Agenda Item IX
August, 1979

MEMORANDUM

DATE: August 21, 1979

TO: Council Members, Scientific & Statistical Committee and Advisory Panel

FROM: Jim H. Branson, Executive Director

SUBJECT: Council Contracts, Reports and Proposals

COUNCIL ACTION

IX-1. Approval required for final payment for the Troll Salmon Observer Contract with the Alaska Department of Fish & Game.

IX-2. Approval for final payment for the Salmon Tag Recovery Contract with the Alaska Department of Fish & Game.

IX-3. Approval for funding of a proposal from the Alaska Department of Fish and Game to analyze troll salmon fisheries data.

IX-4. Council approval of concept for funding for a study to analyze the leasing alternatives proposed as management options for the Bering Sea Clam Draft FMP.

IX-5. Council funding approval to assist the Commercial Fisheries Entry Commission in keypunching halibut fish tickets.

BACKGROUND INFORMATION

The final reports and proposals have been reviewed by the Scientific and Statistical Committee and the Finance Committee. Their recommendations will be presented on Friday. Specific information on each contract and proposal is contained under tabs IX-1 to IX-5.

MIH

Agenda Item IX-1
August, 1979

MEMORANDUM

DATE: August 21, 1979

TO: Council Members, Scientific & Statistical Committee and Advisory Panel

FROM: Jim H. Branson, Executive Director

SUBJECT: Contract Final Report: 78-9 "The Pilot Observer Program for the Troll Salmon Fishery off Alaska"

COUNCIL ACTION

Approval for final payment.

BACKGROUND INFORMATION

In our review of the final report to see if it complied with the terms and conditions of the contract, it was apparent that the contractors overcame many obstacles and did put forth a very credible effort. We had one remaining difficulty with the final report; it did not meet the third primary objective: ". . . to investigate the feasibility of determining. . . if and the degree to which, the ATA logbook data program can be verified." The last paragraph on page 32 of the final report addresses this objective and points to mechanical problems which prohibited the objective from being addressed.

We have asked the Scientific & Statistical Committee to review this discrepancy and should have their recommendation in time for the Finance Committee Meeting.

The total contract price was $39,810. We have withheld 10% pending approval of the final report.

MIH

North Pacific Fishery Managen

Clement V. Tillion, Chairman
Jim H. Branson, Executive Director

Suite 32, 333 West 4th Avenue
Post Office Mall Building

AGENDA IX 1.1
August 1979

Mailing Address: P.O. Box 3136DT
Anchorage, Alaska 99510

Telephone: (907) 274-4563
FTS 265-5435

MEMORANDUM

DATE: July 25, 1979

TO: Scientific & Statistical Committee

FROM: Jim H. Branson, Executive Director

SUBJECT: Final Report - Pilot Observer Program for the Troll Salmon Fishery Off Alaska - Contract #78-9, Alaska Department of Fish & Game

Enclosed are two items:

1. Contract 78-9 "Pilot Observer Program for the Troll Salmon Fishery off Alaska; and
2. the Final Report

In our review of the final report it was apparent that the contractors overcame many obstacles and did put forth a credible effort. We do however, have one remaining difficulty with the contract final report -- specifically the third primary objective:

> "...investigate the feasibility of determining...if, and the degree to which, the ATA Logbook Data Program can be verified."

The last paragraph on page 32 of the final report addresses this objective. The paragraph points to mechanical problems which prohibited this objective from being addressed.

Technically this means that the final report did not satisfy the terms and conditions of the contract. However, we have a precedent for this situation where in the past we have either stated that original objectives were unobtainable or the omission of one objective was not grounds for rejection of the final report. I would appreciate your comments on the matter, as final payment has not been authorized.

We would like to place this on your August agenda, so please bring the contract and the final report with you.

Enclosures

MIH

cc: Keith Specking
Ed Linkous

North Pacific Fishery Managemer..

Harold E. Lokken, Chairman
Jim H. Branson, Executive Director

Suite 32, 333 West 4th Avenue
Post Office Mall Building

Mailing Address: P.O. Box 3136DT
Anchorage, Alaska 99510

Telephone: (907) 274-4563
FTS 265-5435

Contract No. 78-9

PILOT OBSERVER PROGRAM FOR THE TROLL SALMON FISHERY OFF ALASKA

This Contract, entered into between the North Pacific Fishery Management Council, herein called "The Council" and represented by the Executive Director executing this Contract and

The Alaska Department of Fish and Game
Division of Commercial Fisheries
Subport Building
Juneau, AK 99801

hereinafter called the "Contractor" agrees as follows:

INTRODUCTION

The North Pacific Fishery Management Council is responsible for developing a fishery management plan for the troll salmon fishery in the offshore waters of Alaska and has designated the Alaska Department of Fish and Game as the lead agency in the development of this plan. There is general agreement between user groups and state and federal agencies that the native stocks of Chinook and Coho salmon on which the fishery has historically depended have declined from previous levels. However, there is not agreement that sufficient information exists on species composition, abundance, size, maturity, stock origins and incidence of sublegal Chinook salmon by time and area upon which to base certain refinements of the draft fishery management plan for Council waters. When the proposed fishery management plan was formally reviewed, the plan was found to have contained incomplete data but otherwise was based on the best scientific information available.

The pilot observer program proposed here will examine the feasibility of eliminating those data gaps and will compliment other troll salmon research programs in Southeast Alaska, namely:

1. The Alaska Trollers Association Logbook Program
2. The Department of Fish and Game's Port Sampling Program for Coded Wire Tags
3. Reevaluation of Catch Reporting Areas
4. The ADF&G's Natural Stock Coho and Chinook Smolt Tagging Program's
5. The National Marine Fisheries Service Coho Tag and Release Programs at Little Port Walter

The Pilot Observer Program is intended to provide real time, area-specific, biological sampling in the fishery. These coordinated efforts will provide data that can be used directly for the evaluation of a management plan for the troll salmon fishery in the Fishery Conservation Zone off Alaska.

ARTICLE I - STATEMENT OF WORK

A. Background

An onboard observer program is needed to develop and verify information which will begin to provide a more complete picture of the fishery: i.e., fill in the data voids. A full-scale onboard observer program, as originally contemplated by the Council, is both philosophically and logistically an impossibility for the 1978 season.

Because of this immediate need to understand the fishery in terms of shakers, stock origin and validity of the logbook program, a pilot program has been proposed which is expected to lay the groundwork for a major observer program, as well as to begin assessing these specific and primary problems.

B. Objectives

Because the feasibility and value of a large scale observer program in Council waters is unknown, the initial program will be used to determine whether a large scale program can economically provide information useful for management plan evaluation. In particular, the logistics of attaining representative observer coverage of the troll effort as well as developing methodology and procedures will be investigated.

The primary objectives of this pilot observer program are to investigate the feasibility of determining the following:

1. The extent and degree of variation in the abundance of mature, immature and sublegal (shaker) Chinook salmon in the troll salmon catch by time and area.

2. The extent of variation of stock origins by time and area.

3. If, and the degree to which, the ATA Logbook Data Program can be verified.

Secondary ancilliary objectives will be to investigate the feasibility of determining the following:

1. The extent and degree of variation of species composition in the catch by time and area.

2. The extent and degree of variation of ages, lengths, weights and sex by species by time and area.

3. The extent and degree of variation in the catch composition by gear type and bait.

C. Statement of Work

This Contract and the proposed research will be conducted using Alaska Department of Fish and Game personnel as observers with participating vessels provided by the Alaska Trollers Association. Every effort will be made by the Department to hire observers who are competent research biologists with experience in the troll salmon fishery. Alaska Trollers Association will likewise endeavor to secure the participation of experienced fishermen with reliable vessels.

Task 1

The Contractor will schedule, during the 1978 fishing season, 14, 10-day observer trips guaranting the following coverage:

(a) May, 1978 - Two ten-day observer trips: one for the Fairweather Grounds, one in any other offshore coastal area.

(b) June, 1978 - Four ten-day observer trips: two for the Fairweather Grounds, two to any other offshore coastal area.

(c) July, 1978 - Four ten-day observer trips: two for the Fairweather Grounds, two to any other offshore coastal area.

(d) August, 1978 - Four ten-day observer trips: two for the Fairweather Grounds, two to any other offshore coastal area.

Task 2

The Contractor is expected to provide information gathered by observers from each fishing day of each observer trip on the following:

(a) Lengths (fork lengths) and weights (round weights) of harvested salmon by species, sex, time and area.

(b) Scales from a sample of the retained salmon catch.

(c) Environmental data related to harvest by time and area including at least: a characterization of the water as very clear, normal, brown or red; feed abundance according to lots, some or none; wind characterized as no wind, less than 10 knots, 10 to 30 knots, more than 30 knots, direction; and high and low sea temperature.

(d) Gonad samples (male and female) from retained Chinook salmon in the harvest. Male gonads to be retained in tact. Ten eggs to be taken from each female in sample with the total ovary to be measured volumetrically. The sample size will depend on the harvest by area, but will not exceed 20 out of every 100 fish of each sex.

(e) Data on hours fished by hook type, bait type and number of lines.

(f) Incidence of marked salmon.

(g) Specifications of observer vessel to include length, gross tonnage, freezer or non-freezer, wood, steel, fiberglass construction and other important non-identification characteristics.

(h) Data will be compiled in the Alaska Trollers Association Logbook forms as well as on standardized recording forms. (Appendix A)

Task 3

The Contractor must analyze gonad and scale samples to determine maturity, age composition and stock origin of fish sampled by observers.

Task 4

The Contractor must produce the following reports.

(a) A report summarizing all collected data by time, period and area of harvest.

(b) A comparison of differences in harvest composition, catch per unit effort and magnitude by time and area.

(c) A report summarizing observed qualitative, if not subjective relationships between harvest composition, incidence of shakers, gear type and effort and environmental factors.

(d) A report comparing observer logbook data with Alaska Trollers Association Logbook data.

(e) A report analyzing the feasibility of economically attaining representative biological and harvest data on the troll salmon fishery through an expanded observer program potentially scheduled for 1979.

ARTICLE II - PROJECT SCHEDULES AND DELIVERABLES

Schedule

Date	Event
May 15, 1978	Contract award
July 24, 1978	Interim informal progress report
September 25, 1978	First draft expanded outline of final report due for review by the Executive Director and subsequent review by the North Pacific Council on September 28th and 29th.
October 31, 1978	Interim report due including receipt of all reports of completion of tasks 1 - 3.
April 30, 1979	Final report which includes receipt of reports for Tasks 4 and 5.

