

SCOR

15

COMMITTEE REPORT

SENATE

FURTHER: Finance

3/11/81

Date: \_\_\_\_\_

Mr. President:

The Committee on RESOURCES has had SCR 15

gathering and evaluation of comprehensive information about salmon stocks in Arctic-Yukon-Kuskokwim management area

under consideration and (a majority of the committee) (the committee) reports it back with the following recommendations:

- do pass  do not pass
- do pass with attached amendments(s)
- replace with CS for SCR 15  same title  
 new title
- and recommends \_\_\_\_\_
- AND attaches a "Letter of Intent"  New Fiscal Note
- reports it back without recommendation
- referred to the \_\_\_\_\_ Committee

MEMBERS SIGNING  
DO PASS

Brad Bradley  
Alan Simon  
Bob Mulcahy  
V. F. ...  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

MEMBERS HAVING  
OTHER RECOMMENDATIONS:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

George Schuckman  
 CHAIRMAN

# Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN  
VIC FISCHER, VICE-CHAIRMAN  
BRAD BRADLEY  
DICK ELIASON  
DON GILMAN  
BOB MULCAHY  
ARLISS STURGULEWSKI



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STATE CAPITOL  
JUNEAU, ALASKA 99811  
(907) 463-3034  
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## Senate

### Committee on Resources

May 6, 1981  
1:30 p.m.

Beltz Room  
211 - Capitol

#### MEMBERS PRESENT

Senator Fahrenkamp  
Senator Fischer  
Senator Bradley  
Senator Mulcahy  
Senator Gilman

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#### Hearing:

- SB 388 An Act relating to the Alaska Commercial Fishing and Agriculture Bank
- SCR 15 Relating to the gathering and evaluation of comprehensive information about salmon stocks in the Arctic-Yukon-Kuskokwim management area.
- SB 249 An Act relating to fisheries information planning and evaluation.
- SJR 43 Requesting the United States Senate to support continuation of the present fur seal harvest quota.

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Rosaleen Moore, Chairman of the Alaska Commercial Fishing and Agriculture Bank, stated that she supported the amendments to SB 388 by the United Fishermen of Alaska.

Pete Argetsinger, General Counsel for CFAB, discussed the issue of auditing CFAB. He stated that the legislative auditors are not bound to keep information confidential, while the banking auditors are covered by very strict federal and state requirements of confidentiality.

Larry Butterfield, Vice President, Spokane Bank of Cooperatives, stated that SB 388 clarifies CFAB's status as a private cooperative, and also, the confidentiality of CFAB's records. He stated that government oversight is necessary to make sure the intent of the original law is being carried out and that the state's investment is protected.

In response to the question, if SB 388 did not pass would you keep loaning CFAB money? Mr. Butterfield, stated that they would keep loaning money to CFAB. He indicated that if CFAB was challenged in court it might be declared a state agency.

Senator Mulcahy put forth the motion to move the amendments to SB 388 by United Fishermen of Alaska.

Senator Mulcahy put forth the following amendments to SB 388: page 4, line 1 delete "may" and insert "shall" in its place; page 4, line 4, between the words "or a" insert "may provide to"; page 5, line 8 starting with the word "However" and delete the sentence to line 11.

Senator Mulcahy put forth the motion to move SB 388 as amended with individual recommendations.

Senator Mulcahy stated that SCR 15 is the result of finding out that alot of information is available in the Departments but there is a need for the gathering and evaluation of comprehensive information about the salmon stocks in the Artic-Yukon-Kuskokwim area.

Senator Mulcahy put forth the motion to move Committee Substitute for SCR 15 with individual recommendations.

Senator Mulcahy stated that SB 249 is the result of find out that it is not easy to gather fisheries information because it is located in numerous locations. The Division of Commercial Fish spends most of its time on management of the fisheries and preparing for the Board of Fisheries meetings. They do not have enough time or employees to gather and put together the information addressed in the bill.

Senator Mulcahy put forth the motion to move CSSB 249 with individual recommendations.

Senator Mulcahy stated that the fur seals in the Pribilof Islands contribute to the economy and provide a subsistence food base. The United States Senate is proposing to cut the annual harvest down to 7800 fur seal. SJR 43 is directed to the U.S. Senate to encourage them to continue the present fur seal harvest quota.

