

**ALASKA DEPARTMENT OF FISH AND GAME UPPER COOK
INLET COHO SALMON RESEARCH PROGRAM:
Report for the Alaska Board of Fisheries**



by

**Stephen M. Fried
and
Robert A. Clark**

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AUTHORS

Stephen M. Fried is a Regional Research Biologist for the Alaska Department of Fish and Game, Commercial Fisheries Division, 333 Raspberry Road, Anchorage, AK 99518.

Robert A. Clark is a Regional Research Supervisor for the Alaska Department of Fish and Game, Sport Fish Division, 333 Raspberry Road, Anchorage, AK 99518.

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INTRODUCTION

This report provides a summary of the Alaska Department of Fish and Game's existing and proposed research program for Upper Cook Inlet coho salmon. All activities conducted under this program serve four major functions:

- 1) *Harvest Accounting*, which includes monitoring and documentation of catches, harvest patterns, and fishing effort, as well as sampling to collect biological information (age, sex, size, tissue samples for genetic investigations, etc.) and recover marked individuals;
- 2) *Escapement Estimation*, which includes monitoring and documentation of numbers of spawners, distribution of spawners, and timing of spawning, as well as sampling to collect biological information (age, sex, size, tissue samples for genetic investigations, etc.) and recover marked individuals;
- 3) *Wild Stock Assessment*, which includes marking juveniles and smolt or looking for available biological and genetic markers to identify stocks, collecting and analyzing data to estimate freshwater production, marine survival, total return, exploitation rates, and spawning goals, as well as developing management strategies;
- 4) *Hatchery Supplementation and Assessment*, which includes producing and stocking smolt and juveniles reared in hatcheries, marking all or a portion of stocked fish, and collecting and analyzing data to estimate marine survival, total return, exploitation rates, stocking goals, and effects on wild populations.

Since coho spawn in a variety of systems throughout this management area, we grouped activities conducted for each major function under the existing program, as well as those proposed as program enhancements, under six geographic areas within Upper Cook: Susitna River Drainage, Knik Arm Systems, Anchorage Urban Streams, West Cook Inlet Systems, Northern Kenai Peninsula Systems, and Lower Kenai Peninsula Systems (Appendix A). We also included a copy of a recent Capitol Improvement Project proposal which was developed as part of the Governor's request to improve Cook Inlet coho salmon management (Appendix B).

During fiscal year 2000, which extends from 1 July 1999 through 30 June 2000, the department is spending \$1,479.4 thousand to operate its coho salmon program for Upper Cook Inlet. Of this total, Sport Fish Division is conducting 11 coho salmon projects which have a combined annual budget of \$1,058.0 thousand, while Commercial Fisheries Division is conducting six projects which contain \$59.6 thousand for coho salmon work (Tables 1 and 2). The department is seeking an additional \$385.0 thousand for a Capitol Improvement Project that will enhance our understanding and improve our ability to manage this resource (Appendix B).

PROGRAM OVERVIEW

Harvest Accounting

Existing Program

Currently operated projects provide total estimates of commercial and sport fishery harvests within this management area, and support sampling activities which obtain age, size and sex information and recover marked salmon from commercial harvests (Appendix A). Preliminary commercial harvest estimates are obtained from hailed reports during and after each opening, while final numbers are obtained from fish harvest tickets completed by fish buyers and processors and sent to the department during and shortly after the fishery. Sport harvest estimates are obtained from a statewide mail survey, whose results are available about 12 to 18 months after the fishing season.

Knowledge Gaps

The department generally lacks estimates of sport fishery harvest and effort data during the fishing season. Development of a telephone and logbook program for recreational guides in Cook Inlet freshwaters would, if successful, provide a relatively inexpensive tool to obtain area specific information on harvests and effort for an important segment of many sport fisheries both during and after the fishing season (Appendix B). Such information would be of use in making management decisions, and could provide a means of evaluating coho salmon abundance in some systems.