Deliverables

All products shall be delivered to the Executive Director, NPFMC. Two copies must be submitted and must be of professional quality and reproducible. The original must be one of the copies submitted and shall be camera ready copy, single spaced, typed on one side of the page on good quality white paper measuring 8½ x 11 inches. The following format will be used in preparing the final report:

Title Page
Executive Summary
Table of Contents
List of Figures
List of Tables
List of Abbreviations and Symbols
Acknowledgements
Introduction
Methods
Results
Conclusions
Recommendations
Abstract
Keywords
References

The Executive Director, NPFMC, may allow combinations of sections or those omissions or other changes if requested by the Contractor.

ARTICLE III - COSTS AND TERMS OF PAYMENT

The Council agrees to pay and the Contractor agrees to accept as full payment for all services agreed to above, the sum of $36,210. This amount was approved by the North Pacific Council at its regular March Council meeting. Because the approved price of $36,210 did not include standard Department of Fish and Game overhead of 10 percent and a value for liability insurance (if any), it is expected that these items will either be covered by the Contract price or requested as an amendment add-on to the Contract at a later date.

ARTICLE IV - PERIOD OF CONTRACT

Work on this Contract shall commence on March 15th, 1978 and shall be completed by April 30, 1979 unless extended by written mutual agreement.

ARTICLE V - CONTRACT MONITOR

Mrs. Judy A. Willoughby is designated Contract Monitor. The Contract Monitor is responsible for the administration of this Contract for the Council. Mrs. Willoughby is located at the Council's headquarters office, 333 W. 4th Avenue, Suite 32, P. O. Box 3136 DT, Anchorage, Alaska 99510, telephone (907) 274-4563.

ARTICLE VI - PAYMENTS

Provisional payments for services under this Contract will be made on the basis of quarterly billing with an accompanying detailed invoice, the total not to exceed $36,210. An explanatory management letter of no more than two page must accompany each voucher.

ARTICLE VII - GENERAL PROVISIONS

ARTICLE VIII - BUDGET

Incurred Costs - Budgetary Requirements

Line 100

Number of Positions	Class	Man Months	Amount
2	Biologist I, Observers	8+12%(benefits)	$ 13,000.00
1	Biologist II, Project Coordinator	4+12%(benefits)	7,960.00
	Total		$ 21,060.00

Line 200

Travel for project lead, assistant and observers	2,500.00
Reimbursable vessel expenses @ $25.00/day(a) - maximum of 14-ten day trips	3,500.00
Total	6,000.00

Line 300

Air Charter - 30 hours Cessna 180 @ $105.00/hour	3,150.00
Servicing of sampling gear	1,000.00
Data analysis	4,000.00
Liability Insurance (b)	
Total	8,150.00

Line 400

Rain gear, scales, calipers, sample supplies, etc.	1,000.00
Total	1,000.00

Line 500

Nil	---
Preliminary Grand Total	$36,210.00(c)

(a) Paid to vessel operator-includes food for observer, all contingencies
(b) Unknown at present
(c) Does not include liability insurance premium costs or overhead.

Contract 78-9 The Pilot Troll Salmon Observer Program

The SSC recommended that the Council approve final payment of this contract. They feel that although some comparison of data is still possible at a later stage, it does not warrant financial penalty and recommended the Council approve payment.

PILOT OBSERVER PROGRAM FOR THE TROLL SALMON FISHERY OFF ALASKA

CONTRACT NO. 78-9

NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

Alaska Department of Fish and Game

April 1979

EXECUTIVE SUMMARY

During May through August 1978 the Alaska Department of Fish and Game placed observers aboard selected vessels of the Southeast Alaska power troll fleet. Twenty trips (78 observer days) were completed during the course of this pilot observer program. While on board the troll vessels the observer collected a multiplicity of data on the incidence of mature, immature, and sublegal fish, stock origin, age, size, sex, and species composition of the catch as well as environmental and fishing effort information. The goal of the pilot project was to determine the feasibility of obtaining these data through a full scale troll observer program.

The pilot observer program demonstrated that it is feasible to collect a variety of data in an observer program. A number of problems became evident through the pilot program. Foremost of the problems which must be overcome in an expanded observer program are finding boats willing to accept an observer and matching the magnitude of data collection duties with the capacity of the observers. Many fishermen were not willing to accept an observer due to lack of available space on the vessel or due to distrust of government programs. Increased contact with the fishermen and the fishermen's associations prior to the fishing season is proposed to reduce the distrust and encourage more fishermen to participate in the program. The magnitude of the data required of an observer once onboard a boat was often overwhelming. Only under ideal weather conditions and at moderate catch rates can the observer collect all the information which was sought during the pilot program. In any subsequent observer program the amount of data should be limited to that data which can be collected only by an observer program. Rigorous definition of the project goals and scientific design of the data collection procedures must be accomplished before any observer project is undertaken.

The Alaska Department of Fish and Game outlined two proposals for the troll observer program. The first proposal suggests an expanded observer program for the entire coastal troll fishery for three years. The anticipated cost of an expanded program would be $813,500 for the three years. The second proposal suggests a limited observer program designed to investigate specific time and area aspects of the troll fishery. A typical limited observer program could be operational for approximately $100,000 per year.

The Department recommends that a limited troll observer program be implemented to gather information on the fishing power and efficiency of the troll fleet, gear selectivity, and maturity of fish caught. A limited observer program is recommended because it can supply needed information to resource managers at a much lower cost than the full expanded program. The expanded program was not considered cost efficient if it absorbed funds which might otherwise be allocated to other research projects.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDIX TABLES

ACKNOWLEDGEMENTS

This project was funded by the North Pacific Fishery Management Council, Contract No. 78-9. Cooperation in program design was obtained from the Alaska Trollers Association and Mr. Pat O'Brien of the California Department of Fish and Game. We also appreciate the cooperation of the fishermen who agreed to take observers on board their boats.

INTRODUCTION

The North Pacific Fishery Management Council is responsible for developing a fishery management plan for the troll salmon fishery in the offshore waters of Alaska and has designated the Alaska Department of Fish and Game as the lead agency in the development of this plan. There was general agreement between user groups and state and federal agencies that the native stocks of chinook and coho salmon on which the fishery has historically depended have declined from previous levels. However, there was also agreement that insufficient information exists on species composition, abundance, size, maturity, stock origins and incidence of sublegal chinook salmon by time and area upon which to base certain refinements of the Fishery Management Plan for the high seas salmon fishery off Alaska. When the Fishery Management Plan was formally reviewed, the plan was found to contain incomplete data but otherwise was based on the best scientific information available.

The pilot observer program examined the feasibility of eliminating those data gaps while complimenting other troll salmon research programs in Southeast Alaska, namely:

1. The Alaska Trollers Association Logbook Program

2. The Department of Fish and Game's Port Sampling Program for Coded Wire Tags

3. The ADF&G's Natural Stock Coho and Chinook Smolt Tagging Programs

4. The National Marine Fisheries Service Coho Tag and Release Programs at Little Port Walter

The Pilot Observer Program was intended to provide real time, area-specific, biological sampling in the fishery. These efforts were to provide information that could contribute to the management plan for the high seas salmon fishery in the Fishery Conservation Zone off Alaska.

Objectives

Because the feasibility and value of a large scale observer program was unknown, the pilot program was designed to determine whether a large scale program can feasibly provide information useful for management plan evaluation. In particular, the logistics of attaining representative observer coverage of the troll effort as well as developing methodology and procedures were investigated.

The primary objectives of this pilot observer program were to investigate the feasibility of determining the following:

1. The extent and degree of variation in the abundance of mature, immature, and sublegal (shaker) chinook salmon in the troll salmon catch by time and area.

2. The extent of variation of stock origins by time and area.

3. If, and the degree to which, the Alaska Trollers Association Logbook Data Program can be verified.

Secondary objectives were to investigate the feasibility of determining:

1. The extent and degree of variation of species composition in the catch by time and area.

2. The extent and degree of variation of ages, lengths, weights and sex by species by time and area.

3. The extent and degree of variation in the catch composition by gear type and bait.

METHODS

Each observer was instructed in methods of collecting information, personal behavior while aboard vessels, and administrative procedures. The observers selected vessels from those available at the docks and made an attempt to contact the skippers. There were some instances where skippers had previously volunteered to take an observer on board. These skippers were actively sought.

While aboard the vessel at sea the observer recorded data during the complete fishing day. Gear type was recorded for each fishing day. Number of hooks were averaged when significant changes occurred in patterns within a day's fishing.

Samples of gonads and scales were taken from every fifth chinook (Oncorhynchus tshawytscha) and coho (O. kisutch) unless the number of fish exceeded the observer's capacity to record all associated data. Observation on sub-legal chinook condition after hooking was determined by observing the swimming characteristics of the fish when released and position and degree of hooking injury (Table 1). When the observer could not view the fish prior to release the skipper was asked for an opinion of hooking injury.

Scale samples were obtained by taking a smear of 10-15 scales from the area two rows above the lateral line on the left side, posterior to the insertion of the dorsal fin. Care was taken not to crease or fold the scales.

Samples and associated data from each trip were returned to Sitka along with a narrative report.

At the end of the fishing season in September one observer was retained to catalog all collected data, analyze gonad and scale sampled and write a summary narrative.

Scales from individual samples were washed to remove excess slime, selected for complete nucleus and readability, and mounted on gummed cards. The gummed cards were then pressed in acetate.

Impressions of scales were analyzed under a micro-projector at 80X. Ages were recorded in accordance with the European system, (e.g., 1.1 represents a fish that has one freshwater annulus and one ocean annulus and was caught during the third year of life. Age 0.3 represents a fish in its fourth year of life that went to sea during its first year).

Laboratory analysis consisted of measuring egg diameters from ten eggs taken from the reproductive tracts of each female sampled, and weighing the total male reproductive tracts from each sample. Gonad samples were frozen until they could be analyzed. Comparison of egg diameters and weights and testis weight before and after freezing indicated that freezing did not alter the size or the weight of the reproductive organs (Kissner 1973). Each egg was measured to the nearest 0.1 millimeter under a binocular microscope utilizing a micrometer disc.