Senator Fischer put forth the following amendment: on page 1 between lines 10 and 11 insert " WHEREAS a reduction of the annual take of adult male seals would endanger the population stability of the Pribilof fur seal herd;" The amendment was accepted.

Senator Mulcahy put forth the motion to move SJR 43 as amended with individual recommendations.

The Committee adjourned at 2:35 p.m.

# Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN  
VIC FISCHER, VICE-CHAIRMAN  
BRAD BRADLEY  
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## Senate

### Committee on Resources

February 4, 1981  
1:30 p.m.

Butro Room  
207 - Capitol

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#### MEMBERS PRESENT

SENATOR FAHRENKAMP  
SENATOR FISCHER  
SENATOR BRADLEY  
SENATOR ELIASON  
SENATOR GILMAN  
SENATOR MULCAHY  
SENATOR STURGULEWSKI

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Hearing: SB 8 Making a special appropriation to the Alaska Power Authority for construction of the Susitna River Hydroelectric project.

SSSB 25 Establishing a power project revolving loan fund in the Alaska Power Authority.

SB 26 Making special appropriations to the power project revolving loan fund of the Alaska Power Authority.

The hearing was teleconferenced to Anchorage, Fairbanks and Mat-Su.

Terry Reikhart, Fairbanks, representing himself, testified on SB 8 stating that the feasibility study is proceeding smoothly. Since Susitna is a major project it is necessary to have as much information as possible before making a decision to proceed.

Patricia Anderson, Fairbanks, a biologist, stated that the Department of Fish and Games needs 5 years to conduct fish and wildlife studies and when completed they will provide good base line data.

Fred Dure, Anchorage, representing himself, stated that he was opposed to SB 8 and that consideration should be given to wildlife.

Chuck Smith, Mat-Su, representing himself, stated that Susitna has been studied for over 40 years that it is time to move on with the project because the area is approaching a power shortage. He indicated that the Alaska Power Authority brochure on Susitna answered all the questions previously raised by the environmentalists.

Kevin Herrin, Fairbanks, representing himself, stated that the feasibility study is needed to determine if the size of the project is appropriate. He indicated that adequate power is needed at a reasonable rate but producing more power was not the solution. He saw the solution as energy conservation.

Vivian Cartwright, Fairbanks, representing herself, stated that the social consequences, of building Susitna, may be high and may disrupt the rural life style of the area. She indicated that the positive points of building the dam are: 1. it would produce cheaper energy for urban areas; and, 2. it would produce short term employment.

Thomas Star, Anchorage, Municipal Light and Power, stated that he was infavor of all three bills. He indicated that it was wise to use non-renewable resource revenues to build useful long term hydro structures. These bills will provide funding for our future energy needs.

Dorothy Jones, representing the MatSu Borough, stated she strongly supported Susitna and all other hydro projects in the State because they are environmentally clean and also a good use of a renewable resource.

Jeff Wilson, Fairbanks, representing himself, stated that it is important to know the potential impacts of Susitna since the river provides fish for the Cook Inlet fisheries. He felt that the feasibility study needs to be completed before a decision was made.

Bob Huffman, Fairbanks, representing himself, stated that he was infavor of all three bills because they will assure that Alaska will have a viable energy future. Hydro is a renewable resource and once the projects are completed they will be virtually inflation free.

David Singlesign, Anchorage, representing himself, stated that the Sierra Club has not taken a position on the Susitna project because they are waiting for the completion of the feasibility study. He further stated that it is logical to study a project of this size in depth.

Bob Lohr, Anchorage, Energy Director RuralCap, stated that he supports the assistant program portion of SSSB 25 and SB 26 because without them the bush communities would be paying

close to 50¢ per KWH.

Jim Booska, Fairbanks, representing himself, stated that the present systems are overloaded and therefore, Susitna is needed as soon as possible. He said that he thought that Snettisham was completed, so what is the appropriation for Snettisham Phase II? (Answered later by Mr. Holdsworth).

Elexis Dvorson, Fairbanks, representing herself, stated that she would like to see the feasibility study completed and was particularly concerned about any potential impact on the Cook Inlet fisheries. She indicated that there were other energy options such as solar energy, and conservation.