The department generally lacks estimates of coho salmon stock specific contributions to commercial harvests, which are needed to assess production and determine spawning goals. Since biological markers have not been identified, it is necessary to physically mark coho salmon and recover them from harvests. Hatchery stocked coho salmon have been marked with coded wire tags for many years, but coded wire tag studies on wild stocks have only begun recently. As more wild stocks are marked, it will be necessary to expand commercial catch sampling in order to recover enough tags to generate stock contribution estimates.

Age information is needed to assign returning adults to their correct brood year. Current commercial catch sampling efforts probably provide relatively accurate and precise estimates of the age composition of the total coho salmon harvest, but sampling efforts would need to be expanded to better define area or gear specific harvests. Sport fishery harvests are generally not sampled.

Escapement Estimation

Existing Program

Currently operated projects provide total or partial spawning escapement counts for twenty systems located in five of the six geographic areas listed in this report (Appendix A). No escapement projects are currently conducted in West Cook Inlet systems. Some of these projects support sampling activities which obtain age, size and sex information and recover marked salmon.

Various methods are used to monitor coho salmon escapements in Upper Cook Inlet systems. Counts at weirs are obtained for seven systems: Deshka River (Susitna Drainage), Little Susitna River (Knik Arm), Fish Creek (Knik Arm), Cottonwood Creek (Knik Arm), Wasilla Creek (Knik Arm), Russian River (Northern Kenai Peninsula), and Deep Creek (Lower Kenai Peninsula). All weirs, except the one on Russian River, are generally operated to provide estimates of total coho salmon escapement. A fish box in a dam is used at Ship Creek (Anchorage Urban Stream) to provide a good estimate of total escapement. Hydroacoustic equipment is used in Yentna River (Susitna Drainage), but only provide a partial estimate of coho salmon escapement since the project is currently operated and designed to count sockeye salmon. Aerial or foot counts are made for 15 systems: Rabideux Creek (Susitna Drainage), Birch Creek (Susitna Drainage), Question Creek (Susitna Drainage), Answer Creek (Susitna Drainage), Cottonwood Creek (Knik Arm), Wasilla Creek (Knik Arm), Jim Creek (Knik Arm), McRoberts Creek (Knik Arm), Eklutna River (Knik Arm), Yellow Creek (Knik Arm), Ship Creek (Anchorage Urban Stream), Campbell Creek (Anchorage/Turnagain Arm), Bird Creek (Anchorage/Turnagain Arm), Twenty Mile River (Anchorage/Turnagain Arm), and Placer River (Anchorage/Turnagain Arm). These survey counts are viewed as indices of abundance rather than total counts, since only one survey per system is usually obtained each year. Finally, mark and recapture techniques to estimate escapement are being developed for use on the Kenai River (Northern Kenai Peninsula).

Knowledge Gaps

Very little information on abundance, as well as age, size and sex composition, of coho salmon spawning stocks is available for Upper Cook Inlet. One component of the proposed Capitol Improvement Project would improve inseason enumeration of coho salmon in the Little Susitna River by moving the weir downriver, while another would develop an enumeration project for a system within West Cook Inlet, such as the Chuitna or Kustatan rivers (Appendix B). No escapement estimates are obtained for the Susitna River, which may be the single largest producer of coho salmon in Upper Cook Inlet. This system is difficult to visually survey from either the ground or air due to its size and generally turbid water. Hydroacoustic equipment and

fish wheels are used to estimate total sockeye salmon escapement into a major branch of this drainage, the Yentna River, but provide only partial counts of coho salmon. To determine whether total coho salmon escapement can be estimated with this method, detailed information on coho salmon migratory behavior at that site as well as new hydroacoustic equipment must be obtained. Finally, additional escapement enumeration and sampling projects are needed on systems such as the Kenai (Northern Kenai Peninsula), Swanson (Northern Kenai Peninsula), and Anchor (Lower Kenai Peninsula) rivers, which also seem to produce large runs of coho salmon.

