,034	178,218	561	4,675	26,127	22,763	54,126	2,414	-	9,098	91,035	129,797	232,344
1971	2,593	-	3,127	4,895	131,362	141,977	1,026	4,097	10,863	21,815 1/	37,801	3,619	-	7,224	15,758	153,177	179,778
1972	2,938	-	454	45,182	100,920	149,494	804	2,319	14,158	13,966 2/	31,247	3,742	-	2,773	59,340	114,886	180,741
1973	1,918	-	9,202	46,499	119,073	176,797	392	570	14,778	7,135	22,867	2,310	-	9,802	61,769	126,283	199,664
1974	2,951	-	2,092	148,519	162,767	315,829	420	1,064	16,426	3,958	21,868	3,371	-	3,156	164,945	165,725	337,697
1975	2,323	2	4,553	32,388	212,486	251,861	186	192	15,803	8,124 3/	24,305	2,579	2	4,785	48,191	220,610	276,166
1976	2,219	11	6,916	87,892	96,250	193,283	203	1,004	18,048	7,718	26,973	2,422	11	7,920	105,940	103,968	220,261

1/ Includes 197 recorded red salmon in all subdistricts.
2/ Includes 93 recorded red salmon in all subdistricts.
3/ Includes 11 recorded red salmon in all subdistricts.

PORT CLARENCE DISTRICT

District boundaries

The Port Clarence district encompasses all waters from Cape Douglas to Cape Prince of Wales (Figure 3). A unique feature of this district is the Pilgrim River-Salmon Lake red salmon run which is one of the northern most occurrences of this species on the continent.

Commercial fishery

Commercial fishing in freshwater is prohibited. In 1966 a total of 1,216 salmon consisting of 93 reds, 131 pinks and 992 chums was taken commercially in the Grantley Harbor-Tuksuk Channel area. This was the only bona fide commercial fishery in the district, but a few salmon are probably sold or bartered each year in Teller and Nome. In 1974 the Board of Fish & Game officially closed the Port Clarence district to commercial salmon fishing.

Subsistence fishery

Red salmon bound for the Salmon Lake-Grand Central River spawning grounds must pass through Port Clarence, Grantley Harbor, Tuksuk Channel, Imuruk Basin and Pilgrim River. Teller and

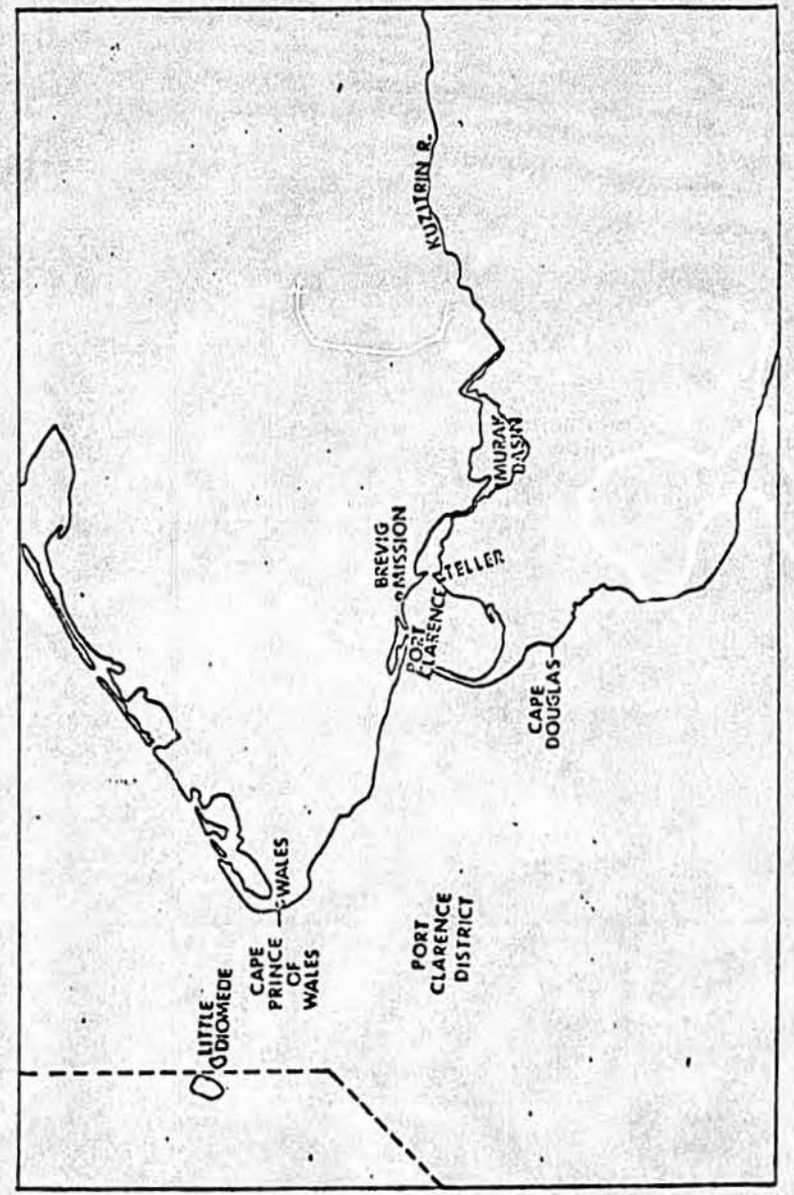


Figure 3. Port Clarence District.

Brevig Mission subsistence fishermen take an unrestricted harvest of all species of salmon, mainly in the Grantley Harbor and Tuksuk Channel areas. Subsistence fishermen from Nome fish for all species of salmon in the Pilgrim River and Salmon Lake areas under special permits.

The subsistence salmon fishery in the Tuksuk Channel-Grantley Harbor area is a traditional fishery probably dating back hundreds of years. Subsistence fishing in Salmon Lake dates back at least to the 1930's. The Pilgrim River was not fished until 1962.

It is likely that the traditional subsistence fishery in the area had been harvesting this run at or near its maximum sustained yield for many years. Easier access to Salmon Lake and Pilgrim River due to road construction in 1957 increased subsistence utilization by Nome fishermen in these areas and resulted in overharvest by the combined subsistence fisheries. The red salmon in this district are currently at threshold population levels.

Since 1964 the subsistence fishery in the Pilgrim River-Salmon Lake area has been made more restrictive. A summary of the important restrictions, in chronological order, is presented below:

1. Beginning with the 1964 season, a permit was required under which numbers of salmon taken could be limited. Fishermen were also required to record daily catches.

2. In 1964 the Grand Central River was closed to subsistence fishing for salmon.

3. No salmon gill net or fishing device can obstruct one-half of any salmon migration waterway or spawning stream. This took effect in 1964.

4. Subsistence fishing for salmon was prohibited within 300 feet of a marker placed at the outlet of Salmon Lake. This also took effect in 1964.

5. In 1966 fishermen were restricted to a total salmon take of either 25 or 50 fish (all species combined), depending on need. The effort in the Salmon Lake-Pilgrim area decreased by 50 percent that year (Appendix Table 14).

6. Beginning with the 1969 season, fishermen were restricted to a total of 25 salmon of all species. Failure to return their daily catch records would result in not being able to receive a permit the following year.

7. Beginning with the 1971 season, the following regulation went into effect: a set gill net may obstruct no more than one-half the width of any fish stream. A stationary fishing device

Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976).

Location	No. of Fishermen	Catch/ Fisherman	King	Red	Coho	Pink	Chum	TOTAL
				1963				
Pilgrim River	7	246	0	303	0	805	419	1,727
Salmon Lake	9	263	0	3,283	25	0	0	3,308
TOTAL	16	315	0	3,586	25	805	419	5,035
Teller	3	802	9	1,280	0	256	860	2,405
DISTRICT TOTAL	19	392	9	4,866	25	1,061	1,279	7,440
				1964				
Pilgrim River	14	197	17	1,266	174	312	986	2,755
Salmon Lake	8	43	0	209	53	59	63	384
TOTAL	22	143	17	1,475	227	371	1,049	3,139
Teller-no survey								
DISTRICT TOTAL	22	143	17	1,475	227	371	1,049	3,139
				1965				
Pilgrim River	12	101	11	305	64	199	628	1,207
Salmon Lake	11	103	1	962	100	23	43	1,129
TOTAL	23	102	12	1,267	164	222	671	2,336
Teller	6	600	24	537	475	1,632	931	3,599
DISTRICT TOTAL	29	205	36	1,804	639	1,854	1,602	5,935

in gradual increases in run magnitudes over the next few years. However, it is also possible that the run has suffered such a significant decline that it cannot be restored to former levels by management techniques alone. It may be necessary to initiate an expensive rehabilitation program and prohibit all subsistence fishing. One problem concerning a blanket subsistence closure is that other harvestable species such as pink and chum salmon migrate concurrently with the red salmon. To prohibit the taking of red salmon would prohibit, or at least seriously limit, the taking of these other species as well. An alternative management policy would be to subject the subsistence fishery to open and closed periods in order to increase escapement and still allow a subsistence harvest. This latter policy was initiated during the 1972 season.