Eric Meyers, Anchorage, representing the Alaska Public Interest Research Group, stated that by suppressing the cost of electricity it encourages consumption. He suggested that undue emphasis was placed on electricity when there are other energy needs. He suggested that \$20 million be put into the audit and retro-fitting program.

Nancy Lee, Anchorage, representing herself, stated that the amount of money under consideration may not be needed and suggested that the feasibility study be completed first.

David Lacey, Fairbanks, representing himself, stated he was opposed to SB 8 because it creates a big Golden Valley Electric Authority and big government.

Roxie Paiser, Fairbanks, stated she supported hydro electric projects because there have been changes in Alaska which have increased the need for hydro.

Jeff Bowman, Fairbanks, representing himself, stated he did not believe that the alternatives that are being studied are being given the same consideration as Susitna. He indicated that he thought that smaller projects may be more appropriate.

Doug McIntyre, Fairbanks, representing himself, stated he was opposed to SB 8 because the per capita cost was \$10,000.

3:05 p.m. End of Teleconference.

Phil Holdsworth, Juneau, representing South Eastern Conference, stated that their policy statement #3 on hydro-electric fits SB 25. In reference to the previously asked question regarding Snettisham Phase II, he stated that the funds were to connect Lake Dorothy to the existing plant. The existing plant was built to take an extra turbine and flow from the lake and this comparatively small amount of money will increase the capacity.

Roland Shanks, Juneau, Alaska Environmental Lobby, stated that it is premature to appropriate money to start construction of the Susitna River Hydroelectric Project. That the decision to expend money for the Susitna Project should await the outcome of the studies. He indicated that it may be in the economic best interest of the State to foster an in-state economy based on energy conservation, retro-fitting and smaller more localized hydroelectric projects.

Dave Hutchens, Juneau, Executive Director, Alaska Rural Electric Cooperative Association, stated that there had been some misunderstanding about SB 8 because the Federal Energy and Regulatory Commission requires the feasibility studies to be completed prior to their issuance of a license. But, it is wise while the money is available from non-renewable income to put aside some of it so it can be used if and when Susitna is determined to be feasible. He stated that SB 25 and SB 26 use the revenue from non-renewable resources to finance permanent energy facilities at low interest rates so people across the state can benefit. He indicated that when these projects are completed 7/8 of the people in the state will be on hydro power. He further indicated that it will be years before Susitna is built but it can be funded at today's cost with today's dollars. If it is proven infeasible the money becomes available for other projects in that area. He stated that the reason for such a large project like Susitna is it is economically more efficient.

Senator Jalmar Kerttula, President of the Alaska State Senate, stated that these bills represent a 8 year program. The basic philosophy behind the bills is: that the oil revenues are here today which can be used to build a sound economic base for the future. These projects represent a long term investment in the State's economic future. He stated that now is our chance to put the money aside because if for some reason there is a shortage of funds in the future even the money in the permanent fund will be spent.

Senator Mulcahy put forth the motion to move the bills, with individual recommendations, with an amendment to SB 26 correcting the typographical error on page three, and with a letter of intent with SB 8.

The Committee adjourned at 4:10 p.m.



# Alaska State Legislature

## Senate

### RESOURCES SUBCOMMITTEE ON FISHERIES

JUNEAU, ALASKA

TO: Senator Bettye Fahrenkamp, Chairman  
Senate Resources Committee

FROM: Senate Resources Subcommittee on Fisheries

SUBJ: SCR 15 "Relating to the gathering and evaluation of comprehensive information about salmon stocks in the Arctic-Yukon-Kuskokwim management area."

The subcommittee has taken testimony and replaced SCR 15 with CSSCR 15 and reports CSSCR 15 back to the committee as a whole with the following recommendations.

| Members         |                    | Recommendation                          |
|-----------------|--------------------|---|
| Senator Mulcahy | <u>Bob Mulcahy</u> | <u>No Pass</u>                          |
| Senator Eliason | <u>Al Eliason</u>  | <u>No Rec. Pending</u>                  |
| Senator Gilman  | <u>Dan Gilman</u>  | <u>No Rec. possible<br/>(Amendment)</u> |



# Alaska State Legislature

## Senate

JUNEAU, ALASKA

RESOURCES SUBCOMMITTEE ON FISHERIES

April 29, 1981

### Senate Resources Subcommittee on Fisheries meeting

The meeting was called to order by Chairman Mulcahy at 3:09 PM. All members of the committee were present.