Wild Stock Assessment

Existing Program

Assessment of wild stocks can occur prior to, during, and after the fishing season. In general, very little data has been collected in past years, or is currently being collected, which can be used in assessment analyses of Upper Cook Inlet coho salmon wild stocks. No formal preseason abundance forecasts can be made, limited information is available to estimate abundance during the fishing season, and few spawning goals have been established.

Some work has been accomplished to assess abundance, examine productive capacity, and determine spawning goals for coho salmon stocks within the management area (Appendix A). Harvest estimates are available from all fisheries; escapement estimates are available for a few Knik Arm and Anchorage/Turnagain Arm systems; age, size and sex information is available for commercial harvests landed during the Central District drift gill net fishery as well as most set net fisheries within Central and Northern districts. Very limited information is available on the contribution of specific stocks to harvests. Information obtained from recovery of marked hatchery coho salmon which had been stocked into Little Susitna River for several years, has been used estimate harvest patterns, exploitation rates and total returns for wild coho salmon in this system. The department has also recently begun marking wild coho smolt and juveniles with coded wire tags in a three systems: Deep Creek (Lower Kenai Peninsula), the Kenai River (Northern Kenai Peninsula), and Cottonwood Creek (Knik Arm; Appendix A). If successful, these projects will provide estimates of smolt abundance, marine survival, harvest patterns, total return, and exploitation rates for these stocks. Finally, the effect of instream flow, limnology and environmental effects on freshwater production is being examined for a few systems.

During the season, information to assess coho salmon abundance comes from commercial fishery harvests, a few weirs, fishwheels and hydroacoustic equipment operated in the Yetna River during a sockeye salmon escapement enumeration project, an offshore test fishing project

operated to assess sockeye salmon abundance, and anecdotal information obtained from speaking with participants in various fisheries.

Given the relative small amount of data available for most coho salmon stocks within Upper Cook Inlet, spawning goals are established for only seven systems on which either weirs have been operated (Knik Arm: Little Susitna) or foot surveys conducted (Knik Arm: Cottonwood Creek, Fish Creek, Wasilla Creek, Jim Creek; Anchorage Area Streams: Campbell Creek and Ship Creek) over a period of several years. Of these goals, only the one for the Little Susitna River is based on an estimate of the number of spawners thought to produce maximum sustained yield. All other goals are based on average foot or aerial survey counts which have sustained harvests in past years rather than an understanding of the productive capacity of these systems.

Knowledge Gaps

Much work needs to be done to improve the department's ability to assess wild stocks of coho salmon within Upper Cook Inlet. Some improvements to inseason assessment might be gained from a thorough analysis of data collected during existing projects. A component of the proposed Capitol Improvement Project would seek to develop an index of total Upper Cook Inlet coho salmon abundance using commercial catch and offshore test fishing information (Appendix B). Over the longer term, spawner and recruitment information needs to be collected for more systems to estimate production capacity and determine spawning goals. In addition to previously mentioned program enhancements to fill knowledge gaps in harvest accounting and escapement estimation, development of more coded wire tagging studies could provide data for stock and recruitment analyses as well as information on harvest patterns, run timing, marine survival, exploitation rates, and smolt production. Such information is particularly needed for the Susitna River (Susitna River Drainage) since it appears to account for a large portion of coho salmon production within Upper Cook Inlet. Other candidate systems include Clearwater Creek (West Cook Inlet), Chuitna River (West Cook Inlet), Ninilchik River (Lower Kenai Peninsula), and Anchor River (Lower Kenai Peninsula).

Hatchery Supplementation and Assessment

Existing Program

Most available information on marine survival, harvest patterns and exploitation rates for Upper Cook Inlet coho salmon has been obtained from marking and recovering hatchery stocks used to supplement wild runs in Knik Arm and Anchorage/Turnagain Arm. Currently, supplementation of coho salmon runs in Upper Cook Inlet systems occurs in Eklutna River (Knik Arm), Ship Creek

(Anchorage/ Turnagain Arm), Campbell Creek (Anchorage/Turnagain Arm), and Bird Creek (Anchorage/ Turnagain Arm). Coho salmon runs to Little Susitna River are no longer supplemented with hatchery stocks, and no additional hatchery supplementation of other Upper Cook Inlet wild coho salmon runs is planned.