Appendix Table 14. (continued) Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976)

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
				1969				
Pilgrim River	3	5	0	4	0	10	0	14
Salmon Lake	4	13	0	51	0	0	0	51
TOTAL	7	9	0	55	0	10	0	65
Teller	6	270	2	128	27	538	932	1,617
DISTRICT TOTAL	13	122	2	180	27	548	922	1,582
				1970				
Pilgrim River	3	20	0	32	0	2	25	59
Salmon Lake	4	22	0	30	6	23	30	89
TOTAL	7	21	0	62	6	25	55	148
Teller	9	710	4	481	1,040	1,261	3,601	6,387
Brevig Mission	2	334	0	45	25	22	575	667
TOTAL	11	641	4	526	1,065	1,283	4,176	7,054
DISTRICT TOTAL	18	400	4	588	1,071	1,308	4,231	7,202
				1971				
Pilgrim River	4	21	3	37	3	0	39	82
Salmon Lake	4	30	4	90	2	14	10	120
TOTAL	8	25	7	127	5	14	49	202
Teller	12	531	23	688	899	1,155	3,605	6,370
Brevig Mission	2	104	1	35	55	2	115	208
TOTAL	14	470	23	723	954	1,157	3,720	6,578
DISTRICT TOTAL	22	308	31	850	959	1,171	3,769	6,780

Appendix Table 14. (continued) Subsistence catches (all species) for Pilgrim River, Salmon Lake, and Teller, (1963-1976).

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
				1966				
Pilgrim River	7	58	5	7	14	84	295	405
Salmon Lake	4	32	0	123	2	0	2	127
TOTAL	11	48	5	130	16	84	297	532
Teller	13	348	2	702	785	645	2,393	4,527
Brevig Mission	2	291	3	168	95	130	185	581
TOTAL	15	341	5	870	880	775	2,578	5,108
DISTRICT TOTAL	26	217	10	1,000	896	859	2,875	5,640
				1967				
Pilgrim River	4	22	7	51	4	5	21	88
Salmon Lake	9	32	0	286	2	0	0	288
TOTAL	13	34	7	337	6	5	21	376
Teller	6	629	5	1,731	226	762	1,051	3,776
DISTRICT TOTAL	19	244	12	2,068	232	767	1,073	4,152
				1968				
Pilgrim River	3	22	3	34	4	7	19	67
Salmon Lake	3	25	0	73	1	0	0	74
TOTAL	6	24	3	107	5	7	19	141
Teller	11	249	25	361	75	1,542	738	2,741
Brevig Mission	7	113	12	220	53	537	147	789
TOTAL	18	196	37	581	128	1,899	885	3,530
DISTRICT TOTAL	24	153	40	688	133	1,906	901	3,671

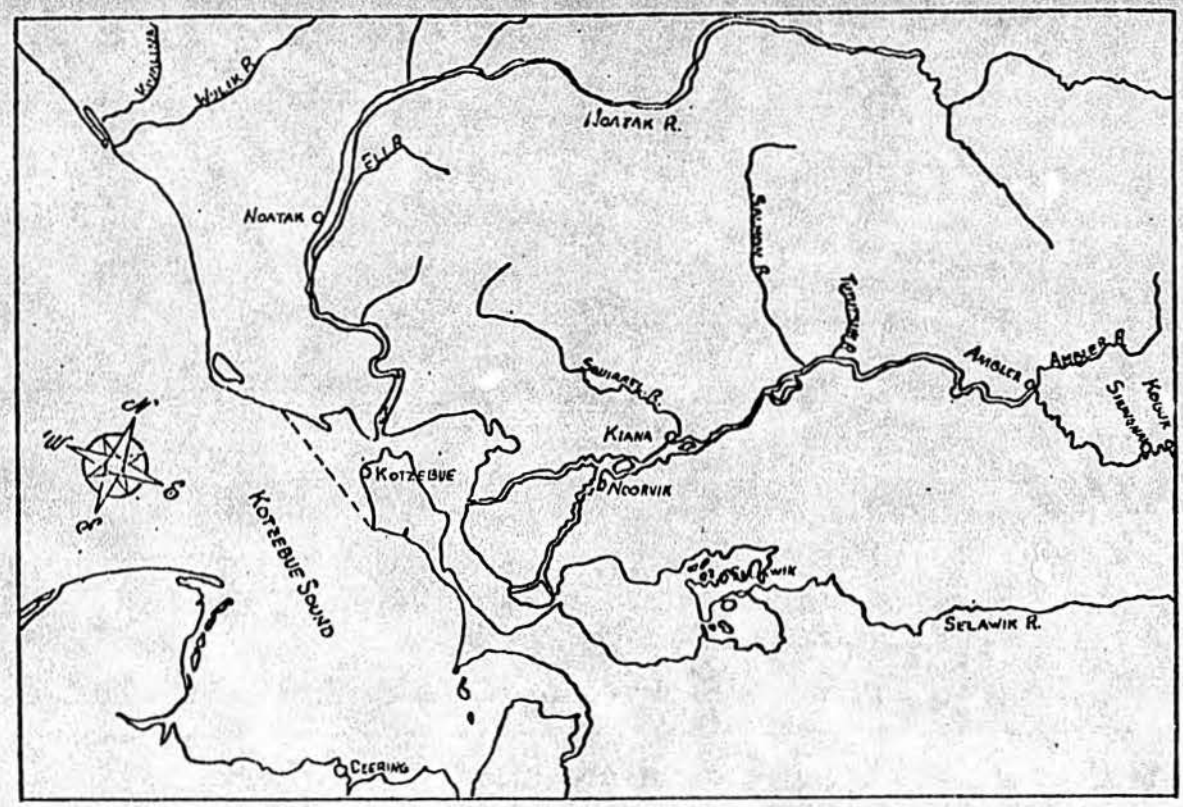
Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake and Teller, (1963-1976) (continued)

Location	No. of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	TOTAL
				1976				
Teller	6	1,034	4	200	0	200	5,800	6,204
Brevig Mission								
TOTAL	6	1,034	4	200	0	200	5,800	6,204
Pilgrim River	8	67	2	53	20	236	226	537
Salmon Lake	1	39	1	38	0	0	0	39
TOTAL	9	106	3	91	20	236	226	576
DISTRICT TOTAL	15	452	7	291	20	436	6,026	6,780

Appendix Table 14. Subsistence catches (all species) for Pilgrim River, Salmon Lake and Teller, (1963-1976). (continued)

Location	No.of Fishermen	Catch/ Fishermen	King	Red	Coho	Pink	Chum	Total
				1972				
Teller	7	442	0	68	287	75	2,661	3,091
Brevig Mission	1	250	4	0	101	0	145	250
DISTRICT TOTAL	8	418	4	68	388	75	2,806	3,341
				1973				
Teller	4	584	22	46	280	424	1,562	2,334
Brevig Mission	0	0	0	0	0	0	0	0
DISTRICT TOTAL	4	584	22	46	280	424	1,562	2,334
				1974				
Teller	7	218	0	0	62	12	1,445	1,529
Salmon Lake	4	7	0	28	0	0	0	28
Brevig Mission	2	605	0	0	0	2	1,208	1,210
DISTRICT TOTAL	13	213	0	28	62	14	2,663	2,767
				1975				
Teller	7	310	0	216	5	743	1,209	2,173
Brevig Mission	2	153	0	0	0	0	305	305
TOTAL	9	275	0	216	5	743	1,514	2,478
Pilgrim River	2	38	0	1	0	0	75	76
Salmon Lake	6	5	0	27	0	0	0	27
TOTAL	8	13	0	28	0	0	75	103
DISTRICT TOTAL	17	152	0	244	5	743	1,589	2,581

Figure 4. Kotzebue District, showing project location.



Appendix Table 15. Comparative red salmon aerial survey counts and subsistence catches, Port Clarence District, 1963-1976.

	Aerial Survey Counts			Subsistence Catch		
Year	Salmon Lake	Grand Central River	Total	Pilgrim River Drainage	Teller Brevig Mission	Total
1963	866	620	1,486	3,586	1,280	4,866
1964	76	590	666	1,475	0	1,475
1965	250	160	410	1,267	537	1,804
1966	1,120	370	1,490	130	870	1,000
1967	129	280	409	337	1,731	2,068
1968	830	645	1,475	107	581	688
1969	24	171	195	55	128	183
1970	1/	1/	1/	62	526	588
1971	538	512	1,050	127	723	850
1972	680	300 2/	980	0	68	68
1973	1,747	607	2,354	0	46	46
1974	820	0	820	28	0	28
1975	537	123	660	28	216	244
1976	132	22	154	53	291	344

1/ No survey made.
2/ Boat survey.

Commercial Fishery-other species

Other species of fish that are harvested commercially include sheefish and Arctic char. The Arctic char fishery is incidental to the commercial salmon fishery. In 1976 no commercial landings of incidentally caught Arctic char were recorded. There were Arctic char being caught during the last week of the commercial salmon fishery, but the fishermen utilized them for personal use.