Table 1. Condition code for shakers*

Condition Code	Description
1. Good	(a) No injury to eye, gill, olfactory organ. (If the fish is bleeding heavily the gills are probably injured) (b) No mouth injury except hook hole. (c) Swam away in upright position (fast or slow doesn't matter)
2. Fair	(a) Same as No.1 except moderate damage to mouth (torn maxillary, large hook hole, etc.)
3. Poor	(a) Injury to eye or olfactory organ or bleeding heavily and/or (b) Extensive injury to mouth and/or (c) Floated or did not swim away (d) Dead

* Shakers are chinook less than 28 inches total length.

The maturity of female chinook was determined by the size of the egg in relation to the time of harvest and the analysis of scales. The size of eggs was established by taking the average of 10 eggs from each sample. Scales from females were analyzed to determine stock origin (fall or spring chinook). Immature females had eggs averaging less than 1 millimeter.

The maturity index for male chinook and coho is the total gonad weight as a percent of the total body weight. A maturity index of 0.2% or greater before June indicated a mature male chinook. After June 1 a maturity index of 0.5% indicated a mature chinook (Kissner 1973).

RESULTS

One fact that is evident from data contained in this report is that meaningful data cannot be collected over a large span of space and time without an enormous expenditure of sampling effort. The information contained in this report merely illustrates that the data can be collected, but does not lend itself to statistical analysis. The data were collected from too many different areas, at too many different times. Had the few observer trips which were completed by this pilot program been confined to a single fishing area throughout the season or a number of fishing areas during a short period of time, more meaningful data would have resulted from this pilot program. However, this was a pilot project to investigate feasibility and not necessarily intended to answer specific management questions.

During the course of this pilot study, 20 observer trips (78 observer-days) were completed (Table 2). Seventeen trips (54 observer days) were completed during July and August. Fiscal and logistic problems limited the number of trips which could be taken during May and June. Five trips (27 observer days) included the Fairweather Grounds. The remaining trips covered other fishing areas on the outside coast of Southeast Alaska (Fig. 1).

There were 713 chinook, 1,802 coho, and 881 pink salmon (O. gorbuscha) caught by the observer vessels during the 1978 fishing season. A total of 304 undersized (less than 28 inches total length) chinook were also caught and released. Other incidental catches of salmon included chum (O. keta) and sockeye (O. nerka). Rockfish (Sebastes spp.) were the most common non-salmon fish caught by the observer vessels followed by halibut. The total catch of all observer vessels is summarized in Table 3.

Of the 304 undersized chinook caught, 79% were released in "good" condition. The overall, undersized to legal chinook ratio was 0.43 for all areas. The highest incidence of undersized fish occurred on observer trips to on-shore fishing districts adjacent to, or north of, Icy Straits (statistical areas 116-05, 181-05, and 114-21). The average incidence of undersized chinook for trips in these areas was 1.57 for each legal fish caught. For the other areas fished (statistical areas 104,113,116-25,154, and 181-25) the incidence of undersized fish averaged 0.24 undersized chinook for each legal chinook caught.

The average size for legal chinook was 7.5 kilograms (16.7 lbs) and 80.4 centimeters (31.6 inches). The average size of coho was 3.5 kilograms (7.8 lbs) and 65.1 centimeters (25.6 inches) (Tables 4 and 5).

Scales were analyzed from 500 chinook for determination of age and stock origin. A majority (64%) of chinook caught were four-years-old (Table 6). The second most common age (27%) group was the five-year-old chinook. Three and six-year-old fish constituted a small proportion (9%) of the legal catch. Within each age class a majority of all chinook went to sea during their second year. The distribution of the chinook catch among age classes and different life histories within age classes varied from area to area without any discernible trend.

Of the 500 scale samples analyzed 70% were determined to be non-Alaskan, fall chinook, and 30% were determined to be spring chinook of undetermined origin.

Table 2. Trips by location and statistical area - 1978.

Location	Statistical Area	Vessel	Observer	Dates	Average Fishing Time	Sea Conditions	No. of Fish Caught and Average Wt.	Shaker to Legal Chinook Incidence	Comments
1. Between Cape Addington and Cape Cherikof	104	Rambler	Gary Gunstrom	5/19-5/30	14 hrs.	15-20 ft. 8 fishing 2 harbor	101 chinook 16.77 lbs. 32 shakers 26 good 2 fair 4 poor	0.32	
2. Cape Cross	113	Defiance	Linnea Neuman	7/13	11 hrs.	2 ft.	7 chinook 16.93 lbs. 40 coho 7.13 lbs. 9 shakers 5 good 1 fair 3 poor	1.29	
3. St. Lazaria Island	113	Gota	Craig Juleen	7/20-7/22	1 ¼ hrs.	3-4 ft.	1 coho 6.5 lbs. 2 shakers 1 good 1 fair		Engine Troubl
4. Biorka Island	113	Germaine (hand-troller)	Robert Hernacki	7/26-7/27	6 3/4 hrs.	Slight	9 chinook 13.82 lbs. 2 coho 6.62 lbs. 2 shakers 2 good	0.22	

Table 2. (Continued) Observer program trips by location and statistical area-1978.

Location	Statistical Area	Vessel	Observer	Dates	Average Fishing Time	Sea Conditions	No. of Fish Caught and Average Wt.	Shaker to Legal Chinook Incidence	Comments
5. St. Lazaria Island to Cape Edgecumbe	113	C-Rae	Craig Juleen	7/26-7/30	14 hrs.	5-7 ft.	63 chinook 17.98 lbs. 113 coho 5.95 lbs. 6 shakers 4 good 2 fair	0.10	
6. Surge Bay Hoktaheen Area	113	Coro-nation	Linnea Neuman	8/01-8/09	9 ½ hrs.	2-8 ft.	13 chinook 16.8 lbs. 322 coho 8.02 lbs. 13 shakers 11 good 2 poor	1.00	
7. Sandy and Snipe Bays	113	Myrth	Craig Juleen	8/05-8/10	9 ¼ hrs.	3-4 ft.	29 chinook 19.89 lbs. 18 coho 5.53 lbs. 18 shakers 15 good 1 fair 2 poor	.62	
8. Surge Bay	113	Chief Seattle	Linnea Neuman	8/18-8/20	6 ¼ hrs.	3-6 ft.	9 chinook 17.25 lbs. 61 coho 9.17 lbs. 2 shakers 1 good 1 poor	0.22	

Table 2. (Continued) Observer program trips by location and statistical area-1978.

Location	Statistical Area	Vessel	Observer	Dates	Average Fishing Time	Sea Conditions	No. of FIsh Caught and Average Wt.	Shaker to Legal Chinook Incidence	Comment
9. Off Cape Edgecumbe	113	Duke	Robert Hernacki	8/26-8/29	10 ¼ hrs.	Slight to 5 ft.	29 chinook 21.84 lbs. 44 coho 9.36 lbs. 4 shakers 3 fair 1 poor	0.14	
10. North Passage-Idaho Inlet	114-21	Defiance	Linnea Neuman	7/14-7/15	9 ½	Flat	3 chinook 13.23 lbs. 48 coho 6.79 lbs. 5 shakers 4 good 1 poor	1.67	
11. East Bank Graves	116-05	Defiance	Linnea Neuman	7/16+7/23	8 3/4 hrs.	2 ft.	13 chinook 18.91 lb.s 4 coho 7.31 lbs. 1 shaker 1 good	0.08	
12. La Perouse Glacier Area	16-05	Chief Seattle	Linnea Neuman	8/14-8/17	10 hrs.	4-6 ft.	30 chinook 15.78 lbs. 179 coho 9.52 lbs. 65 shakers 61 good 4 poor	2.16	

Table 2. (Continued) Observer program trips by location and statistical area-1978.

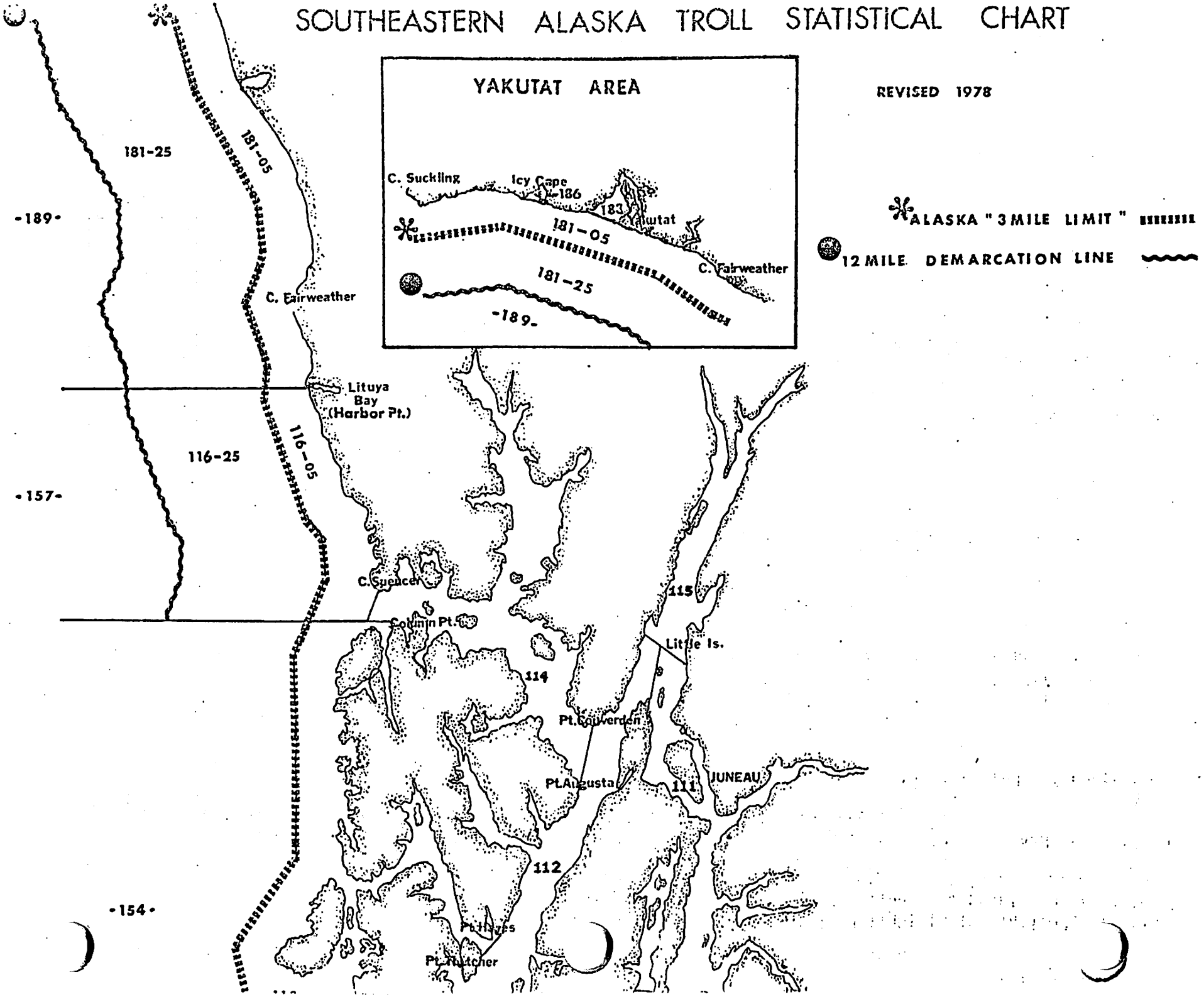
Location	Statistical Area	Vessel	Observer	Dates	Average Fishing Time	Sea Conditions	No. of Fish Caught and Average Wt.	Shaker to Legal Chinook Incidence	Commen
13. Between Lituya Bay and Icy Point	116-05	Defense	Craig Juleen	08/23-08/29	14 ¼ hrs.	Slight to 2 ft.	53 chinook 14.28 lbs. 328 coho 7.12 lbs. 84 shakers 65 good 11 fair 8 poor	1.59	
14. Inner Bank	116-25	North Star	Randy Timothy	05/24-06/01	7 ¼ hrs.	5-7 ft. 3 fishing 3 harbor days	16 chinook 14.90 lbs. 8 shakers 5 good 3 fair	0.50	
15. 14 miles off Cape Cross	154	Defiance	Linnea Neuman	07/12	12½ hrs.	2 ft.	4 chinook 14.74 lbs. 41 coho 6.74 lbs. 5 shakers 1 good 4 poor	1.25	
16. Redfish Cape to Biorka Island	154	Seakin	Robert Hernacki	07/28-08/05	16 ½ hrs.	2-6 ft.	68 chinook 20.10 lbs. 460 chinook 7.74 lbs. 10 shakers 7 good 2 fair 1 poor	0.15	