Knowledge Gaps

No studies on the effects of hatchery supplementation on wild stocks has been done within Upper Cook Inlet. However, if supplementation is limited to currently stocked systems and care is exercised in selection of brood stock and monitoring of diseases, continuation of existing projects is not expected to have any large effect upon Upper Cook Inlet wild coho salmon production.

Table 1. Alaska Department of Fish and Game, Sport Fish Division Upper Cook Inlet coho salmon projects. Costs shown are for the fiscal year 2000 budget (1 July 1999 to 30 June 2000).

| Project Title | Cost (thousands of dollars) | Description |
|--------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kenai River Coho Coded Wire Tag Recovery | \$120.0 | A portion of this funding provided to Commercial Fishery Division for sampling Central District commercial catches and processing collected heads; also includes funds for analyzing data and reporting |
| Kenai River Coho Stock Assessment | \$137.6 | Coded wire tagging juvenile coho in Moose River; sampling inriver catches; estimating contributions to catches; reporting |
| Kenai River Coho Escapement Study | \$182.7 | Estimating coho salmon run above mile 19 through mark and recapture studies; reporting |
| Cook Inlet Coho Watershed Analysis | \$37.0 | Operating gauging station on Cottonwood Creek; stream and water quality surveys of Cottonwood Creek |
| Stocking | \$165.1 | Providing hatchery-produced coho salmon for Anchorage area fisheries |
| Urban Coho Enhancement | \$63.5 | Indexing escapement of coho salmon in Anchorage/Turnagain systems; estimating total return of Anchorage hatchery coho salmon |
| Northern Cook Inlet Commercial Coded Wire Tag Recovery | \$28.5 | Funding provided to Commercial Fishery Division for sampling commercial catches in Northern District to recover heads from coho salmon with coded wire tags |
| Northern Cook Inlet Coho Hatchery Coded Wire Tagging | \$34.5 | Coded wire tagging Anchorage/Knik Arm hatchery releases of coho salmon smolt |
| Knik Arm Coho Weirs | \$192.9 | Operating weirs on Knik Arm streams and on Little Susitna River; analyzing data; reporting |
| Cottonwood Creek Coded Wire Tagging | \$21.6 | Beginning a coded wire tagging program for coho salmon in Cottonwood Creek |
| Deshka Coho Weir | \$74.6 | Operating a weir on Deshka River; analyzing data; reporting |
| Total | \$1,058.0 | |

Table 2. Alaska Department of Fish and Game, Commercial Fisheries Division projects that include work on Upper Cook Inlet coho salmon. Costs shown are for the fiscal year 2000 budget (1 July 1999 to 30 June 2000).

| Project Title | Cost (thousands of dollars) | | Description |
|-----------------------|-----------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Total | Coho | |
| UCI Research | \$209.7 | \$31.5 | Research staff salaries, providing data and analyses for management decisions; conducting stock assessment studies; pre- and inseason abundance and run timing forecasting; reporting |
| Harvest Sampling | \$63.5 | \$13.0 | Sampling commercial harvest to estimate age, sex, and size information is used to assess stocks |
| Susitna River Sonar | \$48.6 | \$4.9 | Indexing run timing and abundance in Yentna River through use of side scan sonar and fishwheels (Provides limited information on coho salmon) |
| Fishery Monitoring | \$35.6 | \$7.2 | Collecting commercial catch and effort data; maintaining fish ticket database; initial analyses of harvest data |
| Offshore Test Fishing | \$64.0 | \$3.0 | Sampling salmon entering the district by fishing gillnets from chartered vessel; estimating run timing and abundance (Provides limited information on coho salmon); reporting |
| Total | \$421.4 | \$59.6 | |