The sheefish fishery is generally considered a winter fishery. This fishery is regulated by permit and area to be fished with an area quota of 25,000 pounds in effect. During the winter of 1975-1976, 556 sheefish, averaging 9.0 pounds, were harvested. The bulk of this harvest was marketed and sold locally with some sheefish flown in the round to marketing outlets in Fairbanks and Anchorage (Table 23).

Subsistence Fishery-salmon

Subsistence salmon fishing has long been an important food gathering activity for the Eskimo people of the Kotzebue district. Remnants of salmon spears and nets have been found in old village sites on the Kobuk River that date back to 1250 A.D.. At present, subsistence fishermen use set gill nets and beach seines to catch salmon in the bays and rivers. Nearly all of the catch is

consumed as dried fish. All portions are utilized, e.g. the flesh is dried and used for both human and animal consumption, while the head and viscera are fed to dogs.

It is difficult to calculate the value of the subsistence fishery in terms of dollars to the residents of this area. However, if subsistence fishermen had to purchase a protein food in the place of their subsistence salmon catch, this fishery would probably rival the value of the commercial fishery. In some years the numbers of salmon taken for subsistence in the Kotzebue Sound area exceeds the commercial catch. Subsistence catches of salmon and other fish were especially important in 1976 due to reduced numbers of caribou.

All available subsistence chum salmon catches are presented in Appendix Table 23. The 1957 studies of Raleigh document estimates of average annual subsistence catches for recent years prior to 1957. The methods and completeness of this survey were not fully documented. ne catch estimates were obtained from interviews of a certain percentage of each village population. The interview data was then expended to include the entire village. Possible large errors in the estimation of total catches could have occurred.

this is expected to result in less subsistence fishing effort in the future.

In 1976, 15,765 chum salmon were harvested for subsistence purposes by 91 fishermen. The subsistence harvest is annually assessed either by personal interviews or catch calendars. The personal interview is the predominant means of gathering this information. Appendix Table 24 presents mean catches per fisherman (fishing family) for the seven villages surveyed annually since 1962.

The 1976 subsistence harvest of 15,765 chum salmon represented a decrease from the 1975 harvest. The 1976 harvest was approximately 32% below the recent 5-year average of 23,264 (Appendix Table 25).

Escapements

During 1976, aerial surveys were conducted of key tributaries as well as the main streams of the Kobuk and Noatak River systems and the Inmachuk River of southern Kotzebue Sound. Aerial and foot survey counts of spawning chum salmon in 1976 are presented in Table 10.

Chum salmon escapements indices recorded for the Noatak and Kobuk River systems were respectively 32% and 78% below primary brood year abundance indices. The Noatak River escapement indexes for 1976 was 52% below comparable annual average indices. Appendix Table 26 represents comparative escapements for the 1962-1976 period.

Catches during the period 1962-1976 were obtained by the Alaska Department of Fish and Game. The catches were tabulated by direct counts of salmon, interviews, or by the return of catch forms that were distributed to the fishermen who are not contacted by interviewers. On the basis of observations and analysis of catch records, it was estimated that the recorded catches represented at least 70 percent of the actual harvest. The villages of Deering, Buckland, Candle and Shishmaref were not surveyed until the 1965 season.

The estimated average annual catch, both commercial and subsistence, of chum salmon in the Kotzebue Sound drainage during the 1962-1976 period was slightly less than one-half of that for the 1957 study. There is insufficient information to determine whether this apparent decline in catch is a result of less fishing effort, fewer available salmon, errors in catch estimates or a combination of all of these factors.

Although there is no fishing effort or other data available, there is some indication that the dependence on subsistence fishing has declined in this region during recent years as a result of increased welfare payments and more employment opportunities. Motorized snow vehicles are beginning to replace sled dogs and

Appendix Table 23. Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976.

Village	1965-1967 Fishermen Interviewed	1965-1967 Number of Sheefish	1967-1968 Fishermen Interviewed	1967-1968 Number of Sheefish
SUBSISTENCE				
Noorvik	28	3,792	35	1,910
Kiana	19	925	25	766
Ambler	11	194	14	559
Shungnak	11	166	13	837
Kobuk	7	99	5	270
Subtotal	76	5,176(6-10/67)	92	4,342(6-10/68)
Selawik	29	7,164(3-11/67)	38	5,030(4-11/68)
Kotzebue	30	10,060(10/66-22,400 5/67)	48	21,871(10/67-31,293 7/68)
Totals	135		178	
COMMERCIAL				
Kotzebue	10	922(10/66-5/67)	17	2,375(10/67-9/68)
Combined TOTALS	145	23,322	195	33,668

Village	1968-1969 Fishermen Interviewed	1968-1969 Number of Sheefish	1970 Fishermen Interviewed	1970 Number of Sheefish
SUBSISTENCE				
Noorvik	20	1,324	46	7,126
Kiana	22	409	25	790
Ambler	20	554	12	125
Shungnak	17	530	19	608
Kobuk	11	553	4	158
Subtotal	90	3,370(10/68-12/69)	106	8,807
Selawik	35	4,140(3-11/69)	29	1,601
Kotzebue	19	4,362(10/68-11,872 12/69)	33	3,520
Totals	144		168	13,928
COMMERCIAL				
Kotzebue	-	2,206(10/68-12/69)	4	350(1/70-12/70)
Combined TOTALS	144	14,078)	172	14,278

Appendix Table 23. (continued) Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976.

Village	1971 Fishermen Interviewed	1971 Number of Sheefish	1972 Fishermen Interviewed	1972 Number of Sheefish
SUBSISTENCE				
Noorvik	32	5,975	21	2,213
Kiana	25	1,060	17	307
Ambler	13	711	6	350
Shungnak	20	671	10	639
Kobuk	5	1,068	7	12
Subtotal	95	9,485	61	3,521
Selawik	27	3,416	-	--
Kotzebue	33	682	18	311
Totals	155	13,583	79	3,832
COMMERCIAL				
Kotzebue	5	456	11	2,325
Combined TOTALS	100	14,039	90	6,157

SUBSISTENCE	1973		1974	
Noorvik	19	4,394	21	519
Kiana	25	--	15	51
Ambler	5	83	10	257
Shungnak	9	195	7	127
Kobuk	7	226	5	100
Subtotal	65	4,888	58	1,062
Selawik	-	--	-	--
Kotzebue	-	--	-	--
Totals	65	4,888	58	1,062
COMMERCIAL				
Kotzebue	6	--	-	--
Combined TOTALS	71	4,888	58	1,062

Appendix Table 24. Subsistence chum salmon catch per fisherman, Kotzebue district, 1962-1976.

Village	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kotzebue	1/	650	515	400	158	202	135	98	187
Noatak	1,190	800	710	810	820	914	220	760	242
Noorvik	665	160	220	220	137	90	84	163	132
Kiana	350	2/	260	265	62	68	96	223	138
Ambler	1/	94	310	190	76	49	33	235	242
Shungnak	1/	2/	2/	220	45	125	114	318	182
Kobuk	335	67	205	145	104	35	206	206	150

1/ No survey.
2/ Number of fishermen unknown.

Appendix Table 23. Subsistence and commercial sheefish catches, Kotzebue district, 1966-1976. (Continued)

Village	1975 Fishermen Interviewed	1975 Number of Sheefish	1976 Fishermen Interviewed	1976 Number of Sheefish
SUBSISTENCE				
Noorvik	22	660	6	210
Kiana	15	68	20	58
Ambler	12	114	8	60
Shungnak	14	540	15	539
Kobuk	6	255	8	99
Subtotal	69	1,637	57	966
Selawik	-	--	-	--
Kotzebue	-	--	-	--
Totals	69	1,637	57	966
COMMERCIAL				
Kotzebue	14	2,633(12/74-6/75)	2	566
Combined TOTALS	83	4,270	59	1,522
SUBSISTENCE				
Noorvik				
Kiana				
Ambler				
Shungnak				
Kobuk				
Subtotal				
Selawik				
Kotzebue				
Totals				
COMMERCIAL				
Kotzebue				
Combined TOTALS				

Appendix Table 25. Kotzebue district subsistence chum salmon catches, 1962-1976.

Village	1962	1963	1964	1965	1966	1967	1968	1969
Noorvik	15,934	4,304	2,167	5,596	3,141	2,350	2,424	1,301
Kiana	3,139	1,973	783	1,598	433	1,489	2,488	2,458
Ambler	1/	755	2,142	1,340	912	679	457	3,525
Shungnak	1/	1,240	3,134	2,160	899	1,500	1,600	2,550
Kobuk	2,321	200	1,020	877	625	175	1,030	1,655
Kobuk River TOTAL	21,393	8,472	9,246	11,571	6,010	6,193	7,999	11,489
Noatak River TOTAL 2/	48,890	16,762	12,763	5,671	19,700	26,512	5,490	14,458
Kotzebue	-	5,835	7,753	8,058	3,640	4,032	4,324	1,768
Deering	-	-	-	5,200	6,238	3,098	2,838	1,897
Buckland	-	-	-	-	-	162	37	-
Candle	-	-	-	-	-	11	89	200
Shishmaref	-	-	-	-	-	100	37	-
DISTRICT TOTAL	70,283	31,069	29,762	30,500	35,583	40,108	20,814	29,812

1/ Not surveyed.
2/ Represents catches of the village of Noatak; 40,693 chums taken during 1961.