First on the Agenda was SCR 15 "Relating to the gathering and evaluation of comprehensive information about salmon stocks in the A-Y-K management area".

Doug Pope, of the AYK Fin Fish Project testified on SCR 15. He stated that the resolution was a result of work that he and staff had done, and explained what was to be accomplished by the resolution.

SCR 15 was moved with individual recommendations.

Next on the agenda was SB 249 "An Act relating to fisheries information planning and evaluation".

Doug Pope testified on SB 249. He said that the bill came from the same project that SCR 15 came from. He explained the bill to the committee.

Senator Gilman explained some concerns he had with the bill, and proposed amendments to the bill.

SB 249 was moved with individual recommendations.

Next on the agenda was SB 508 "An Act making a special appropriation to the Department of Commerce and Economic Development for a pilot project to finance the Nushagak Fish Producers Coop".

Carl Heyano, Secretary of the Nushagak Fish Producers Cooperative, testified on SB 508. He briefly stated the history and present circumstances of the Nushagak Fish Producers Cooperative, and why he felt they needed funding.

Chairman Mulcahy asked if other attempts had been made to achieve funding, specifically with CFAB or ARRC.

Mr. Heyano stated that Archie Gottschalk could answer that question better.

Archie Gottschalk testified next on SB 508. He stated that attempts had been made to get funding from ARRC, but that they had fallen through.

The meeting was adjourned by Chairman Mulcahy at 3:57 PM.



# Alaska State Legislature

## Senate

JUNEAU, ALASKA

### RESOURCES SUBCOMMITTEE ON FISHERIES

SCR 15

This resolution requests:

1. the Governor to direct the Department of Fish and Game to gather information on identification, enumeration, separation, migration patterns and run timing, escapement, and smolt outmigration of all salmon stocks in the Arctic-Yukon-Kuskokwim management area.
2. the Department of Fish and Game gather information regarding biological effects on salmon escapement from foreign interception.
3. the Department of Fish and Game and the Board of Fisheries initiate and complete an evaluation of information gathered, and report each year to the legislature any gaps in information and the success of in-season management in alleviating resource user and gear conflict, and recommend appropriate action.

# STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

## DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

SUPPORT BUILDING  
JUNEAU, ALASKA 99801

April 1, 1981

The Honorable Frank R. Ferguson  
Alaska State Senate  
Pouch V, State Capitol  
Juneau, Alaska 99811

Dear Senator Ferguson:

This letter is written in response to your March 12, 1981 request for Department assistance in preparation of a fiscal note for SCR 15 (your letter attached). I directed the Commercial Fisheries Division staff to develop a five-year approach or plan to the gathering and evaluation of comprehensive data concerning salmon stocks in the Arctic-Yukon-Puskokwim Region. I directed the staff to consider the projects recommended by Douglas Pope which you provided and to consider the following assumptions as they developed the five-year plan:

- (1) the level of program currently represented in the FY 82 Governor's operating budget request would be continued through the five-year period;
- (2) only a limited number of the countless possible field projects can be implemented over the next few years due to logistic, personnel, and needed quality control considerations;
- (3) an approach to better documentation and utilization of existing data must be identified;
- (4) comprehensive studies keying on: (a) stock enumeration, identification, and migratory patterns and timing; (b) mixed stock fishery problems and solutions; and (c) juvenile salmon abundance must be considered in relation to improving the existing resource and fishery monitoring and management regime; and
- (5) as a general guideline for the number of projects to include while addressing your specific requests, the total cost of the continuation and new proposed program cannot exceed more than one-half of the commercial value of the AYK salmon resource over the next five-years (five-year commercial fishery value is estimated at \$40 million and five-year continuation cost is estimated at \$10 million).