**APPENDIX A: EXISTING AND PROPOSED RESEARCH FOR UPPER COOK INLET
COHO SALMON SYSTEMS**

Susitna River Drainage

Existing Program

Harvest Accounting

Sport Fish Statewide Harvest Survey Data Collection and Reporting

Commercial Fishery Studies

Commercial Fish Harvest Ticket Data Entry and Reporting

Central and Northern District Catch Sampling for Age, Sex and Size Data

Escapement Estimation

Deshka - Weir

Yentna - Sonar (Primarily Used for Sockeye Salmon)

Westside Susitna - Rabideux Creek Foot Surveys

Eastside Susitna - Birch, Question, and Answer Creeks Foot Surveys

Wild Stock Assessment

No Spawning Goals Established; Insufficient Information to Conduct Analyses

Hatchery Supplementation and Assessment

No Supplementation Conducted

Proposed Program Enhancements

Harvest Accounting

Sport Fish Telephone/Logbook Pilot Study to Obtain Area Specific Harvest Data

Commercial Fishery Studies

Extend Commercial Catch Sampling for Age, Sex, and Size Data to West Side Set Net Fishery

Commercial Catch Sampling to Recover Coded Wire Tags (May Need to Expand Existing Sampling Program If Susitna River Stocks Marked; See Below)

Escapement Estimation

Yentna River Mark and Recapture Study

Mainstem Susitna/Yentna River Radio Telemetry Study

Yentna River Sonar Technology Evaluation Study

Wild Stock Assessment

Estimate Coho Salmon Abundance in Upper Cook Inlet Using Commercial Catch and Offshore Test Fishing Data

Susitna River Coded Wire Tag Study to Estimate Smolt Abundance, Marine Survival, Harvest Patterns, Total Return, and Exploitation Rates

Knik Arm Systems

Existing Program

Harvest Accounting

Sport Fish Statewide Harvest Survey Data Collection and Reporting

Commercial Fishery Studies

Commercial Fish Harvest Ticket Data Entry and Reporting

Central and Northern District Catch Sampling for Age, Sex and Size Data;

Recovery of Coded Wire Tags from Cottonwood Creek and Eklutna

River Supplementation (See Below)

Escapement Estimation

Little Susitna River - Weir

Fish Creek - Weir

Cottonwood Creek - Weir and Foot Survey

Wasilla Creek - Weir and Foot Survey

Knik River - Jim Creek, McRoberts Creek, Eklutna River Foot Surveys

Matanuska River - Yellow Creek Foot Survey

Wild Stock Assessment

Spawning Goals Established for Five Systems:

Little Susitna - Stock and Recruitment Used; Estimate of MSY Made

Jim Creek - Average Survey Counts Used; No Estimate of MSY

Fish Creek - Average Survey Counts Used; No Estimate of MSY

Wasilla Creek- Average Survey Counts Used; No Estimate of MSY

Cottonwood Creek- Average Survey Counts Used; No Estimate of MSY

Cottonwood Creek Studies (Started 1998)

Coded Wire Tagging to Estimate Smolt Abundance, Marine Survival,
Harvest Patterns, Total Return, and Exploitation Rate (First Marked
Returns 2000)

Increased Foot Surveys to Describe Timing and Distribution (Ended 1999)

Instream Flow and Lake Trophic Investigations to Examine Spawning,
Incubation and Rearing Habitat (Ended 1999)

Hatchery Supplementation and Assessment

Eklutna River Hatchery Coded Wire Tagging (First Marked Returns 2000)

Little Susitna River Supplementation Ended (Last Returns 1996)

Proposed Program Enhancements

Harvest Accounting

Sport Fish Telephone/Logbook Pilot Study to Obtain Area Specific Harvest Data

Escapement Estimates

Examine Relation Between Cottonwood Creek Foot Survey and Weir Counts

Examine Relation Between Wasilla Creek Foot Survey and Weir Counts

Move Little Susitna River Weir Down to River Mile 32.5 to Obtain Counts

Earlier

Wild Stock Assessment

Estimate Coho Salmon Abundance in Upper Cook Inlet Using Commercial Catch
and Offshore Test Fishing Data