Appendix Table 24. (continued) Subsistence chum salmon catch per fisherman, Kotzebue district, 1962-1976.

Village	1971	1972	1973	1974	1975	1976
Kotzebue	53	63	195	1/	1/	1/
Noatak	148	74	36	393	138	212
Noorvik	223	84	121	324	210	259
Kiana	207	84	178	181	288	79
Ambler	177	244	305	165	282	250
Shungnak	133	266	469	891	647	281
Kobuk	386	302	273	450	293	70

1/ No survey.
2/ Number of fishermen unknown.

Appendix Table 26. Comparative chum salmon aerial survey counts, Kotzebue district, 1962-1976.

	1962	1963	1964	1965	1966	1967	1968
Noatak River System							
Noatak River(below Kelly River	168,000	1,970 1/	89,798	4,177 1/	101,640	28,620	39,394
Eli River	9,080	35 1/	-	-	12 1/	-	5,502
Kelly River&Lake	1,818	600	-	3,155	570	225	375
TOTAL	178,898	2,605 1/	89,798	7,332 1/	102,222	28,845	45,271 1/
Kobuk River System							
Main Kobuk River							
Mouth toKobuk	-	-	7,985	-	-	-	-
Kobuk to Pah River	-	-	-	1,000	266	-	530
Pah River to just below Selby River	-	400	-	-	-	-	50
Selby River mouth and Slough	-	2,575	-	1,750	630	1,625	70
Selby River mouth to just below Beaver R.	-	-	-	-	-	75	170
Seaver River mouth	-	1,095	-	-	460	795	1,550
Above Beaver River	-	465	-	-	118	-	-
TOTAL Main Kobuk River	23,150 2/	4,535	7,985	2,750	1,474	2,495	2,370
Squirrel River	16,050	2,200	8,009	7,230	1,350	3,332	6,746
Salmon River	12,936	1,535	9,353	1,500 1/	3,957	2,117	3,367
Tutuksuk River	10,841	670	2,635	-	1,383	169	823 1/
TOTAL KOBUK R. System	62,977 2/	8,940	28,032	11,480	8,164	8,113 2/	13,306

1/ Poor survey conditions or incomplete survey.
2/ Probably represents over-estiamte and includes some sheefish.
3/ Counts have been revised and are now correct.

Appendix Table 25. Kotzebue district subsistence chum salmon catches, 1962-1976. (continued)

Village	1970	1971	1972	1973	1974	1975	1976	Fishermen Interviewed(1976)
Noorvik	6,077	7,144	1,774	2,312	6,809	4,620	1,555	6
Kiana	3,457	5,177	1,435	4,470	2,726	4,320	1,579	20
Ambler	2,899	2,299	1,469	1,529	1,651	3,390	2,000	8
Shungnak	3,450	2,653	2,665	4,406	6,243	9,060	4,213	15
Kobuk	600	1,931	2,119	1,917	2,251	1,755	562	8
Kobuk River TOTAL	16,483	19,204	9,462	14,634	19,680	23,145	9,909	57
Noatak River TOTAL 2/	4,120	9,919	741	216	4,330	1,515	4,448	21
Kotzebue	6,184	1,737	1,151	1,172	1/	1/		1/
Deering	1,242	763	369	1,098	1,880	1,175	1,358	12
Buckland	344	155	59	1,722	639	1,540		
Candle	113	50	15	1/	1/	1/	50	1
Shishmaref	-	131	29	100	200	230		
DISTRICT TOTAL	28,486	31,959	11,085	18,942	26,729	27,605	16,765	91

1/ Not surveyed.
2/ Represents catches of the village of Noatak; 40,693 chums taken during 1961.

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

TABLE OF CONTENTS

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

[redacted]

STAFF

BETHEL FIELD OFFICE -- P. O. BOX 90
Michael D. Jonrowe (Kuskokwim Area Biologist)
Rae Baxter (Kuskokwim Research Biologist)

ANCHORAGE REGIONAL OFFICE -- 333 Raspberry Road
Gary Schaefer (Kuskokwim Research Biologist)

INDEX TO FIGURES AND TABLES

APPENDIX TABLES

APPENDIX TABLES (Continued)

PREFACE

This report presents all available information concerning the management of commercial and subsistence fisheries in the Kuskokwim district. Although data from many special research projects are included in this report, complete documentation of these projects and results will be presented in separate reports. All catch data tables are based upon field data.

Data presented in this report supercedes information found in previous management reports. An attempt has been made to correct errors in previous reports and previously unrecorded data have been incorporated into this report which are so indicated by appropriate footnotes.

This report is organized into the following major sections:

1. District Introduction. This is a general and brief description of the area, inhabitants, fishery resources, fisheries and management practices.
2. District Summary. This section summarizes current year data for the area and makes comparisons with previous years.
3. Subdistrict Reports. There are several unique and separate fisheries in the district and separate comprehensive reports are presented for each.

In order to facilitate use of this report, the tabular data has been separated into current year tables and appendix tables where annual comparisons are made. The text for each major section is followed by current year tables and then appendix tables.

The following is an explanation of how effort and catch per unit effort data, presented throughout this report, have been derived. Total boat (or fisherman) hours are computed by arbitrarily assuming that if a fishing boat delivers in any 24 hour fishing period, it fished the

Commercial Fishery

Although the Kuskokwim district commercial fishery is the oldest in the AYK region with catches reported as early as 1913, commercial fishing did not mature for a half-century. For many years, small commercial mild-cure operations were conducted in or near Kuskokwim Bay while the Kuskokwim River fishery remained virtually undeveloped. During the 1930's when dog teams were intensely utilized for freight hauling, a "quasi-commercial" fishery operated in the McGrath area for the sale of dried, subsistence caught salmon for dog food. However, this fishery declined with the dog teams and the Kuskokwim district experienced little additional commercial effort until Alaska became a state more than twenty years later.

Commercial salmon fishing activity has grown significantly since statehood as district fishermen have been making the difficult transition from a subsistence culture to a cash economy. This has affected fishing effort, resulting in a tremendous expansion in fishermen numbers and in increased, sustained effort. Fishing vessels have remained virtually unchanged over the years, but increased utilization of highly mobile nylon drift nets has greatly improved the efficiency of the fleet. Of course, the overall expansion of the commercial fishery could not have been accomplished without improvements in processing and tendering facilities that have occurred throughout the district (Appendix Table 1).

King, red, coho, pink and chum salmon are of primary commercial significance in the Kuskokwim district. Although these fish are commercially utilized locally to some extent, the vast majority are transported from the district as a fresh or frozen product. Sheefish and whitefish are harvested incidentally to the salmon catch, however, a limited fall and

winter "whitefish fishery" is conducted to satisfy local market requirements.

Subsistence Fishery

District residents have long depended upon the fishery resources as a source of food. Until relatively recently, traditional fishing methods and materials limited the size and scope of the fishery. Spears, dip nets, fish traps, and willow or caribou strip gill nets were slowly supplanted by more efficient linen gill nets enabling the fishery to expand tremendously. Whitefish, cisco, black fish, pike, burbot, and sheefish have been historically utilized along with salmon, particularly chum salmon. Recent improvements in fishing gear, notably the introduction of nylon gill net webbing, have increased the availability and importance of king salmon since statehood. Estimated peak subsistence salmon harvest levels were reached during the 1930's coincidentally with the quasi-commercial McGrath fishery, but harvest trends indicated a continuing decline into the 1940's. Little additional catch data is available for the twenty year span prior to statehood (Appendix Table 1).

Today the dependence on fish for personal use remains as important as money realized from the commercial fishery. However, several factors, as yet not totally defined, are affecting the complexion of the subsistence fishery. These factors include:

(1) Increasing commercialization of subsistence products.

(2) Cultural changes of local residents.

(3) Various State and Federal social-aid programs.

Any management of the Kuskokwim district fishery resources must take into account the growing - and changing - requirements of the subsistence fishery.

Subsistence Salmon Roe Fishery

The Governor approved legislation on May 29, 1975 allowing the sale of subsistence caught salmon roe within the AYK region. In order to administer the legislation, the Commissioner of Fish and Game issued an emergency regulation in June, 1975 which controlled the purchase and sale of subsistence roe in portions of the region. The key elements of the emergency regulation were:

1) Permits are required of all persons or companies purchasing or processing subsistence-caught roe.
2) Revocation of permits upon violation of permit terms, regulations or laws.
3) Strict reporting requirements in regard to amount of subsistence-caught roe in order that estimates of subsistence harvests can be made.
4) Prohibition of subsistence-caught roe sales when subsistence harvests are likely to exceed traditional personal use needs.
5) Prohibition of subsistence-caught roe sales in districts and subdistricts where salmon runs are especially vulnerable to overharvest or where subsistence catches in the past have been negligible.