Table 2. (Continued) Observer program trips by location and statistical area-1978.

Location	Statistical Area	Vessel	Observer	Dates	Average Fishing Time	Sea Conditions	No. of Fish Caught and Average Wt.	Shaker to Legal Chinook Incidence	Comment
17. Nine miles off Cape Fairweather	181-25	Carolyn L	Linnea Neuman	06/16-06/22	14 hrs.	3-8 ft.	104 chinook 14.52 lbs. 9 coho 4.54 lbs. 15 shakers 11 good 4 poor	0.14	
18. Ocean Cape - Dangerous River	181-05	Chief Seattle	Linnea Neuman	08/21-08/22	5 ¼ hrs.	3-8 ft.	1 chinook 12.68 lbs. 20 coho 8.85 lbs. 2 shakers 1 good 1 fair	2.00	
19. Ten-twelve miles off inner bank	181-25	Defiance	Linnea Neuman	07/17-07/22	14 ½ hrs.	2 ft.	161 chinook 15.60 lbs. 112 coho 7.60 lbs. 21 shakers 13 good 8 fair	0.13	

SOUTHEASTERN ALASKA TROLL STATISTICAL CHART

REVISED 1978



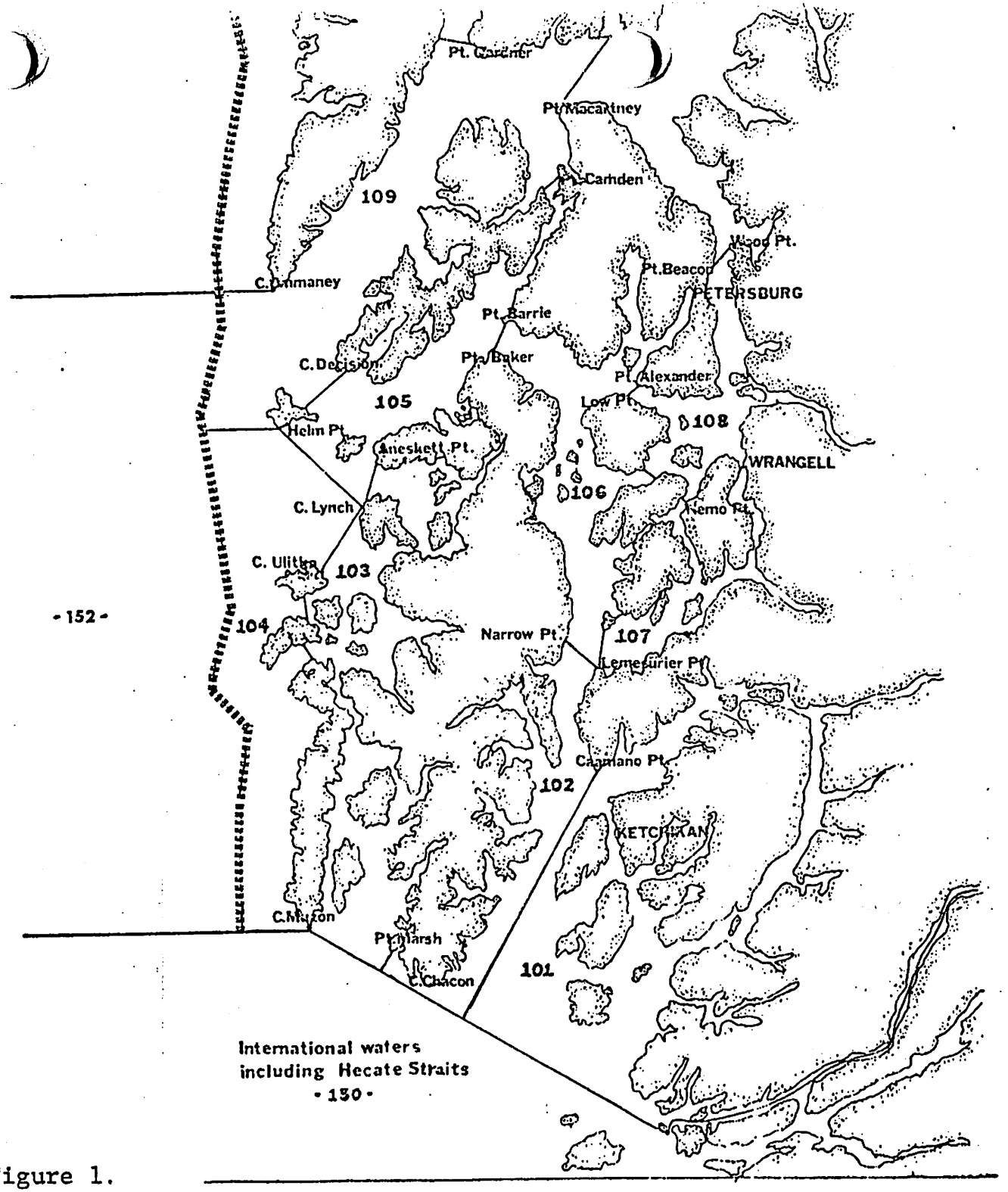

Pt. Gardner
Pt Macartney
Camden
109
Wood Pt.
Pt.Beacon
PETERSBURG
C. Ommaney
Pt. Barrie
Pt. Baker
C. Decision
Pt Alexander
105
Low Pt
108
Helm Pt
Aneskett Pt.
WRANGELL
106
C. Lynch
Nemo Pt
C. Ulitka
103
- 152 -
104
Narrow Pt
107
Lemesurier Pt
Cagmano Pt
102
KETCHIKAN
C. Muzon
Pt Marsh
C. Chacon
101
International waters
including Hecate Straits
- 130 -

Figure 1.

Table 3. Total catch in numbers of fish for all species - 1978.

Species	Catch	
Chinook	713	
Coho	1,802	
Pink	881	
Chum	38	
Chinook shakers	304	
	239	good
	25	fair
	40	poor
Sockeye	7	
Salable Halibut (*Hippoglossus stenolepis*)	15	
Unsalable Halibut	45	
Lingcod (*Ophiodon elongatus*)	17	
Truecod (*Gadus macrocephalus*)	10	
Turbot (*Atheresthes stomias*)	1	
Rockfish (*Sebastes sp.*)	509	

No fin-clipped fish were encountered during observer trips.

The frequency of female maturity classes, as determined by egg size, is shown on Table 7. Much of the variability shown by the data in Table 7 is attributable to timing and location of the observer coverage. The presence of large mature eggs (greater than 4.0 mm) may be artifact of the timing of the observer program. Those fish from area 104 with large mature eggs were from spring chinook caught during one observer trip in May. There was not any additional sampling during this time which could have caught very mature spring chinook. The period of intense sampling did not begin until July, by which time all mature spring chinook had migrated to fresh water. The additional observer trips which took place in late May and mid-June took place much further north on the onshore areas adjacent to the Fairweather Grounds. Analysis of reproductive tracts in Southeast Alaska indicates that maturing female spring chinook have egg diameters greater than 4.0 mm by May 1st as sampled in the Taku gillnet fishery. During late July sampling in Juneau, it was found that the female chinook salmon were 99% immature with average egg diameters of 2.24 mm. (Kissner 1973)

The results of the determination of gonad maturity for male chinook is shown in Table 8. Prior to June 1 most male chinook captured were immature fish which would not spawn for another year. After June 1 a majority of the male chinook were still immature fish, but a number of fish that would spawn in the fall were caught.

The maturity index of male spring chinook salmon is greater than 0.8% in May as sampled in the Taku gillnet fishery. The male chinook sampled in July at Juneau had a maturity index of 0.03-0.46%, which indicates that they were immature. All samples that fell between maturing springs and the immatures were considered to be fall spawners (Kissner 1973).

All coho caught during the observer trips were determined to be maturing (Fig. 2 and 3). These figures show the progression of gonad development as the fishing season progressed. The decrease of male gonad weight and the leveling of egg diameters during week 33 and weeks 31 and 32, respectively, (see Appendix, P.7) shows the influx of later maturing coho in the fishery after the early maturing coho had passed through. The increase in testis weight and egg diameter towards the end of the season shows that all of the coho are maturing rapidly as they approach their natal streams.