Anchorage/Turnagain Arm

Existing Program

Harvest Accounting

Sport Fish Statewide Harvest Survey Data Collection and Reporting

Commercial Fishery Studies

Commercial Fish Harvest Ticket Data Entry and Reporting

Central and Northern District Catch Sampling for Age, Sex and Size Data;

Recovery of Coded Wire Tags from Ship, Campbell and Bird Creek

Hatchery Supplementation (See Below)

Escapement Estimation

Ship Creek - Dam Live Box and Foot Survey

Campbell Creek - Foot Survey

Bird Creek - Foot Survey

Twenty Mile River - Aerial Survey

Placer River - Aerial Survey

Wild Stock Assessment

Spawning Goals Established for Two Systems:

Ship Creek - Average Foot Survey Counts; No Estimate of MSY

Campbell Creek - Average Foot Survey Counts; No Estimate of MSY

Hatchery Supplementation and Assessment

Ship Creek Coded Wire Tagging to Estimate Marine Survival, Total Return,
Exploitation Rate

Campbell Creek Coded Wire Tagging to Estimate Marine Survival, Total Return,
and Exploitation Rate

Bird Creek Coded Wire Tagging to Estimate Marine Survival, Total Return, and
Exploitation Rate

Proposed Program Enhancements

Wild Stock Assessment

Estimate Coho Salmon Abundance in Upper Cook Inlet Using Commercial Catch
and Offshore Test Fishing Data

West Cook Inlet

Existing Program

Harvest Accounting

Sport Fish Statewide Harvest Survey Data Collection and Reporting

Commercial Fishery Studies

Commercial Fish Harvest Ticket Data Entry and Reporting

Central and Northern District Catch Sampling for Age, Sex and Size Data

Escapement Estimation

No Studies Being Conducted

Wild Stock Assessment

No Spawning Goals Set; Insufficient Information to Conduct Analyses

Hatchery Supplementation and Assessment

No Supplementation Conducted

Proposed Program Enhancements

Harvest Accounting

Sport Fish Telephone/Logbook Pilot Study to Obtain Area Specific Harvest Data

Commercial Fishery Studies

Extend Commercial Catch Sampling for Age, Sex and Size Data to West Side Set Net Fishery

Commercial Catch Sampling to Recover Coded Wire Tags (May Need to Expand Existing Sampling Program If Clearwater Creek or Chuitna River Stocks Marked; See Below)

Escapement Estimation

Clearwater Creek - Weir

Chuitna River - Weir

Wild Stock Assessment

Estimate Coho Salmon Abundance in Upper Cook Inlet Using Commercial Catch and Offshore Test Fishing Data

Clearwater Creek Coded Wire Tagging to Estimate Smolt Abundance, Marine Survival, Harvest Patterns, Total Return, and Exploitation Rate

Chuitna River Coded Wire Tagging to Estimate Smolt Abundance, Marine Survival, Harvest Patterns, Total Return, and Exploitation Rate

Northern Kenai Peninsula

Existing Program

Harvest Accounting

Sport Fish Statewide Harvest Survey Data Collection and Reporting

Commercial Fishery Studies

Commercial Fish Harvest Ticket Data Entry and Reporting

Central and Northern District Catch Sampling for Age, Sex and Size Data;

Recovery of Coded Wire Tags from Kenai River (See Below)