Numbers of salmon were "back-calculated" from reported subsistence roe poundages by utilizing in-season sampling of the various runs. Therefore, estimates of the subsistence harvest were possible and were available for in-season management purposes. Attachment 1 presents a comprehensive review of the "subsistence roe fishery".

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of the commercial and

subsistence fisheries within the Kuskokwim district. The permanent staff assigned to this district includes one management biologist and two research biologists. In addition, 10-15 temporary summer employees are hired each season to assist the permanent staff in conducting various management and research studies.

The main objective of the Department's program is to manage the commercial salmon fisheries on a sustained yield basis in addition to obtaining needed information to determine the potential for commercial fisheries on under utilized species such as herring, char and whitefish. Present commercial salmon fishing regulations are still relatively restrictive in order to insure that sufficient salmon are provided for subsistence fishery and spawning ground requirements.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing is normally allowed from 6 hours to four days a week during the open season, depending upon the sub-district and species involved. Fishing effort usually occurs during the entire run and not just during any particular segment of the run. Occasionally more, or less, fishing time is allowed, depending upon fishing conditions, the strength of the runs or spawning escapements as determined by special studies conducted by the Department.

Due to the vast size of the area and the turbid nature of many streams, accurate estimates of the size of salmon runs and the spawning escapements are difficult to obtain. Fishery management is also hampered by the relative lack of comparative catch and return information since all the fisheries were either initiated or expanded through regulation changes since 1961 and 1962. The management problem is further compounded by having to provide sufficient escapement after commercial fishing for the important subsistence fishery as well as for spawning purposes.

Subsistence Fishery

Methods: The annual survey of the Kuskokwim River subsistence fishery was initiated in 1960. During the early years, the Department utilized "smokehouse counts" to determine total utilization of subsistence-caught fish. In an effort to determine additional timing and magnitude data, the Department began using "subsistence catch calendars" which are distributed to fishermen prior to the fishing season. Subsistence fishermen enter their daily catches of salmon and non-salmon species on the calender. During July and August a Department crew utilizes a cabin skiff to travel more than 360 river miles (Eek to Swift River) to collect catch data from the individual fishermen in addition to recording certain information from non-fishing families. After the river survey is completed, catch questionaries are sent to those fishermen not individually contacted.

In the 1969 Annual Report, a review is presented regarding methods used to obtain subsistence harvest and related information. All subsistence information presented in tabular form in this report, except in Appendix Table 17 represents "expanded data". This includes those families known to have fished but for one reason or another were not personally contacted by the survey crew. Catch data for these families are assumed to be the same as the averages for the particular village and are included in most of the tables.

Reported coho salmon catches are very minimal as the coho salmon run occurs after the survey is completed. Most of the coho salmon catch data is obtained from the return of catch calenders. Prior to 1969, little effort was made to determine the coho salmon harvest. The coho salmon estimates are not included in the comparative catch tables.

Catch and Effort: The Kuskokwim River system's harvest included 57,917 king salmon and 223,792 chum salmon utilized by 672 fishing

families during 1976 (Table 11). The king salmon catch was the largest since 1970 and was 33 percent above the recent 15 year average (Appendix Table 13). The chum salmon harvest was 18 percent below the high 1974 catch, but 8 percent above the recent 16-year average (Appendix Table 14).

In order to evaluate the effect of snowmachines on the subsistence harvest, all fishing families interviewed since 1967 have been checked for the number of snowmachines they owned. The number of families owning snowmachines has more than doubled since 1969 (Appendix Table 15). Average numbers of snowmachines per fishing family during 1967-1975 are shown in Appendix Table 16.

The public relations aspect of the annual subsistence fishery survey is important to the success of the survey itself and the Department's management program. By any method tested, the results of the voluntary contribution of the people of this program are as accurate as the people are capable of giving. The major problem is that many of the fishermen are illiterate and speak only Eskimo and have to relay much of the catch information through their school-age children.

There is still a moderate sale or trading of dried salmon on the Kuskokwim River, but is not documented. People from the coastal delta villages still bring their pokes of seal oil to trade for dried fish. The lower river dried fish are now primarily being used for human consumption.

The use of the fishwheel to capture salmon is slowly disappearing from the Kuskokwim River. Only 8 fishwheels were used along the survey route in 1976, compared to 30 in 1965 and 65 in 1960. The fishwheel is being replaced by the much more mobile gill net, which involves a lot less time and effort to operate. The use of gill nets is a relatively new technique for most Kuskokwim River residents. The efficiency of the two types of gear is difficult to evaluate, as large catches are often made with both. Table 15 presents an overview of all the subsistence data conducted in 1976.

Escapement

Kuskokwim River drainage escapement estimates from aerial surveys have proved difficult and costly to obtain. Varying stream and weather conditions, in addition to pilot and observer skills, often make the data difficult to interpret (Appendix Table 18). Although aerial surveys will be continued for some streams, emphasis will be placed on obtaining accurate escapement figures by use of counting towers or weirs on several "key" spawning tributaries.

All the kuskokwim River aerial survey results for 1976 are presented in Table 12. Escapements of kings, chums and reds were generally above average as documented by aerial survey.

A counting tower has been operated yearly on the Kogrukluk River (Holitna River system) since 1969 (except 1971). The Kogrukluk River crew counted 3,261 kings, 9,170 chums, and 4,433 reds. The chum and red salmon counts were the highest on record, while the king count was average in magnitude.

QUINHAGAK (SUBDISTRICT 4)

Commercial Fishery

The Quinhagak fishery is one of two located south of the Kuskokwim River mouth (Figure 1). This fishery has traditionally been very sporadic due to unstable processing facilities, however, the commercial fishery has stabilized during the past few seasons.

Fishing regulations for this subdistrict are very similar to those found on the Kuskokwim River, except that there are no distinct fishing seasons. Beginning with the 1971 season, the basic fishing period was reduced from two 24-hour periods to two 12-hour periods per week. Commercial fishing is allowed only in Kuskokwim Bay waters. This is necessary to ensure escapement of adequate numbers of salmon up the

narrow Kanektok River. The vast majority of gear operated consists of drift gill nets that are fished at low tide in "gutters" located two to three miles off shore and next to shore at high tide. Most of the fishing takes place near the mouth of the Kanektok River.

The Kanektok River king salmon run is later than that of the Kuskokwim River and for this reason the Quinhagak fishery opening is delayed until mid-June. The delayed opening prevents possible interception of Kuskokwim River fish and aids in preventing overharvest of the king salmon run.

Fishermen were required to use small mesh gear (6-inch stretched mesh or smaller) during the entire commercial fishing season. This was necessary primarily to prevent selective harvesting of the larger, more productive king salmon by the large mesh nets. However, the mesh limitation was also designed to increase harvests of the more abundant "other salmon" species (i.e. red, pink, chum, and coho).

The commercial salmon season was opened on June 21 with two 12-hour fishing periods a week continuing until July 19 when an additional 12-hour period was added to the schedule. (Table 16). A total of 14,110 kings, 6,090 reds, 13,777 cohos, 31,412 pinks and 43,659 chums totalling 109,048 fish was taken. All catches were considerably above the recent 5 year averages with the exception of the red salmon catch (Appendix Table 3). Fishermen were placed on limit for much of the season by one of the major buyers. Commercial fishing effort totaled 181 fishermen, an 8 percent decrease from the record 1974 levels but still above average.

Subsistence Fishery

Accurate comparable subsistence data has been lacking for the Quinhagak subsistence fishery during recent years. However, observation by the staff indicates that dependence on subsistence fishing has not been high. Apparently the greatest amount of fishing effort occurs in

the Kanektok River after the commercial fishing season when mostly coho salmon are taken.

Methods used to tabulate catches made by Quinhagak fishermen were similar to those used for the Kuskokwim River survey. A total of 50 Quinhagak fishing families returning catch calendars reported catching 2,200 kings and 5,950 "other salmon"..

Appendix Table 17 shows comparative catch data for 1967-76.

Escapement

Escapement counts made during various aerial surveys of the Kanektok River system are shown in Table 17. Poor weather conditions frequently hampered aerial surveys in the Quinhagak subdistrict. The king salmon escapement appeared to be at least average in magnitude. Based on comparative catch data, escapement of all other species was probably average also.

GOODNEWS BAY (SUBDISTRICT 5)

Commercial Fishery

Traditionally, the male residents from the villages of Goodnews Bay and Platinum have gone to Bristol Bay each summer to fish or work in the canneries, leaving the women and children home to fish for subsistence purposes. Prior to 1968, there are no records indicating that commercial salmon harvests were ever made in Goodnews Bay. The Department held public meetings in the area during the early 1960's regarding the possibility of initiation of a commercial fishery, but the negative response from village residents plus the absence of salmon buyers precluded this development.