Projects planned for the gathering and evaluation of comprehensive information about salmon stocks in the A-Y-K region.

| Title of Proposal  | Department<br>priority | Duration   | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total Cost |
|--|------------------------|------------|--------|--------|--------|--------|--------|------------|
| Origins of Chinook Salmon Intercepted by the Japanese Mothership Fishery           | High                   | 3 years    | 85.2   | 120.0  | 130.0  | 0      | 0      | 337.2      |
| Stock Biology of Yukon River Chinook Salmon  | High                   | Continuous | 291.2  | 228.1  | 251.0  | 276.0  | 303.7  | 1350.0     |
| Kotzebue Chum Salmon Stock Separation Studies                                      | High                   | 3 years    | 84.6   | 78.1   | 85.9   | 0      | 0      | 248.6      |
| Test Fishing in the North Mouth of the Yukon River                                 | High                   | Continuous | 49.4   | 41.2   | 45.4   | 49.9   | 54.9   | 240.8      |
| Assessment of Salmon Run Size in the Main Stem Yukon and Kuskokwim Rivers by Sonar | High                   | 3 years    | 212.5  | 127.4  | 140.1  | 0      | 0      | 480.0      |
| Horton Sound Salmon Escapement Studies   | High                   | Continuous | 70.9   | 57.1   | 62.8   | 69.1   | 76.0   | 335.9      |
| Sonar Evaluation of Salmon in the Unalakleet River                                 | High                   | Continuous | 129.8  | 37.5   | 41.3   | 45.4   | 49.9   | 303.9      |
| Biometric Analysis of Arctic-Yukon-Kuskokwim Fisheries Information                 | High                   | Continuous | 224.4  | 148.9  | 163.8  | 180.2  | 198.2  | 915.5      |
| Administrative Support for an Expanded A-Y-K Salmon Program                        | High                   | Continuous | 709.9  | 252.9  | 278.2  | 306.0  | 336.6  | 1883.6     |
| Arctic-Yukon-Kuskokwim Region Subsistence Salmon Surveys                           | High                   | Continuous | 49.3   | 54.2   | 59.7   | 65.6   | 72.2   | 301.0      |
| Upper Tanana Chinook Salmon Optimum Escapement Studies                             | Medium                 | 5 years    | 166.0  | 84.6   | 93.0   | 102.4  | 112.6  | 561.6      |
| Kobuk River Escapement Studies   | Medium                 | Continuous | 92.9   | 90.2   | 99.2   | 109.1  | 120.1  | 511.5      |
| Lower Yukon River Juvenile Salmon Abundance Index                                  | Medium                 | 5 years    | 50.0   | 55.0   | 60.5   | 66.6   | 73.2   | 305.3      |
| Eastern Horton Sound Fisheries Monitoring  | Medium                 | Continuous | 53.6   | 59.0   | 64.9   | 71.3   | 78.5   | 327.3      |
| Stebbins-St. Michael Salmon Study  | Medium                 | 3 years    | 35.7   | 32.0   | 35.2   | 0      | 0      | 102.3      |
| Kuskokwim Bay Salmon Tag and Recovery Study  | Low                    | 3 years    | 34.4   | 38.0   | 20.0   | 0      | 0      | 92.4       |
| Yukon and Kuskokwim River Salmon Forecast Study                                    | Low                    | 5 years    | 89.2   | 82.2   | 90.4   | 99.5   | 109.4  | 470.7      |
| Commercial Fishery Gear Selectivity Research                                       | High                   | 3 years    | 0      | 45.0   | 50.0   | 55.0   | 0      | 150.0      |
| Sonar Enumeration of Salmon in the Upper Yukon River                               | Medium                 | 4 years    | 0      | 110.0  | 50.0   | 55.0   | 60.0   | 275.0      |
| Upper Tanana Coho and Chum Salmon Studies  | Medium                 | 3 years    | 0      | 34.5   | 38.0   | 41.7   | 0      | 114.2      |
| Port Clarence Salmon Research  | Medium                 | 3 years    | 0      | 40.0   | 45.0   | 50.0   | 0      | 135.0      |
| Yukon and Kuskokwim Smolt Studies  | Low                    | 4 years    | 0      | 150.0  | 109.0  | 110.0  | 121.0  | 490.0      |
| False Pass Tagging Research  | Low                    | 3 years    | 0      | 0      | 150.0  | 165.0  | 181.5  | 496.5      |
| TOTAL  |                        |            | 2431.4 | 1965.9 | 2156.4 | 1917.8 | 1947.8 | 10,419.3   |