Escapement Estimation

Russian River - Weir

Kenai River - Mark and Recapture Study Above River Mile 19 Started 1999

Wild Stock Assessment

No Spawning Goals Set; Insufficient Information to Conduct Analyses

Kenai River Coded Wire Tagging Study to Estimate Smolt Abundance, Marine

Survival, Harvest Patterns, Total Return, and Exploitation Rate

Hatchery Supplementation and Assessment

No Supplementation Conducted

Proposed Assessment Projects

Harvest Accounting

Sport Fish Telephone/Logbook Pilot Study to Obtain Area Specific Harvest Data

Escapement Estimation

No Studies Proposed

Wild Stock Assessment

Estimate Coho Salmon Abundance in Upper Cook Inlet Using Commercial Catch and Offshore Test Fishing Data

Lower Kenai Peninsula

Existing Program

Harvest Accounting

- Sport Fish Statewide Harvest Survey Data Collection and Reporting
- Commercial Fishery Studies
 - Commercial Fish Harvest Ticket Data Entry and Reporting
 - Central and Northern District Catch Sampling for Age, Sex and Size Data;
 - Recovery of Coded Wire Tags from Deep Creek (See Below)

Escapement Estimation

- Deep Creek - Weir

Wild Stock Assessment

- No Spawning Goals Set; Insufficient Information to Conduct Analyses
- Deep Creek Studies
 - Coded Wire Tagging Study to Estimate Smolt Abundance, Marine Survival, Harvest Patterns, Total Return, and Exploitation Rate (Started 1999)
 - Logging Impact Assessment

Hatchery Supplementation and Assessment

- No Supplementation Conducted

Proposed Assessment Projects

Harvest Accounting

- Sport Fish Creel Surveys on Deep Creek, Ninilchik or Anchor Rivers to Obtain Area
 - Specific Harvest Data
- Commercial Catch Sampling to Recover Coded Wire Tags (May Need to Expand Existing Sampling Program, If Ninilchik or Anchor River Stocks Marked; See Below)

Escapement Estimation

- Ninilchik or Anchor River - Weir

Wild Stock Assessment

- Ninilchik or Anchor River Coded Wire Tagging to Estimate Smolt Abundance, Marine Survival, Harvest Patterns, Total Return, and Exploitation Rate

**APPENDIX B: PROPOSED CAPITOL IMPROVEMENT
PROGRAM FOR UPPER COOK INLET COHO SALMON**

PROPOSED CAPITOL IMPROVEMENT PROGRAM FOR UPPER COOK INLET AND KUSKOKWIM RIVER COHO SALMON

The Upper Cook Inlet and Kuskowkim management areas have historically produced substantial runs of coho salmon that support important commercial, recreational, personal use, and subsistence fisheries. Coho salmon spawn in a wide variety of freshwater systems throughout these management areas. Unfortunately, relatively little information is available on coho salmon spawning escapement levels, smolt production, and marine survival for most of these systems. Escapement goals have only been established for a limited number of systems where weirs have been operated or surveys conducted over a period of several years. Most of these escapement goals are based on average counts that seem to sustain harvests rather than on an understanding of the productive capacity of these systems. These proposed projects will improve our knowledge of overall return and escapement by increasing the number of systems for which estimates of coho spawning escapement are available.

Improve Inseason Enumeration of Coho Salmon in the Little Susitna River

Location: Little Susitna River

Primary Objective: Enumerate coho salmon entering the Little Susitna River such that inseason management of fishery objectives can occur.

Description: From 1988-1995 the Little Susitna River weir was situated at river mile 32.5 to facilitate management of the recreational fishery. In 1996, the weir was moved upstream to river mile 70 to address complaints that the weir at river mile 32.5 severely interfered with the coho salmon migration. The change in migratory timing between river mile 32.5 and river mile 70 (approximately three weeks) made inseason management based on weir counts impractical. By moving the weir back downstream to river mile 32.5, this project will improve inseason management by as much as three weeks. It will also allow monitoring of chum salmon escapement, since many chum salmon spawn below river mile 70. This will also provide funding to extend the counting season.