In late August of 1968, the commercial salmon fishing was opened by emergency order in Goodnews Bay. This commercial fishery was created as

a result of a request from area residents and Department surveys, which indicated that a small harvestable supply of salmon was available. The fishery has been sporadic in nature due to inconsistent processing capabilities and inclement weather.

The commercial salmon season was opened June 21. The harvest was composed of 4,417 kings, 5,575 reds, 9,852 cohos, 8,453 pinks and 10,354 chums, totaling 38,651 fish. The king salmon catch was 51 percent above the 1975 harvest and 56 percent above the recent five-year average. Numbers of reds were 40 percent below the 1974 record level but were 22 percent above the recent average. The coho salmon harvest was 54 percent below 1974 record but 6 percent above the five-year average, while the chum salmon harvest was 37 percent below the 1974 record and 36 percent above the recent average. Commercial fishing terminated on September 11 when buyers left the subdistrict (Table 18).

A total of 40 fishermen made commercial landings in 1976, a decrease of 24 fisherman below 1975 levels.

This fishery has an important potential enforcement problem, indicated by fishermen's reports of illegal commercial fishing in the Goodnews River. Department personnel held several meetings in Goodnews Bay to discuss the fishing activities, and toward the end of the season, illegal fishing in the Goodnews River abated somewhat.

Subsistence Fishery:

Subsistence information from Goodnews Bay was very sparse for 1976. Subsistence catches from the subdistrict are always minimal.

Escapement:

Escapements of all species in the Goodnews River appeared adequate.

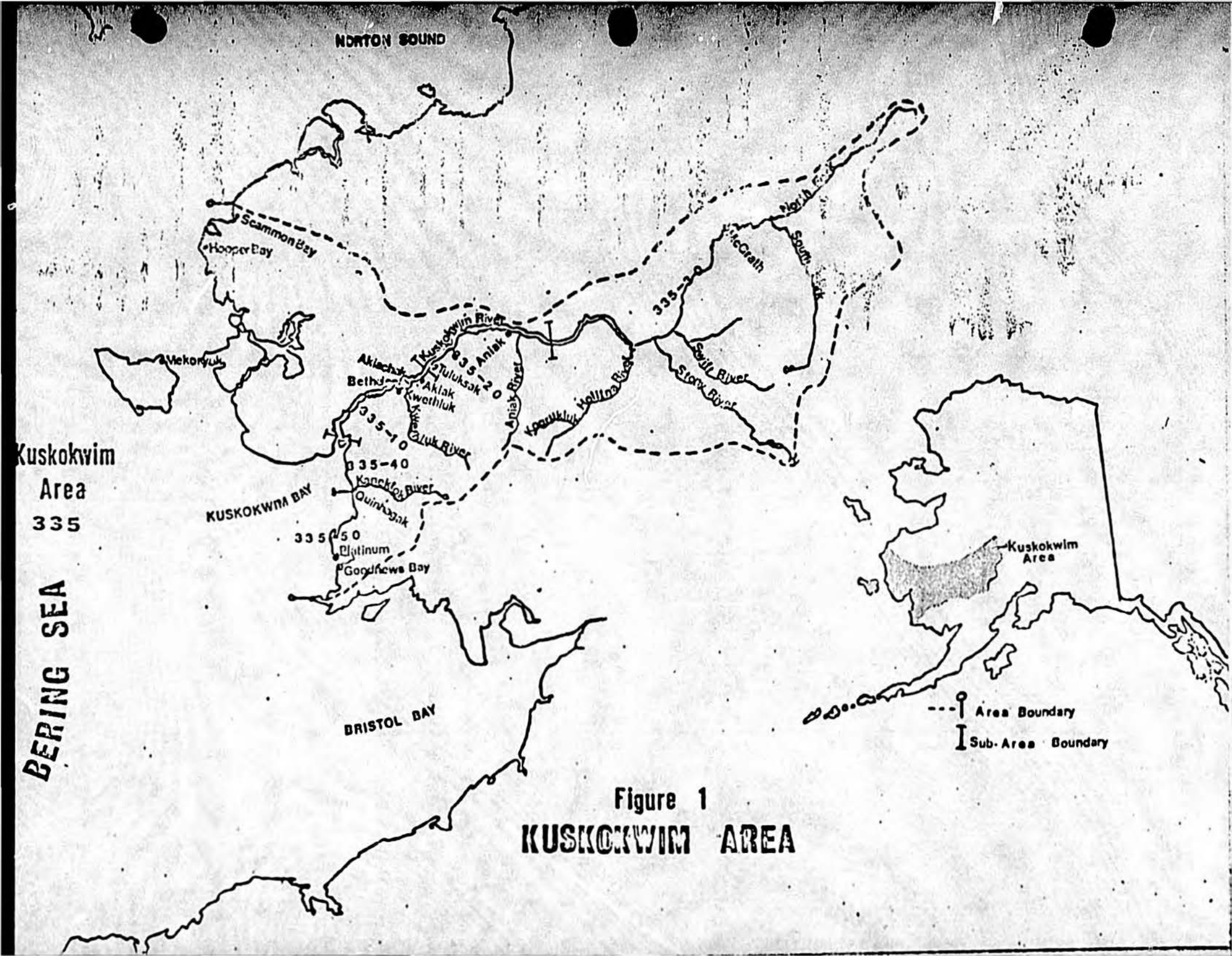


Figure 1

KUSKOKWIM AREA

Table 8. Commercial and subsistence salmon catches by species and statistical area, Kuskokwim district, 1976.

Subdistrict	King	Red	Coho	Pink	Chum[1/]	Total
335-10 Lower Kuskokwim						
Commercial	27,418	2,971	87,933	133	176,727	295,182
Subsistence [2/]	46,522	-	- [3/]	-	140,258	186,780
Total	73,940	2,971	87,933	133	316,985	481,962
335-20 Middle Kuskokwim						
Commercial	3,317		568		1,137	5,022
Subsistence [2/]	9,507		- [3/]		58,537	68,044
Total	12,824		568		59,674	73,066
335-30 Upper Kuskokwim						
Commercial	0		0		0	0
Subsistence [2/]	1,888		- [3/]		24,997	26,885
Total	1,888		0		24,997	26,885
Subtotal Kuskokwim River						
Commercial	30,735	2,971	88,501	133	177,864	300,204
Subsistence [2/]	57,917	-	- [3/]	-	223,792	281,709
Total	88,652	2,971	88,501	133	401,656	581,913
335-40 Quinhagak						
Commercial	14,110	6,090	13,777	31,412	43,659	109,048
Subsistence [2/]	2,217	-	- [3/]	-	5,930	8,147
Total	16,327	6,090	13,777	31,412	49,589	117,195
335-50 Goodnews Bay						
Commercial	4,417	5,575	9,852	8,453	10,354	38,651
Subsistence	201	-	- [3/]	-	1,428	1,629
Total	4,618	5,575	9,852	8,453	11,782	40,280
Total Kuskokwim District						
Commercial	49,262	14,636	112,130	39,998	231,877	447,903
Subsistence [2/]	60,335	-	- [3/]	-	231,150	291,485
Total	109,597	14,636	112,130	39,998	463,027	739,388

1/ Subsistence catches contain small numbers of red and pink salmon.

2/ Expanded data.

3/ Insufficient data for valid determination.

Table 15. Kuskokwim River subsistence fishery data, 1976.

Village	Fishing Family Data: Families	People	Dogs	Snow-Machines	Estimated Salmon catch 1/: King	Other 2/ Salmon	Coho 3/	Units of Gear: 8-1/2" Nets	5-1/2" Nets	Fish Wheels
Kipnuk										
Kwigillingok					75	463				
Kongigonak					122	439				
Eek	24	134	75	28	3232	3637	788	19	15	
Tuntutuliak	29	183	112	36	4807	8390	50	27	25	
Kasigluk	29	240	81	37	1613	4044	6	19	19	
Nunapitchuk	33	223	134	54	2578	6466	85	23	23	
Atmauthluak	13	82	33	15	1159	3361	85	12	10	
Napakiak	34	204	83	42	3330	9265	212	32	31	
Oscarville	7	45	31	7	623	2376	40	7	3	
Napaskiak	18	121	63	22	3566	21380	138	18	19	
Bethel	97	720	258	105	13215	26533	437	83	78	
Kwethluk	43	245	203	58	4193	26443	677	41	40	
Akiachak	29	209	91	43	4915	15298	752	26	25	
Akiak	22	135	207	28	3076	12163	174	23	25	
Tuluksak	22	169	98	30	1411	11673	160	19	23	
Lower Kalskag	23	139	105	26	4536	17158	11	18	20	
Upper Kalskag	15	83	73	15	1413	8527	167	11	13	
Aniak	14	73	47	13	1490	13355	152	10	7	2
Chuathbaluk	9	58	26	26	657	7824	143	8	8	
Napaimute	2	7	8	2	420	1636	17		2	1
Georgetown										
Crooked Creek	5	35	20	3	264	3236		2	4	1
Red Devil	3	15	13	3	195	4231		1	3	1
Sleetmute	13	57	50	5	356	7571	57	3	13	
Stony River	6	30	36	9	620	5523		2	7	3
Lime Village	4	18	33		33	2800	161		6	
Totals	494	3225	1880	607	57917	223792	4312	404	419	8

1/ Expanded data.