### Origins of Chinook Salmon Intercepted by the Japanese Mothership Fishery

The Japanese Mothership drift gill net fishery operating in the Bering Sea and North Pacific Ocean continues to intercept significant numbers of chinook salmon despite regulations imposed on it. In fact, the 1980 harvest of 704,000 exceeded the combined Alaskan inshore and troll harvest. While one small study indicated that Alaskan stocks are intercepted by this fishery, no comprehensive study has been made. A more detailed understanding of the contribution of Alaskan chinook salmon to the past and present Mothership fishery will permit consideration of high seas interceptions to the inshore management of the resource and will be instrumental in assisting the United States delegation to the International North Pacific Fisheries Commission in requesting time and area closures to protect Alaskan stocks. Specific objectives of this proposal are to: update and summarize existing information on the origin of chinook salmon intercepted by the Japanese Mothership fishery; gather, compile and analyze basic biological data on chinook salmon collected by various agencies during the period 1966-1980; estimate the past and present interception of Alaskan chinook salmon to river of origin whenever possible. The expected cost of this project is \$337,200 over a three-year period and the research would be contracted to scientists presently engaged in similar research at the University of Washington.

### Stock Biology of Yukon River Chinook Salmon

The chinook salmon resource of the Yukon River Basin is a vital segment of the region's economic base and is also heavily utilized by subsistence fishermen. The physical size of the river, multitude of component stocks and nature of the fishery make achievement of optimal sustained yield difficult. Knowledge of the biology of the component stocks would greatly enhance the Department's ability to maximize the harvest while achieving optimal escapements. This study addresses three key areas of research identified as critical to management. First, to continue a pilot study to identify the origin of component stocks (based on scale pattern recognition techniques) as they enter the fishery. Secondly, to determine the age composition and sex ratios of the resulting escapement. Thirdly, to expand the Department's aerial survey coverage of spawning streams. The first year cost of implementing this project is \$291,200 and will require 12 months of permanent employee services and 46 man months of seasonal employee services.

### Kotzebue Chum Salmon Separation Studies

Chum salmon originating in the Kobuk and Noatak Rivers presently support the commercial chum salmon fishery in Kotzebue Sound and subsistence fisheries along these rivers. A major chum hatchery is proposed for the Noatak River. Management will be complicated by the addition of hatchery returns to the commercial fishery, and the absence of a terminal harvest area where discrete harvest and management for these hatchery stocks can occur. The proposed project would establish the timing and migration patterns of Kobuk and Noatak River wild stocks so that management strategies may be developed which conserve

wild chum stocks while fully utilizing surplus hatchery stocks. The project consists of tagging studies and scale pattern analysis, and would require 19 man months of seasonal time annually over a three year period. First year costs total \$84,600.

#### Test Fishing in the North Mouth of the Yukon River

Management of the lower Yukon River commercial salmon fishery is dependent upon the analysis of catch per unit of effort data to assess run strength. Test fishing projects are presently located in the south mouth (Kwikluak Pass) and in the middle mouth (Kawanak Pass) of the lower Yukon River. Significant numbers of salmon also enter the river via the north mouth (Apoon Pass) in some years. In years when this occurs, substantial underestimation of run strength may result in underharvesting of the run. Deployment of a test fishing project in the north mouth will permit more complete assessment of the spatial and temporal abundance of salmon entering the Yukon River. First year project costs total \$49,400 and the project continues indefinitely. Eight man months of seasonal technician time would be required annually.

#### Assessment of Salmon Run Size in the Mainstem Yukon and Kuskokwim Rivers by Sonar

The large silt-laden rivers of western Alaska present problems to effective salmon management because of the inability to visually enumerate escapement. The run strength of chinook, chum, and coho salmon is therefore currently assessed using a combination of test fishing indices and commercial catch statistics. Reliable indices of the total run of each species are possible only after the major segment of the return has passed through the fishery and entered the tributary streams to spawn. Implementation of a sonar enumeration project on the lower portions of the mainstem of these rivers would provide run strength data in the time frame required to assist in daily management decisions. Such a project would greatly enhance the Department's ability to maximize the harvest while insuring optimum escapement.