The analysis of coho scales samples show that 58% of the fish caught were of the age group 2.1; 41% were age group 1.1; and 1% were age group 3.1 (Table 9). Southeast Alaska cohos spend an average of two years in fresh water before reaching smolt size whereas Washington coho remain in fresh water for only one year. The 2.1 age class is predominant in Southeast Alaska.

It was noted by all observers that the fishermen on the observer vessels changed gear frequently. A varied assortment was used which can be classified into four basic types; plugs, spoons, hootchies and bait (Table 10).

Plugs used were plastic. The most common sizes were the 6-8 inches, but smaller and larger plugs were also used. Spoons were of hammered or pre-formed metal. The most common type was a bronze-copper combination. "Hootchies" is a collective, common name for artificial squid. They were most often fished on a leader behind large chrome-finished flashers. Individual fishermen had preferences

Table 4. Total landed chinook and coho per trip - 1978.

Vessel	Area Fished	Chinook(lbs)	Coho(lbs)
North Star	116-25	238.40	-
Rambler	104	1,693.34	-
Gota	113		6.62
Germaine	113	124.31	13.23
C-Rae	113	1,132.64	672.44
Carolyn L	181-25	1,509.68	40.78
Sea Kin	154	1,363.18	3,558.14
Myrth	113	576.79	99.40
Duke	113	633.21	441.69
Defense	116-05	756.86	2,335.14
Coronation	113	218.20	2,652.19
Chief Seattle	113	170.26	548.69
	116-05	473.20	1,702.59
	181-05	12.68	176.88
Defiance	181-25	2,511.46	860.12
	114-21	39.68	325.65
	113	118.47	284.87
	154	58.96	276.01
	116-25	245.75	29.21
Combined total weight for all trips		11,877.07	14,023.65
Combined catch average weight for all trips		16.7 (7.5 kg)	7.8 (3.5 kg)

Table 5. Average lengths* for chinook and coho by statistical area 1978.

Vessel	Statistical Area	Chinook(cm)	Coho(cm)
Rambler	104	80.4	
Gota	113		66.0
Defiance	113	78.6	62.0
Germaine	113	75.7	65.0
C-Rae	113	86.3	65.2
Myrth	113	86.1	68.1
Duke	113	85.6	69.1
Coronation	113	78.9	65.1
Chief Seattle	113	81.1	67.5
Combined Average	113	81.8	66.0
Defiance	114-21	73.7	60.5
Defense	116-05	79.0	69.6
C-Rae	116-05	78.2	67.8
Defiance	116-05	84.6	63.1
Combined Average	116-05	80.6	66.8
North Star	116-25	80.6	
Defiance	154	78.0	61.8
Sea Kin	154	83.8	65.7
Combined Average	154	80.9	63.8
Carolyn L	181-05	85.9	59.8
Sea Kin	181-05	71.4	67.0
Combined Average	181-05	78.7	63.4
Defiance	181-25	78.5	63.5
Overall Combined Average		80.4	65.1

* Measurement has from tip of snout to the fork of the tail.

Table 6. Age composition for chinook - 1978

Statistical Area 104 - 1 trip

Age:	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number	0	54	11	0	0	13	19	2	0	99
Percent	0	54.6	11.1	0	0	13.1	19.2	2.0	0	100

Brood Ages: 0%-3 yr; 67.7%-4 yr; 30.0%-5 yr; 2%-6 yr.

Statistical Area 113 - 8 trips

Age:	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number:	8	68	23	1	0	10	20	6	0	136
Percent:	5.9	50	16.9	.7	0	7.4	14.7	4.4	0	100

Brood Ages: 5.9%-3 yr; 57.4%-4 yr; 31.6%-5 yr; 5.1%-6 yr.

Statistical Area 114-21 - 1 trip

Age:	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number:	0	1	0	0	0	1	1	0	0	3
Percent:	0	33.3	0	0	0	33.3	33.3	0	0	99.9

Brood Ages: 66.6%-4 yr; 33.3%-5 yr.

Statistical Area 116-05 - 3 trips

Age:	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number:	17	34	7	0	0	16	13	3	0	90
Percent:	18.9	37.8	7.8	0	0	17.8	14.4	3.3	0	100

Brood Ages: 18.9%-3 yr; 55.6%-4 yr; 22.2%-5 yr; 3.3%-6 yr.

Statistical Area 154 - 2 trips

Age	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number:	0	15	2	0	0	5	5	0	0	27
Percent:	0	55.6	7.4	0	0	18.5	18.5	0	0	100

Brood Ages: 0%-3 yr; 74.1%-4 yr; 25.9%-5 yr; 0%-6 yr.

Statistical Area 181-05 & 181-25 - 3 trips

Age:	0.2	0.3	0.4	0.5	1.1	1.2	1.3	1.4	1.5	Total
Number:	6	90	14	0	0	15	19	1	0	145
Percent:	3.6	53.9	8.4	0	0	14.3	19.1	.7	0	100

Brood Ages: 3.6%-3 yr; 68.2%-4 yr; 27.5%-5 yr; 0.7%-6 yr.

Table 7. Maturity of spring and fall female chinook by statistical area as indicated by egg diameters (mm)

Area	Immature Egg Diameter 0.00-.99mm	1.00-2.24mm	Mature Fall Egg Diameter 2.25-2.99mm	3.00-3.99mm	Mature Spring Egg Diameter 4.00-5.99mm
104	7.1%	35.7%	28.6%	7.1%	21.5%
113	6.7%	13.3%	0.0%	73.3%	0.0%
116-05	0.0%	53.8%	15.4%	30.8%	0.0%
154	0.0%	33.3%	22.2%	44.5%	0.0%
181-25	10.0%	56.6%	10.0%	23.3%	0.0%

Table 8. Maturity of spring and fall male chinook salmon by statistical area as determined by maturity index.*

Chinook Caught Before June 1.

Maturity Index	Area 104	Area 116-05
Immature 0.00-.19	85.7%	100%
Fall 0.20-.59	0	0
Spring 0.60-5.99	14.3%	0
Number Sampled	7	2

Chinook Caught After June 1.

Maturity Index	Area 113	Area 116-05	Area 154	Area 181-25
Immature 0.00-.49	45.5%	0	100%	100%
Fall 0.50-.299	54.5%	100%	0	0
Spring 3.00-5.99	0	0	0	0
Number Sampled	11	3	1	12

*$\frac{\text{Wt. of Reproductive Tract}}{\text{Total Body Weight}}$ X 100 = % of Maturity

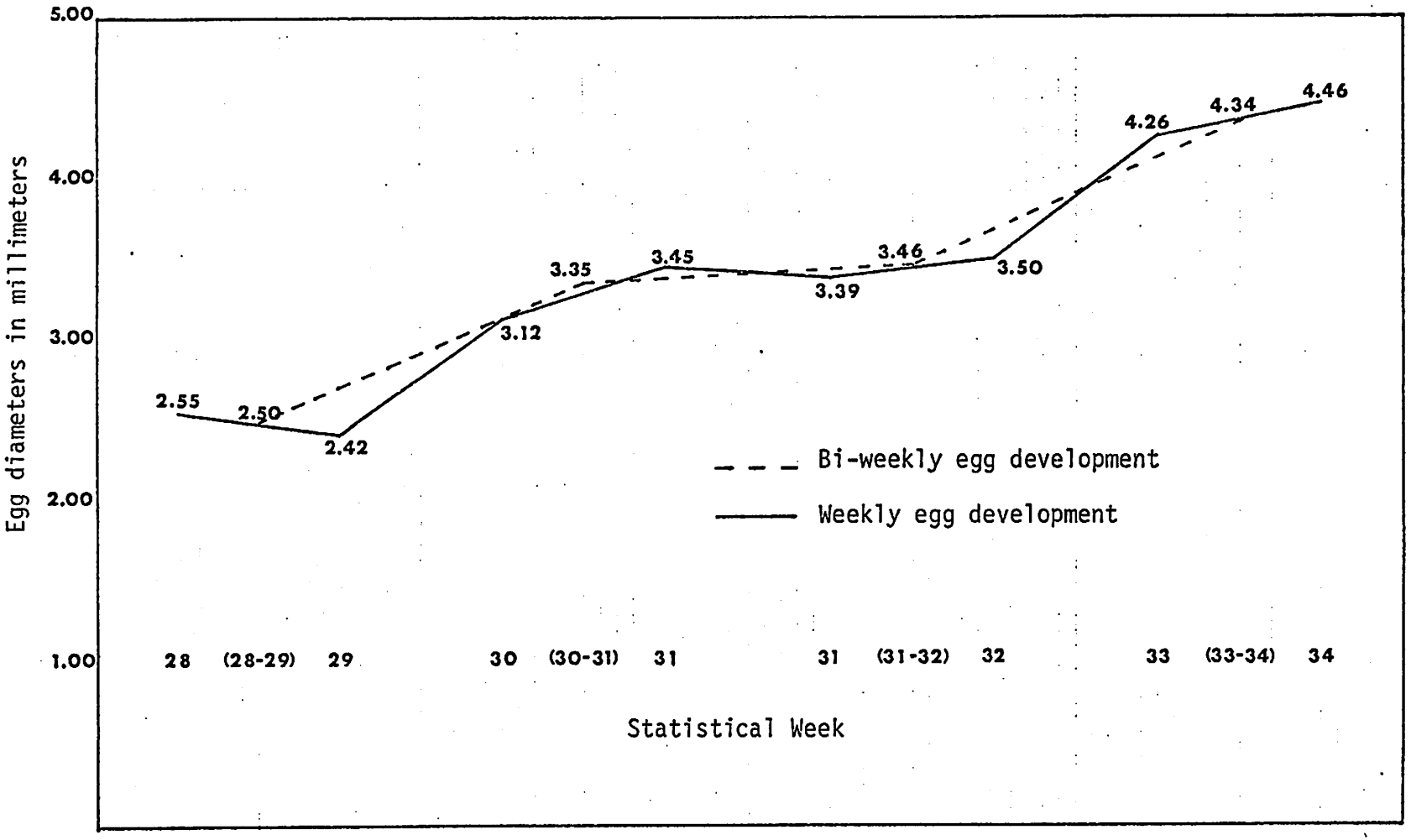


Figure 2. Coho egg development by statistical week.