2/ Mostly chum with lesser number of reds, pinks, and a few small kings.

3/ Data is very fragmented and minimal.

Appendix Table 8. Total utilization of Kuskokwim River king salmon, 1960-1976.

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960	5,969	20,361	26,330
1961	18,918	30,910	49,828
1962	15,341	14,642	29,983
1963	12,016	37,246	49,262
1964	17,149	29,017	46,166
1965	21,989	27,143	49,132
1966	25,545	49,606	75,151
1967	29,986	57,875	87,861
1968	34,278	30,230	64,508
1969	43,997	40,138	84,135
1970	39,290	69,204	108,494
1971	40,274	42,926	83,200
1972	39,454	40,145	79,599
1973	32,838	38,526	71,365
1974	18,664	26,665	45,329
1975	21,720	47,784	69,504
1976	30,735	57,917	88,652
5 year average	30,590	39,209	69,799

1/ Subdistricts 335-10, 335-20 and 335-30.
2/ Catches are expanded and include all villages surveyed each year. Data includes a few villages not included in comparative catch tables.

Appendix Table 10. Total utilization of Kuskokwim River chum salmon, 1960-1976

Year	Commercial Catch 1/	Subsistence Catch 2/	Total Utilization
1960		327,297	327,297
1961		185,447	185,447
1962		165,626	165,626
1963		141,550	141,550
1964		189,660	189,660
1965		283,459	283,459
1966		174,660	174,660
1967	148	205,263	205,411
1968	187	260,023	260,210
1969	7,165	198,628	205,793
1970	1,664	245,550	247,214
1971	68,914	116,391	185,305
1972	78,619	120,316	198,935
1973	148,746	179,259	328,005
1974	171,887	277,170	449,057
1975	181,840	176,389	358,229
1976	177,864	223,792	401,656
5 yr. average	130,001	173,905	303,906

1/ Subdistricts 335-10 and 335-20.
2/ Catches are expanded and include all villages surveyed each year, 335-10, 335-20 and 335-30.

Appendix Table 13. Comparative Kuskokwim River king salmon subsistence catches by village, 1960-1976

Village	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kwigillingok, Kipnuk, Kongiganak	250	283	54	229	414	0[1]	205	957	70	385	1,111
Eek	1,474[3]	2,238[3]	1,060[3]	2,697[3]	1,857	2,737	2,872	4,375	2,760	2,037	2,065
Tuntutuliak	226	2,226	842	2,853	1,826	1,978	3,061	3,338	2,026	2,195	3,558
Kasigluk	135	1,215	127	1,302	[4]	513	1,875	2,766	1,360	2,888	3,931
Nunapitchuk	683	2,042	848	1,874	636	490	2,875	1,926	1,360	2,279	4,680
Atmauthluak[6]											1,205
Napakiak	1,830	2,573	2,191	3,148	2,677	1,670	3,592	3,922	2,317	3,546	4,960
Oscarville	1,968	282	75	309	339	678	301	1,327	393	457	542
Napaskiak	536	1,258	759	1,569	2,201	1,412	2,935	3,091	1,647	2,227	3,446
Bethel	1,923	4,150	1,378	7,019	4,114	3,342	7,604	11,772	4,900	7,472	17,026
Kwethluk	2,692	3,763	2,329	5,050	3,262	4,538	6,135	6,889	3,549	3,187	7,932
Akiakchak	1,626	3,052	1,800	2,533	3,488	3,952	4,957	5,543	3,415	2,602	7,022
Akiak	1,865	3,159	906	2,869	2,495	1,774	3,941	3,790	1,332	1,275	3,290
Tuluksak	737	1,486	493	1,295	572	1,019	1,559	1,710	1,048	1,131	1,995
Lower Kalskag	961	571	805	2,661	710	841	1,918	1,733	1,463	2,083	2,146
Upper Kalskag	667	1,049	[7]	[7]	1,143	719	1,333	1,699	1,404	1,623	734
Aniak	1,057	688	185	602	1,104	494	2,002	1,415	467	1,406	2,136
Chuathbaluk	64	54	10	30	74	29	139	217	40	180	219
Napamute	20	16	44	52	134	2	78	60	100	19	22
Crooked Creek	747	518	561	859	1,358	363	1,249	638	77	541	684
Georgetown	[10]	[10]	[10]	[10]	[10]	[10]	12	[10]	[10]	9	2
Red Devil	[10]	40	144	228	314	[10]	182	[10]	111	142	232
Sleetmute	465	222	[9]	[9]	[9]	491	149	343	200	267	161
Stony River	435	25	31	67	299	101	632	364	191	2,187	105
Totals	20,361	30,910	14,642	37,246	29,017	27,143	49,606	57,875	30,230	40,138	69,204

Village	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974-1976 Average
Kwigillingok, Kipnuk Kongiganak	241	10	75	[10]	[10]	197	330	65.67
Eek	1,882	1,969	1,981	2,356	2,110	3,232	2,286	2,566
Tuntutuliak	1,841	3,214	2,859	1,577	3,492	4,807	2,289	3,292
Kasigluk	1,645	1,292	1,864	1,411	1,713	1,613	1,609	1,579
Nunapitchuk	1,970	2,496	2,663	1,165	2,092	2,578	1,916	1,945
Atmauthluak[6]	548	864	1,106	382	1,042	1,159	931	861
Napakiak	1,868	2,009	1,763	1,224	2,864	3,330	2,719	2,473
Oscarville	570	196	586	180	891	623	573	565
Napaskiak	1,916	1,578	2,048	900	2,308	3,566	1,902	2,258
Bethel	8,731	8,371	8,898	4,631	11,688	13,215	6,907	9,845
Kwethluk	5,564	5,137	3,444	2,694	3,179	4,193	4,534	3,355
Akiakchak	4,818	3,872	2,592	1,726	3,534	4,915	3,662	3,392
Akiak	2,688	1,899	1,895	1,292	2,837	3,076	2,366	2,402
Tuluksak	1,280	1,318	1,322	883	1,338	1,411	1,212	1,211
Lower Kalskag	2,355	2,604	1,309	1,586	2,755	4,536	1,583	2,959
Upper Kalskag	601	401	938	463	1,752	1,431	1,026	1,215
Aniak	1,076	2,105	1,030	1,952	1,391	1,490	1,126	1,611
Chuathbaluk	179	261	942	674	594	657	174	642
Napamute	17	20	13	6	226	420	43	217
Crooked Creek	291	183	269	650	238	264	596	384
Georgetown	0	0	0	[9]	[10]	[10]	4	[10]
Red Devil	135	182	138	205	623	195	168	341
Sleetmute	181	69	504	269	256	356	277	294
Stony River	2,521[11]	95	287	439	861	653[11]	524	651
Totals	42,926	40,145	38,526	26,665	47,784	57,917	38,757	44,122

1/ Included with other vilages.
2/ Does not include 1965
3/ Estimates based on catch data through 1969
4/ Included with Eek
5/ Does not include 1964
6/ New village of Atmauthluak segregated in 1970 from parent village of Nunapitchuk.
7/ Included with Lower Kalskag
8/ Does not include 1962 and 1963
9/ Included with Red Devil
10/ Data not available
11/ Includes Lime Village

ndix Table 14. Comparative Kuskokwim River "other salmon" subsistence catches by village, 1960-1975.[1/2/]