Duration: 3 years

Estimated Annual Costs: Year 1: \$65.0, Years 2 and 3: \$15.0

Support for Cooperative Kuskokwim River Coho Salmon Escapement Monitoring

Location: Kuskokwim River - George and Tatlawiksuk Rivers

Primary Objective: Enumerate coho salmon returning to the George and Tatlawiksuk Rivers

Description: This project would provide additional support to non-profit groups for on-site operational costs of cooperative salmon escapement projects during the coho season, and expand the Department's involvement at two additional sites. Kuskokwim Native Association (KNA)

would receive \$30.0 annually to extend the George and Tatlawiksuk River weir projects through coho season. Such funding is not currently dedicated, and the cooperator has to pursue grant sources. A second component would fund an ADF&G Fishery Biologist I and Fishery Technician II to work at cooperative escapement projects during the coho season.

Duration: 3 years

Estimated Annual Costs: Years 1-3: \$65K

Develop an Index of Total Coho Salmon Abundance Using Commercial Catch and Offshore Test Fishing Information

Location: Upper Cook Inlet

Primary Objective: To develop models using commercial catch and offshore test fishing data to estimate coho salmon abundance to the Upper Cook Inlet management area.

Description: While the Upper Cook Inlet commercial salmon fishery is directed at sockeye salmon, about 350,000 coho salmon, on average, area also harvested. An understanding of the relationship between coho salmon harvests and sockeye salmon management actions could provide valuable inseason information on coho salmon run abundance. This information would help managers make better harvest control decisions. Management of the sockeye salmon commercial fishery has changed greatly over the years, and the time and area open to commercial fishing also can vary greatly within a single season. Coho salmon commercial catches, therefore, are not reliable indicators of overall abundance (i.e. catch may not be proportional to actual abundance)..

Duration: 3 years

Estimated Annual Cost: Years 1-3: \$35.0

Develop a Coho Salmon Enumeration Program on the West Side of Cook Inlet

Location: A tributary to West Cook Inlet

Primary Objectives: Enumerate coho salmon entering one system in West Cook Inlet

Description: There are presently no enumeration projects and no fishery objectives for coho salmon on the west side of Cook Inlet. This program would locate and initiate an enumeration project on one important west Cook Inlet stream. A weir would be constructed (year 1) and operated (years 1-3) to enumerate coho salmon entering one West Cook Inlet stream. If continued and supplemented with a CWT project, a biological escapement goal and fishery objectives could ultimately be developed for this stream.

Duration: 3 years

Estimated Annual Costs: Year 1: \$75.0, Years 2 and 3: \$55.0

Kogrukluk River Resistance Board Weir and Support Facilities

Location: Kogrukluk River, a tributary of the Kuskokwim River.

Primary Objectives: Enumerate coho salmon returning to the Kogrukluk River.

Description: A resistance board weir is needed to replace the existing fixed-picket weir on the Kogrukluk River in the middle Kuskokwim River basin. The resistance board weir can better operate during high water events that often disable the current fixed-picket weir during coho season. A boat survey of the Kogrukluk River would be conducted to locate an optimal site for the new weir. The bulk of this budget request would be used for the purchase of weir material, fabrication, transportation to the site, and installation. Additionally, costs of an outboard motorboat and field housing at the new site are included.

Duration: 3 years

Estimated Annual Costs: Years 1-3: \$40K

PROPOSED CAPITOL IMPROVEMENT PROJECTS FOR UPPER COOK INLET AND KUSKOKWIM RIVER COHO SALMON

| PRIORITY | TITLE | AMOUNT |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 | Improve Inseason Enumeration of Coho Salmon in the Little Susitna River | \$95K |
| 2 | Develop an Index of Total Coho Salmon Abundance in Cook Inlet Using Commercial Catch and Offshore Test Fishing Information | \$105K |
| 3 | Support for Cooperative Kuskokwim River Coho Salmon Escapement Monitoring | \$195K |
| 4 | Develop a Coho Salmon Enumeration Program on the West Side of Cook Inlet | \$185K |
| 5 | Kogrukluk River Resistance Board Weir and Support Facilities | \$120K |
| | TOTAL | \$700K |

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