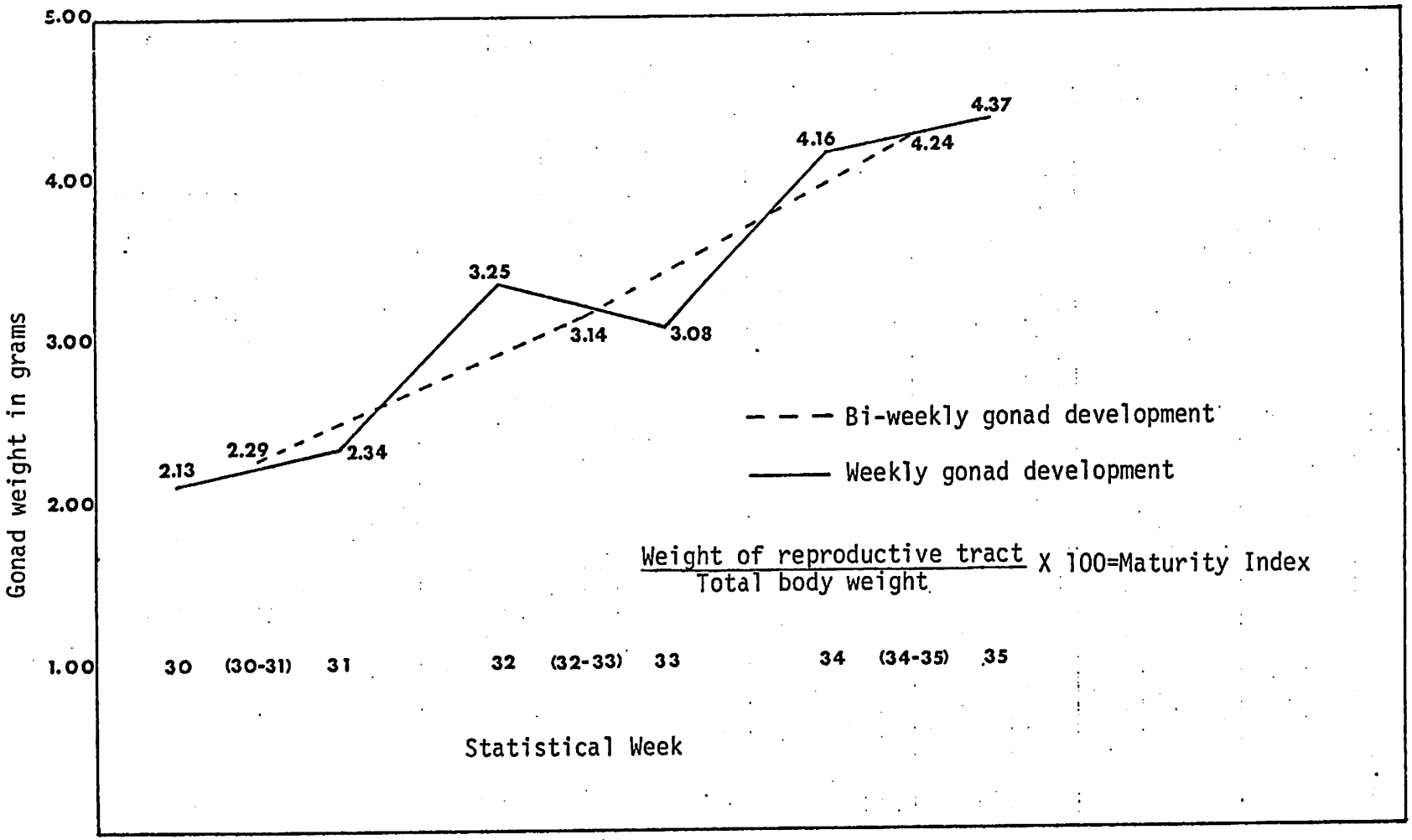


Figure 3. Coho gonad development by statistical week.

Table 9. Age composition for coho - 1978.

Statistical Area 113 - 8 trips

Age:	1.1	2.1	3.1	4.1	Total
Number:	40	80	5	0	125
Percent:	32.0	64.0	4.0	0.0	100

Statistical Area 114 - 1 trip

Age:	1.1	2.1	3.1	4.1	Total
Number:	6	3	0	0	9
Percent:	66.7	33.3	0.0	0.0	100

Statistical Area 116-05 - 3 trips

Age:	1.1	2.1	3.1	41.	Total
Number:	27	38	0	0	65
Percent:	41.5	58.5	0.0	0.0	100

Statistical Area 154 - 2 trips

Age:	1.1	2.1	3.1	4.1	Total
Number:	52	48	0	0	100
Percent:	52.0	48.0	0.0	0.0	100

Statistical Area 181-05 & 181-25 - 3 trips

Age	1.1	2.1	3.1	4.1	Total
Number:	15	24	0	0	39
Percent:	38.8	61.5	0.0	0.0	100

Table 10. Average gear used by vessel per trip - 1978.

Vessel Name	Number Of Lines	Number Of Hooks	Depth In Fathoms	Spoons	Hootchies	Bait	Plugs
Northstar	8	49		28	10	11	
Rambler	4	32	43	4	13	13	2
Germaine	3	15	20		15		
Gota	4	21	25	6	14	1	
C-Rae	4	30	Inside-25 Outside-50	22	4	3	1
Carolyn L	4 6	30 36		7 8	13 17	9 11	1
Sea Kin**	6	48	40	24	24		
Myrth	4	22	Inside-26 Outside-29	8	6	6	2
Duke	4	41		26	15		
Defense**	4	26	16	22	4		
Chief Seattle**	4	54	20	44	10		

* Flashers were used at all times in conjunction with baited hooks, and in the majority of cases with hootchies
** Coho gear used: small spoons and hootchies utilizing bright colors.

Table 11. Combined totals for statistical areas - 1978.

Area	No. of Trips	Total Chinook	Total Chinook Weight and Average Weight	No. of Shakers	Incidence	Total Coho	Total Coho Weight and Average Weight
104	1	101	1693.34 16.77	32	0.32		
113	8	159	2973.88 18.71	56	0.36	601	4719.13 7.87
114-21	1	3	39.68 13.23	5	1.67	48	325.65 6.74
116-05	3	96	1475.81 15.38	150	1.57	511	4066.94 7.96
116-25	1	16	238.40 14.90	8	0.5		
154	2	72	1422.14 19.76	15	0.21	501	3834.15 7.66
181-05	1	1	12.68 12.68	2	2.00	20	176.88 8.55
181-25	2	265	4021.14 15.18	36	0.14	121	900.90 7.45

Table 12. Stomach contents in order of abundance by vessel per trip-1978.

CHINOOK

Vessel Name	Needlefish	Herring	Pollock	Krill	Capelin	Prowfish
Rambler	1			2		
Germaine	1					
C-Rae	2	1	3			
Carolyn L	3	2		1	4	
Sea Kin		2	3	1		4
Myrth	1					
Duke	1					
Defense	1					
Chief Seattle	1					

COHO

Vessel Name	Needlefish	Herring	Pollock	Krill	Capelin	Prowfish
Rambler	1			2		
Germaine	1					
Gota	1					
C-Rae			1			
Carolyn L	3	2		1	4	
Sea Kin		2		1		
Myrth	1					
Duke	1					
Defense	1					
Chief Seattle	1					

for leader length, number of bait types and bait location within the gear set.

Observers noted that the choice of bait type significantly affected catch composition by species. Those vessels using small spoons of various tints of green or orange and hootchies caught more coho than legal chinook. Those vessels using large plugs and copper spoons or herring as bait caught more legal chinook than coho. This varied in relative proportion from area to area.

Feed abundance of chinook and coho varied with time and area. Needlefish (Ammodytes hexapterus) and krill (Thysanoessa spinifera) were most common. Herring (Clupea harengus pallasi) and juvenile pollock (Theragra chalcogramma) followed in order of abundance. Also reported were capelin (Mallotus villosus) and prowfish (Zaprora silenus) (Table 12).

Environmental factors influencing fishing activity were large seas and heavy rain. When the seas were large the ability of the fishermen to ascertain if fish were hooked decreased, because of the movement of the boat. This was especially evident when the fish hooked were relatively small in size (less than 14 pounds). In these instances the fisherman would continue his normal fishing practice of periodically checking the gear. Severe squalls with wind and rain usually forced the fisherman into the protection of the cabin unless fishing was extremely profitable during that time.

During the season the observer vessels encountered large concentrations of pelagic, free swimming sea squirts called salphs, (subphylum Urochordata; genus Salpa). Reports of similar occurrances of these concentrations were received from other vessels in the fleet throughout Southeast Alaska. The concentrations of salphs were often dense enough to foul hooks and lines forcing the fisherman to move to another location or remain in the area and constantly clean the gear.

No logbook data were collected by the observers because logbooks were not made available to the troll observer program. The lack of logbooks hindered the collection of much of the environmental data that was required. Information from the 1978 logbook program is not available for comparison with the results of this study. The results of the 1978 logbook program are not yet available. Without the data from the 1978 logbooks it is not possible to verify the data reported by participants in the logbook program.

FEASIBILITY

The results of the troll observer project demonstrate that under optimal conditions it is feasible for observers to collect a multiplicity of data. A number of the shortcomings of the project have also become evident. Foremost of the obstacles ecountered were the difficulty in obtaining vessels and the sheer number of observations which had to be made.

Throughout the term of the troll observer pilot program the major difficulty was locating skippers willing to take observers aboard for a trip. The primary reason for not wanting observers aboard was the lack of space. Inherent distrust of government sponsored programs was the second most common reason for declining to accept an observer. Those vessel operators who had initially agreed to accept an observer were actively sought. However, the list of cooperating fishermen provided by a fisherman's association included many fishermen who did not understand what the program entailed and ultimately declined to participate in the program. Many of the problems associated with obtaining the cooperation of vessel operators could be resolved through closer cooperation between the project staff and local fishing organizations and through more contact with the fishermen themselves. A greater number of fishermen would be aware of the program and, hopefully, more willing to cooperate if more information was distributed prior to the beginning of the season.

Once a cooperative fisherman was found the next obstacle facing the observer was to obtain all the information requested. The observers reported that in instances where large numbers of fish were landed in a short time their ability to record all the information declined. Because of the amount of time required to sample and record data from each fish, work on deck became confused and some records were lost. When catches of fish exceeded ten per hour, the observers were forced to sample every other fish caught. Determinations of shaker condition, weather, sea conditions, and other observations suffered when catches of fish increased. Weighing of fish was extremely difficult during rough sea conditions although great care was taken to obtain accurate measurements.