age	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1960-1973 Average	1974-1976 Average
k, Kongiganak, KWINHAGAK																			
igillingok, KWIG···	1,430	3,279[4/]	1,990	2,562[4/]	2,323	0	680	2,846	2,800	2,481	3,9[illegible]	1,110	1,284	807	9/	9/	902	1,966	902
EEK	4,094[4/]	2,321[4/]	2,072[4/]	1,771[4/]	3,151	2,898	1,324	1,922	3,503	3,436	4,8[illegible]	2,213	783	2,401	4,227	2,754	4,425	2,625	3,802
tulilak, TUNT···	4,101	8,526	9,692	6,791	8,421	18,993	9,747	11,531	14,090	17,462	10,600	9,964	11,103	13,572	28,321	7,429	8,440	11,042	14,730
luk KASIGLUK	1,400	3,657	1,705	1,020	5/	4,041	3,058	2,309	4,311	3,308	5,731	2,043	1,934	6,090	6,773	3,708	4,050	3,124	4,843
pitchuk NUNAP···	2,743	4,868	7,474	2,462	1,171	4,251	4,145	6,278	7,731	6,934	11,412	3,375	5,600	7,663	12,498	5,447	6,551	5,436	8,165
thluak ATMAUTH···											1,191	1,197	947	2,818	4,585	2,524	3,446	1,538	3,518
ket NUNACHIAK	19,888	5,789	6,167	3,711	12,312	12,928	9,275	12,685	12,700	12,390	16,371	4,427	5,191	8,461	21,494	11,630	9,477	10,164	14,200
ette BOBKEWILLE	3,948	1,680	1,723	1,025	487	8,010	407	2,580	2,104	2,743	4,669	1,675	498	3,081	5,617	3,237	2,416	2,474	3,756
rtak NUNAPITCHUK	5,199	4,286	5,546	3,584	6,275	26,206	8,743	8,585	12,409	11,655	11,169	7,039	8,858	8,478	20,467	12,930	21,518	9,145	18,305
t BETHEL	12,972	12,845	8,470	8,623	15,623	19,099	14,011	14,055	28,603	14,613	33,475	9,905	16,885	33,930	34,892	26,808	26,970	17,365	29,223
luk KWETHLUK	32,975	21,106	22,788	13,188	19,186	37,780	18,707	23,872	36,645	23,462	27,702	13,941	11,721	19,565	39,747	19,183	27,120	23,046	28,783
lrak AKIACHAK	15,932	12,518	10,521	6,725	10,096	25,138	15,049	13,584	19,461	10,306	29,776	12,298	9,266	9,864	15,108	14,008	16,050	14,324	15,055
AKIAK	13,061	8,205	6,551	8,478	9,659	12,297	10,622	9,332	13,775	9,854	13,003	9,264	5,108	6,118	18,434	18,890	12,337	9,666	16,553
lsak TOKLESUK	19,261	7,928	8,526	10,289	9,777	12,820	11,670	8,898	11,114	6,058	7,626	5,115	5,175	5,946	13,261	7,819	11,833	9,298	10,971
r Kalskag LOWER	11,563	7,764	16,478	23,249	9,472	21,906	10,346	16,018	8,114	8,468	11,158	3,509	3,490	2,873	12,265	9,823	17,169	11,029	13,085
r Kalskag UPPER	38,398	27,149	7/	7/	11,391	11,970	6,236	8,364	9,733	9,413	5,309	3,530	1,460	5,607	9,631	6,904	8,694	11,547	8,409
ANIAK	36,673	15,935	10,120	10,808	17,874	11,353	12,484	16,788	17,341	15,127	10,030	4,933	5,243	13,547	9,305	9,597	13,507	14,147	10,803
tbaluk CHUATH····	22,370	2,922	3,784	2,629	5,059	6,507	5,625	7,249	11,588	7,523	10,971	5,632	8,509	14,171	4,287	561	7,967	8,181	4,271
ute NUNAPITCHUK	11,017	6,235	3,898	5,192	4,873	704	3,704	5,750	1,774	1,453	1,224	1,862	4,645	3,451	76	226	1,653	3,584	651
ed Creek CROOKED	41,263	17,558	27,259	23,166	32,550	18,986	19,467	14,365	12,704	6,810	9,216	3,094	3,658	1,981	4,954	2,461	3,236	16,577	3,550
potown GEORGETOWN	9/	9/	9/	9/	9/	9/	70	9/	2,030	3,664	800	0	0	10	9/	9/	9/	939	9/
Devil RED DEVIL	9/	1,350	9,007	5,367	5,706	9/	2,746	9/	2,400	1,130	2,454	1,067	1,695	2,782	2,688	4,481	4,231	3,246	3,600
route SLEETMUTE	17,259	6,884	10/	10/	10/	11,707	2,611	6,875	11,218	8,258	4,464	3,203[11/]	4,293	2,368	4,212	5,761	7,628	7,176	5,867
r River STONY	11,750	2,642	1,855	1,110	4,254	15,865	3,933	11,377	13,875	12,080	8,407	5,995	3,000	3,875	4,328	5,202	8,484[11/]	7,144	6,004
ls	327,297	185,447	165,626	141,550	189,660	283,459	174,660	205,263	260,023	198,628	245,550	116,391	120,316	179,259	277,170	176,389	228,104	205,183	229,246

[1/] Catches include a majority of chum salmon but include small numbers of red, coho, pink and small king salmon.
[2/] 1965 to 1972 catches do not include late coho salmon catches.
[3/] Does not include 1965.
[4/] Estimate based on catch data through 1970.
[5/] Included with Eek.
[6/] Does not include 1964.
[7/] Included with Lower Kalskag.
[8/] Does not include 1962 and 1963.
[9/] Data not available.
[10/] Included with Red Devil.
[11/] Includes Lime Village.

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/

Year	Families	People	Dogs	Snow-machines	Average per family					
					People	Dogs	Snow-machines	Kings	Other Salmon	Percent fa with snowma
1967										
With snowmachine	59	410	288	63	6.95	4.88	1.07	143	355	1
Without snowmachine	359	2,264	1,963	0	6.31	5.47	0	101	404	
1968										
With snowmachine	159	1,100	808	182	6.92	5.08	1.14	70	382	3
Without snowmachine	374	2,247	2,052	0	6.01	5.49	0	51	493	
1969										
With snowmachine	158	1,097	876	189	6.94	5.54	1.20	78	306	4
Without snowmachine	191	1,208	1,173	0	6.32	6.14	0	71	425	
1970										
With snowmachine	287	1,962	1,413	375	6.84	4.92	1.31	121	380	5
Without snowmachine	212	1,201	972	0	5.66	4.58	0	87	413	
1971										
With snowmachine	361	2,459	1,504	494	6.79	4.16	1.37	89	243	7
Without snowmachine	128	734	601	0	5.73	4.70	0	84	278	
1972										
With snowmachine	278	2,096	949	385	7.54	3.41	1.38	76	220	7
Without snowmachine	85	508	328	0	5.98	3.86	0	48	247	
1973										
With snowmachine	343	2,246	1,375	506	6.55	4.00	1.48	79	362	8
Without snowmachine	81	429	283	0	5.15	3.49	0	47	254	
1974										
With snowmachine	337	2,153	1,339	491	6.39	3.97	1.46	47	495	8
Without snowmachine	68	350	158	0	5.15	2.32	0	29	342	

Appendix Table 15. Comparative subsistence fishing data between families owning and not owning snowmachines, Kuskokwim River, 1967-1976. 1/ (Continued)

Year	Families	People	Dogs	Snow-machines	Average per family					
					People	Dogs	Snow-machines	Kings	Other Salmon	Percent families with snowmachines
1975										
With snowmachine	313	2,029	1,252	482	6.55	4.00	1.54	79	309	84
Without snowmachine	59	313	126	0	5.30	2.13	0	62	301	
1976										
With snowmachine	416	2,815	1,578	607	6.77	3.79	1.46	91	340	81
Without snowmachine	78	410	302	0	5.26	3.87	0	60	306	

1/ Unexpanded data.

Appendix Table 16. Comparative Kuskokwim River subsistence fishery data, 1960-1976 4/

Year	Fishing families surveyed	Mean numbers per fishing family					
		People	Dogs	Snow-machines 1/	King Salmon	Other salmon 3/	Fishwheels
1960	247	5.89	6.66		60	1,074	2/
1961	342	6.02	6.33		39	453	.19
1962	349	6.50	6.30		79	470	.18
1963	405	6.14	5.29		87	351	.11
1964	394	6.33	5.44		70	454	.10
1965	332	5.95	5.45		64	669	.08
1966	492	5.91	4.49		91	320	.06
1967	472	6.36	5.22	.18	106	375	.06
1968	567	6.23	5.31	.35	53	447	.06
1969	376	6.49	5.51	.53	78	385	.05
1970	514	6.33	4.65	.75	108	384	.02
1971	488	6.53	4.30	1.01	88	238	.01
1972	576	6.78	3.08	1.00	51	166	.02
1973	408	6.55	3.84	1.48	81	356	.02
1974	596	6.24	3.61	1.12	45	466	.02
1975	437	6.41	3.99	1.35	79	310	.02
1976	494	6.53	3.81	1.23	86	335	.02

1/ Snowmachine count started in 1967.
2/ Information not available.
3/ Does not include coho salmon.
4/ Unexpanded data.

Appendix Table 17. Quinhagak subsistence fishery data, 1967-1976 1/

Year	Total Fishing Families	Averages Per Fishing Family							
		People	Dogs	Snow-machines	King Salmon	Dog Dalmon	Coho Salmon	8 1/2" Nets	5 1/2" Nets
1967	19	6.43	4.00		71	231		.86	1.00
1968	46	5.59	4.07	.28	88	234	380	.48	.54
1969	59	5.38	3.41	.46	27	29	179	.72	.28
1970	46	6.02	2.76	.74	47	110		.64	.69
1971	41	5.83	2.37	.73	55	87	36	.54	.73
1972	54	6.41	2.30	.80	56	116	9	.44	1.00
1973	44	5.80	2.07	.98	61	98	83	1.02	.98
1974	47	5.53	2.31	1.17	46	78	87	.63	.74
1975	46	5.86	1.85	1.13	71	88		1.00	.93
1976	50	5.62	2.2	1.42	44	119		0.84	1.24

1/ Expanded data.

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.