The 1978 Alaska State Legislature appropriated funds to develop adult salmon sonar enumeration capabilities for large rivers. The Department contracted with Bendix Corporation to develop a "fan scanning" sonar system. Two prototype transducer units and one control unit were received in 1980. The sonar unit scans the water column from the river bottom out to a maximum distance of 50 feet in a fan-shaped arc of 180 degrees. Preliminary testing of the new system occurred in 1980. This proposal requests additional operational funds for comprehensive testing of the fan scanning sonar system in the Kuskokwim River over a three year period.

A second segment of this project is to purchase, deploy and evaluate a shorebased, multiple transducer sonar unit in the lower Yukon river. This unit is different from the fan-scan system in that for a river as large as the Yukon, an estimate of the total escapement is possible. The fan-scan system will provide only indices of abundance on the Yukon. This project will cost \$212,500 the first year and requires an additional 11 man months of seasonal employee services.

### Norton Sound Escapement Studies

The Department relies heavily upon aerial surveys to gather escapement information for the major salmon producing streams in Norton Sound. Two factors make this technique undesirable. First, pink and chum salmon enter the rivers simultaneously, and it is extremely difficult to distinguish between them from the air. This is complicated by the fact that chum salmon are the target species of the commercial fishery. Hence, errors in species identification may lead to over or underharvest of the resource. Secondly, inclement weather often precludes aerial surveys. These problems can be circumvented on two of the principle rivers in Norton Sound by deploying counting tower field stations. The two rivers are the North River (a tributary of the Unalakleet River), and the Nome River. This project will require \$70,900 the first year and 15 man months of seasonal technician services.

### Sonar Enumeration of Salmon in the Unalakleet River

The Unalakleet District (Norton Sound) salmon fishery is based primarily upon harvest of Unalakleet River spawning stocks of chinook, chum, pink, and coho salmon. Present management strategy strives to achieve conservation of Unalakleet River salmon stocks while allowing fishing time commensurate with perceived run size. Salmon abundance estimates are presently derived from catch per unit effort data taken from the commercial fishery and from aerial escapement surveys made during and after the season. Both abundance estimation techniques suffer from lack of precision and lead to the possibility of substantial over or underharvest of Unalakleet River salmon stocks. Aerial surveys have been particularly difficult to accomplish with regularity due to turbid river conditions, inclement weather conditions which often prevail in the area, and the presence of numerous pink salmon, which reduces the precision of aerial estimates for other species present. The objectives of the proposed project are to provide reliable, real-time estimates of salmon escapement by species in the Unalakleet River through sonar technology. This project will result in an improved system of regulatory management which will contribute to optimum sustained production of Unalakleet River salmon stocks. Two new permanent/seasonal employees are required for the project and first year and continuing costs total \$129,800 and \$34,100 respectively.

### Biometric Analysis of Arctic-Yukon-Kuskokwim Fisheries Information

The Alaska Department of Fish and Game has been collecting catch and effort statistics on the salmon fisheries of the AYK Region since statehood. While these data provide the basis for management in most of the region, their value is not being fully utilized. This problem stems from a lack of access to the data in useable form and lack of staff support to analyze and interpret the data base. The proposal addresses each of these needs. The data bases collected on the predominant species taken in each of the primary fisheries of the Yukon River, Kuskokwim River and Bay, Kotzebue Sound and Norton Sound will be coded into a machine

readable form and detailed analysis of the migratory timing will be conducted. This will greatly assist in the development of catch estimation procedures which will assist area managers in maximizing the harvest while insuring adequate escapements. The first year cost of this project is \$224,400 and would require 12 man months of permanent employee time and 32 man months of seasonal employee services.