Many of the problems associated with data collection can be resolved by prioritizing data requirements. The essential data elements required by the troll observer program should be those that are not obtainable from another source. Information on environmental factors such as water condition, feed abundance, weather, food habits, total catch and incidence of shaker can be obtained from a troll logbook program. Information on stock origin and age class of fish harvested can be collected through the Coded Wire Tag Port Sampling Program. Information which is not currently available from another source include vessel fishing power data, such as catch-per-hook-type hour, catch-per-bait-type hour, number of lines fished, vessel characteristics, and maturity data for male and female chinook and coho. Additional data could be collected on a time available basis. The importance of each data element requested of the observer must be determined on the basis of project goals before the sampling period begins so that each observer is aware of what data may be foregone without defeating the project.

Sampling intensity will require careful consideration in subsequent observer programs. The question of sampling intensity and sampling design must also be considered in light of the fishery management goals and data requirements, e.g. what information does the fishery manager need and what is the most efficient system to get the information?

RECOMMENDATIONS

The Alaska Department of Fish and Game recognizes that there is value to an observer program for the collection of certain types of data. The Department recommends that continuation of the observer program be limited to the collection of data on vessel fishing power and efficiency and maturity of fish caught. The additional data collected by the pilot observer program (e.g., environmental conditions, stock orgin of fish caught, and logbook information) are either collected by other projects or do not address the critical data gaps. Future observer programs may include either an expanded program to describe the entire coastal troll fishery or a limited observer program to accomplish specific narrowly-defined objectives. An expanded observer program would attempt to refine present information on fish maturity timing throughout the troll season in the coastal area. During a period of several years the expanded observer program would develop an understanding of in-season trends of maturity within stocks of fish available to the troll fishery and efficiency by specific areas and times. The limited observer program would focus upon understanding the distribution of the troll salmon resource at specific areas and times. The decision to adopt one program over another would be determined by the data needs of resource managers, the amount of funding available and project goals.

An expanded observer program for the outside troll fishery should employ a minimum of eleven observers, based at Sitka, Pelican, Craig, and Ketchikan. Eight observers would gather data on the on-shore coastal fishery. Eighty observer trips (320 observer-days) during the season would represent about 1.0% of the fishing trips to the onshore coastal areas. Three observers would monitor the offshore fishery. The offshore observers would make 33 observer trips (231 observer days) per season which represents about 10% of the fishing trips to this area. Proportionally greater effort would be devoted to the offshore fishery as that fishery is the subject of the most intense interest and concern. A three year project is considered as the minimum necessary to obtain an estimate of the annual variability within the outside troll fishery.

An observer program of this scale would require significant supervisory and administrative support. The preliminary budget which is attached includes one full-time project leader and a seasonal assistant project leader. Clerical support and space rent would be provided by the Department, however, these items may require additional funding if facilities were not available. The minimum cost for the three year troll observer project is $824,000.

In certain instances a full observer program would not be required in order to answer certain management questions such as area specific timing and incidence of shakers. A small scale observer program based in one or two ports could be conducted from year to year at a greatly reduced cost. Three to four observers could provide 210 vessel days of observation in 17.5 man-months. Supervision for the project would be provided by a seasonal project leader for 9 man-months. The support costs for this program would be reduced proportionally. The total project cost would be approximately $100,000 per year. A budget for a typical small scale

observer program is also included in this report. In view of the limited amount of research funding available and the intense competition for that funding, it is not likely that the expanded program would be feasible. The opportunity cost associated with the expanded program, in terms of other research foregone, is very high. The Alaska Department of Fish and Game recommends that a limited observer program be established to fucus upon critical time and/or area issues associated with the troll fishery. The Department of Fish and Game cannot fund the troll observer program. Funding for the program must be derived from a non-State source.

The Department is willing to administer the observer program. By virtue of its experience with the Southeast troll fishery and pilot observer program the Department has the advantage of being familiar with the factors that must be considered in order to make the program work. The Department also has an interest in acquiring the information that would be developed.

A scientific advisory committee should be established under the auspices of the funding agency. Among the members of the committee should be scientists from West Coast states who are knowledgeable of the troll fleets in those states as well as statisticians or biometricians. This committee would serve an advisory function for statistical methods and data analysis.

HIGH SEAS SALMON TROLL OBSERVER
PROGRAM BUDGET

YEAR ONE

Personal Services

Project Leader (Fishery Biologist II)	12 mm	33,000
Asst. Project Leader (Fishery Biologist I)	9 mm	20,700
Observers (Temp. Fishery Biologist I)	39.5 mm	79,000
Data (Temp. Fishery Biologist I)	12 mm	24,000
	Subtotal	156,700

Travel

Transportation		6,100
Vessel Reimbursement (@$25/day)		13,775
	Subtotal	19,875

Contractual

Aircraft Charter		23,000
Sample Gear		4,400
Data Processing		2,200
	Subtotal	29,600

Commodities	Subtotal	11,000
	Total	217,175
	Overhead	21,700
	First Year Total	238,875

YEAR TWO

Same as Year One plus 10% inflation	Second Year Total	262,750

YEAR THREE

Same as Year Two plus 10% inflation and 3 additional months for asst. project leader and 6 man-months of data analysis

Third Year Total	311,850
Project Grand Total	$813,475

SMALL SCALE TROLL OBSERVER PROGRAM BUDGET

Personal Services		
Project Leader (Fishery Biologist II) 9 mm		24,750
Observers (Temp. Fishery Biologist I) 17.5 mm		35,000
Data Analysis (Temp. Fishery BiologistI) 3 mm		6,000
		65,750
Travel		
Transport		2,000
Vessel Reimbursement (@ $25/day)		5,250
		7,250
Contractual		
Aircraft Charter		8,500
Sample Gear		2,800
Data Processing		700
		12,000
Commodities		4,500
	Subtotal	89,500
	Overhead	9,950
	TOTAL	99,450

LITERATURE CITED

Gray, Phillip L.; Florey, K.R.; Koerner, J.F.; Marriott, R.A.; 1978. Coho salmon (Oncorhynchus kisutch) fluorescent pigment mark recovery program for the Taku, Berners, and Chilkat Rivers in Southeastern Alaska (1972-1974). Alaska Department of Fish and Game, Informational Leaflet No. 176.

Kissner, Paul D. Jr., 1973. A study of chinook salmon in Southeast Alaska. Alaska Department of Fish and Game Annual Report, 1972-1973. Project F-9-5, 14 (AFS-41).

Rich, Willis H., 1925. Growth and degree of maturity of chinook salmon in the ocean. Department of Commerce, Bulletin of the United States Bureau of Fisheries, Vol. XLI.

APPENDICES

MALE CHINOOK
REPRODUCTIVE TRACT MEASUREMENTS
-1978-

DATE	AREA CAUGHT	GONAD WT. (GM.)	BODY LENGTH (MM.)	BODY WT. (KG.)	BODY WT. (LBS.)	MATURITY INDEX*	ROUND WT. (LBS.)	ROUND WT. (GM.)
5/21	104	5.8	925	13.0	28.5	.04	34.3	15555.5
5/22	104	3.1	700	5.0	11.0	.05	13.2	5986.3
5/22	104	3.6	800	7.0	15.5	.04	18.6	8435.3
5/24	104	4.0	855	10.5	23.0	.03	27.7	12562.3
5/25	104	2.2	795	7.0	15.5	.03	18.6	8435.3
5/25	104	39.5	710	5.2	11.5	.63	13.8	6258.5
5/29	104	2.4	790	6.6	14.5	.03	17.4	7891.1
5/29	113	7.0	770	6.2	13.5	.10	16.0	7256.2
5/30	116-25	6.8	835	7.4	16.0	.08	19.2	8707.4
5/30	116-25	10.6	815	7.0	15.5	.12	18.6	8435.3
6/19	181-05	0.1	784	6.4	14.0	.00	16.8	7619.5
6/19	181-05	3.2	850	8.0	17.5	.03	21.0	9523.8
7/8	181-25	1.1	700	7.7	17.0	.01	20.4	9251.7
7/17	181-25	1.2	822	7.7	16.9	.01	20.2	9161.0
7/17	181-25	1.8	695	4.5	10.0	.03	12.0	5442.2
7/17	181-25	5.2	950	12.5	27.5	.03	33.1	15011.3
7/18	181-25	0.6	500	7.1	15.6	.01	18.7	8480.7
7/18	181-25	6.4	950	8.6	19.0	.06	22.8	10340.1
7/18	181-25	24.6	950	10.0	22.0	.20	26.5	12018.1
7/19	181-25	1.7	825	8.0	17.6	.02	21.0	9523.8
7/20	181-25	0.4	1000	16.5	36.3	.00	43.6	19773.2
7/20	181-25	2.4	855	10.0	22.0	.02	26.5	12018.1
7/27	113	13.8	820	5.4	12.0	.21	14.4	6530.6
7/27	113	37.8	750	4.5	10.0	.20	12.0	5442.1
8/1	113	108.2	765	7.2	16.0	1.24	19.2	8707.4
8/3	154	18.6	830	8.5	18.5	.18	22.2	10068.0

DATE	AREA CAUGHT	GONAD WT. (GM.)	BODY LENGTH (MM.)	BODY WT. (KG.)	BODY WT. (LBS.)	MATURITY INDEX	ROUND WT. (LBS.)	ROUND WT. (GM.)
8/6	113	96.8	885	11.1	24.5	.72	29.5	13378.6
8/7	113	26.8	1055	15.4	33.5	.14	40.3	18276.6
8/24	116-05	128.8	680	4.0	9.0	2.62	10.8	4897.9
8/26	113	75.2	710	5.4	12.0	1.15	14.5	6530.6
8/27	113	0.8	770	6.4	14.0	.01	16.8	7619.5
8/27	113	42.8	1000	15.5	34.0	.50	18.6	8435.3
8/28	116-05	110.8	810	7.0	15.5	1.31	18.6	8435.3
8/28	113	85.2	950	14.5	32.0	.48	38.5	17460.3
8/28	113	126.4	840	8.0	17.5	1.32	21.0	9523.8
8/28	116-05	167.6	800	6.6	14.5	2.12	17.4	7891.1

*$\frac{\text{Wt. of Reproductive Tract}}{\text{Total Body Wt.}} \times 100$

MALE COHO
REPRODUCTIVE TRACT MEASUREMENTS
-1978-

DATE	GONAD WT. (GM.)	BODY WT. (KG.)	BODY WT. (LBS.)	ROUND WT. (GM.)	ROUND WT. (LBS.)	MATURITY INDEX*
7/27	95.0	3.0	6.5	3537.4	7.8	2.68
7/27	109.4	3.2	7.0	3809.5	8.4	2.78
7/27	62.4	3.2	7.0	3809.5	8.4	1.63
7/28	98.4	3.2	7.0	3809.5	8.4	2.58
7/28	65.6	2.3	5.0	2721.1	6.0	2.41
7/28	49.6	3.5	7.7	4217.6	9.3	1.17
7/29	188.6	2.5	5.5	5442.2	12.0	3.46
7/29	52.8	3.4	7.5	4081.6	9.0	1.29
7/29	110.8	4.4	9.6	5215.4	11.5	2.12
7/29	69.0	3.7	8.1	4444.4	9.8	1.55
7/29	68.2	3.7	8.1	4444.4	9.8	1.53
7/30	81.6	3.4	7.5	4081.6	9.0	2.00
7/30	63.2	3.9	8.5	4625.9	10.2	1.36
7/30	104.6	3.4	7.5	4081.6	9.0	2.56
7/30	86.2	4.5	10.0	5442.2	12.0	1.58
7/31	87.2	2.0	4.4	2403.6	5.3	3.67
7/31	27.0	2.0	4.4	2403.6	5.3	1.12
7/31	34.6	3.5	7.7	4217.6	9.3	.82
7/31	61.8	3.9	8.5	4625.9	10.2	1.33
8/1	133.8	3.4	7.5	4081.6	9.0	3.27
8/2	103.2	3.3	7.3	3990.9	8.8	2.58
8/2	66.4	5.0	11.0	6031.7	13.3	1.10
8/2	84.8	3.9	8.5	4625.9	10.2	1.83
8/2	100.2	3.0	6.5	3537.4	7.8	2.83
8/2	76.0	4.0	9.0	4897.9	10.8	1.55
8/2	140.6	3.0	6.5	3537.4	7.8	3.97
8/3	103.2	3.7	8.1	4444.4	9.8	2.32
8/3	121.0	3.9	8.5	4625.9	10.2	2.61
8/3	82.4	2.2	4.8	2630.4	5.8	3.13
8/3	27.4	3.5	7.7	4217.6	9.3	0.64
8/3	101.6	3.0	6.5	3537.4	7.8	2.87
8/3	75.0	3.9	8.5	4625.9	10.2	1.62
8/3	91.4	3.4	7.5	4081.6	9.0	2.23
8/3	175.4	4.6	10.1	5532.9	12.2	3.17
8/3	117.8	3.4	7.5	4081.6	9.0	2.88
8/3	78.8	3.7	8.1	4444.4	9.8	1.77
8/3	155.2	3.2	7.0	3809.5	8.4	4.07
8/3	138.8	3.5	7.7	4217.6	9.3	3.29
8/3	129.2	3.7	8.1	4444.4	9.8	2.90
8/4	82.2	3.4	7.5	4081.6	9.0	2.01

DATE	GONAD WT. (GM.)	BODY WT. (KG.)	BODY WT. (LBS.)	ROUND WT. (GM.)	ROUND WT. (LBS.)	MATURITY INDEX
8/4	62.4	3.0	6.5	3537.4	7.8	1.76
8/4	77.2	3.7	8.1	4444.4	9.8	1.73
8/4	119.4	4.0	9.0	4897.9	10.8	2.43
8/4	217.0	4.0	9.0	4897.9	10.8	4.43
8/4	183.2	5.0	11.0	6031.7	13.3	3.03
8/4	124.2	4.0	9.0	4897.9	10.8	2.53
8/4	87.4	3.5	7.7	4217.6	9.3	2.07
8/6	179.8	4.0	9.0	4897.9	10.8	3.67
8/6	138.2	4.5	10.0	5442.2	12.0	2.53
8/6	133.4	3.5	7.7	4217.6	9.3	3.16
8/7	151.4	3.0	6.5	3537.4	7.8	4.27
8/7	153.4	4.0	9.0	4897.9	10.8	3.13
8/7	212.4	5.7	12.5	6802.7	15.0	3.12
8/14	154.6	3.0	6.5	3537.4	7.8	4.37
8/14	193.2	5.5	12.0	6576.0	14.5	2.94
8/14	78.6	5.0	11.0	6031.7	13.3	1.30
8/14	112.6	2.5	4.8	2630.4	5.8	4.28
8/14	152.8	4.0	9.0	4897.9	10.8	3.12
8/14	137.8	5.5	12.0	6530.6	14.5	2.11
8/14	163.4	4.7	10.3	5623.6	12.4	2.90
8/14	159.8	4.5	10.0	5442.2	12.0	2.94
8/14	119.2	4.0	9.0	4897.9	10.8	2.43
8/16	190.6	4.5	10.0	5442.2	12.0	3.50
8/16	307.2	6.0	13.2	7210.9	15.9	4.26
8/16	145.8	3.5	7.7	4217.6	9.3	3.46
8/18	213.8	4.7	10.3	5623.6	12.4	3.80
8/18	136.4	4.0	9.0	4897.9	10.8	2.78
8/23	156.2	3.7	7.0	3809.5	8.4	4.10
8/23	108.4	5.5	12.0	6530.6	14.5	1.66
8/23	130.4	5.0	11.0	6031.7	13.3	1.80
8/23	270.6	5.7	12.5	6802.7	15.0	3.98
8/23	344.4	6.5	14.3	7800.4	17.2	4.41
8/23	143.2	3.9	8.5	4625.9	10.2	3.09
8/23	100.8	2.3	5.0	2721.1	6.0	3.70
8/23	177.2	4.1	9.0	4897.9	10.8	3.61
8/23	123.4	3.2	7.0	3809.5	8.4	3.23
8/23	161.6	3.6	8.0	4353.7	9.6	3.71
8/24	310.2	4.5	10.0	5442.2	12.0	5.69
8/24	298.4	3.6	8.0	4353.7	9.6	6.85
8/25	223.8	3.2	7.0	3809.5	8.4	5.87
8/25	252.6	4.5	10.0	5442.2	12.0	4.64
8/25	188.2	1.9	4.0	2176.9	4.8	8.64
8/26	155.4	3.4	7.5	4081.6	9.0	3.80
8/26	301.2	4.5	10.0	5442.2	12.0	5.53
8/26	116.0	3.4	7.5	4081.6	9.0	2.84
8/26	142.6	3.0	6.5	3537.4	7.8	4.03
8/26	176.0	3.0	6.5	3537.4	7.8	4.97
8/27	263.4	6.3	13.8	7528.3	16.6	3.50
8/27	208.8	3.9	8.5	4625.9	10.2	4.51

DATE	GONAD WT. (GM.)	BODY WT. (KG.)	BODY WT. (LBS.)	ROUND WT. (GM.)	ROUND WT. (LBS.)	MATURITY INDEX
8/27	170.2	2.7	6.0	3265.3	7.2	5.21
8/27	187.2	3.6	8.0	4353.7	9.6	4.29
8/28	201.2	4.4	9.6	5215.4	11.5	3.86
8/28	164.0	5.0	11.0	6031.7	13.3	2.72
8/28	200.4	3.9	8.5	4625.9	10.2	4.33
8/28	235.2	3.4	7.5	4081.6	9.0	5.76
8/29	245.0	3.9	8.5	4625.9	10.2	5.29
8/29	269.6	4.1	9.0	4897.9	10.8	5.50
8/29	195.8	3.6	8.0	4353.7	9.6	4.49

*$\frac{\text{Wt. of Reproductive Tract}}{\text{Total Body Wt.}} \times 100$

AVERAGE COHO EGG DIAMETER
BY DATE - 1978

Date	Egg Diameter(mm)	Date	Egg Diameter(mm)
7/12	2.12	8/06	3.42
7/13	2.58	8/07	2.89
7/14	2.98	8/08	3.86
7/15	2.51	8/13	2.94
7/17	2.21	8/14	3.60
7/18	2.52	8/16	3.21
7/19	2.52	8/17	3.80
7/27	3.02	8/18	3.93
7/28	3.39	8/21	4/48
7/29	2.95	8/23	4.20
7/30	3.48	8/24	3.88
7/31	3.08	8/25	4.16
8/01	3.74	8/26	4.57
8/02	3.65	8/27	4.18
8/03	3.29	8/28	4.47
8/04	3.81	8/29	4.73
8/05	3.09		

STATISTICAL WEEKS - 1978

Weeks	From	Thru	Weeks	From	Thru
1	Jan 1	Jan 7	28	July 9	July 15
2	Jan 8	Jan 14	29	July 16	July 22
3	Jan 15	Jan 21	30	July 23	July 29
4	Jan 22	Jan 28	31	July 30	Aug 5
5	Jan 29	Feb 4	32	Aug 6	Aug 12
6	Feb 5	Feb 11	33	Aug 13	Aug 19
7	Feb 12	Feb 18	34	Aug 20	Aug 26
8	Feb 19	Feb 25	35	Aug 27	Sept 2
9	Feb 26	Mar 4	36	Sept 3	Sept 9
10	Mar 5	Mar 11	37	Sept 10	Sept 16
11	Mar 11	Mar 18	38	Sept 17	Sept 23
12	Mar 19	Mar 25	39	Sept 24	Sept 30
13	Mar 26	Apr 1	40	Oct 1	Oct 7
14	Apr 2	Apr 8	41	Oct 8	Oct 14
15	Apr 9	Apr 15	42	Oct 15	Oct 21
16	Apr 16	Apr 22	43	Oct 22	Oct 28
17	Apr 23	Apr 29	44	Oct 29	Nov 4
18	Apr 30	May 6	45	Nov 5	Nov 11
19	May 7	May 13	46	Nov 12	Nov 18
20	May 14	May 20	47	Nov 19	Nov 25
21	May 21	May 27	48	Nov 26	Dec 2
22	May 28	Jun 3	49	Dec 3	Dec 9
23	Jun 4	Jun 10	50	Dec 10	Dec 16
24	Jun 11	Jun 17	51	Dec 17	Dec 23
25	Jun 18	Jun 24	52	Dec 24	Dec 30
26	Jun 25	Jul 1	53	Dec 31	Dec 31
27	July 2	Jul 8			