#### Administrative Support for an Expanded Arctic-Yukon-Kuskokwim Salmon Program

This project is an element of the overall research and management program directed at substantially increasing the Alaska Department of Fish and Game's activities in the AYK Region to improve collection and dissemination of fishery information. The expanded program is composed of 22 major new projects with a first year cost of \$1,721,500 and a total cost of \$8,535,700 over the next five years. These projects call for the addition of five new permanent full-time employees and 251 man months of seasonal employee services. Addition of these new projects will significantly contribute to the administrative workload of the region. In order to meet this demand for supervisory, clerical, budgetary and personnel services the Department has identified a need for: a Regional Management Coordinator, an Assistant Regional Research Supervisor, an Administrative Assistant; and a clerk typist for the regional office in Anchorage. Six man months of clerk typist support for both the Fairbanks and Nome offices is also requested. The second element of this proposal is to provide warehousing, shop and bunkhouse space to support the ongoing and new projects out of the Fairbanks and Nome Area offices. First year cost is estimated at \$719,900 and subsequent continuation cost is estimated at \$229,900.

#### Arctic-Yukon-Kuskokwim Regional Subsistence Salmon Surveys

Annual surveys of the various subsistence salmon fisheries in the Arctic-Yukon-Kuskokwim region have been conducted since the early 1960's to collect and compile catch and effort data. This information has been of extreme importance in documenting yearly trends in harvest and fishing effort. Prior to 1979, these surveys were funded from the Division of Commercial Fisheries budget. In 1979 and 1980, funding was provided by the Subsistence Section. The Subsistence Section did not request funds to conduct these surveys in 1981 (FY 82) because of a change in program priorities. This project proposal requests first year funds in the amount of \$49,300 to reinstate this vital project. Thirteen man months of seasonal technician time will be required to implement this project.

#### Upper Tanana Chinook Salmon Optimum Escapement Studies

Within the Alaskan portion of the Yukon River drainage the Chena and Salcha Rivers of the upper Tanana are the primary producers of chinook salmon. The available data on the escapements to these systems is however limited to aerial survey estimates. This dearth of information makes proper estimation of optimum

escapement imprecise. Determination of optimum escapement for these rivers would greatly enhance evaluation of management practices and contribute significantly to realization of maximum sustained yield from this resource. The primary method by which optimum escapements will be estimated is by relating escapements and subsequent egg deposition to resulting smolt production. Enumeration of adults on the Chena and Salcha Rivers will be by visual observation. Observations on the Chena will be made as the fish migrate through existing flood control gates. A moderately sized weir will have to be erected on the Salcha River. Smolt production will be determined on both rivers with a fyke net enumeration effort. The first year cost of the project is \$169,000 and will require 24 man months of seasonal employee services.

#### Kobuk River Escapement Studies

The chum salmon fisheries of the Kotzebue District are based upon stocks which originate in the Noatak and Kobuk Rivers. Previously, but limited, tagging studies suggest that differences exist in run timing to these rivers. The current management strategy emphasizes commercial harvest of the more abundant Noatak run while attempting to reserve the Kobuk stocks for subsistence. Because no in-season estimates of the escapement to the Kobuk River are available, a very conservative approach must be taken to insure a Kobuk River harvest and escapement. The addition of in-season escapement enumeration would greatly enhance the Department's ability to maximize the commercial harvest while at the same time insuring escapement goals and subsistence harvests. The first year cost of this project is \$92,900, and will require an additional 12 man months of permanent employee time and 6 man months of seasonal employee time.

#### Lower Yukon River Juvenile Salmon Abundance Index

Formal forecasts of the annual run of chinook and chum salmon to the Yukon River are not presently made because of a lack of certain kinds of data. A key element in many salmon forecast models is an estimate of the freshwater survival of the juveniles. This proposal addresses the need to provide information on the freshwater production of lower Yukon River chum and chinook salmon. The objective of this project is to develop indices of juvenile salmon abundance at three key tributary streams in the lower Yukon River drainage, and to develop a model capable of forecasting adult returns based on these and other indices. By constructing relationships of fry production to brood year escapement, the staff will also be able to better estimate optimum escapement levels. This project would greatly assist the processing industry in pre-season logistic and financial planning, and help reduce the risk of either over or underharvesting of the run. First year project costs are \$50,000 and will require 6 man months of seasonal employee time.

Eastern Norton Sound Fisheries Monitoring

Management responsibility for Norton Sound, Kotzebue and Port Clarence is vested in a single area management biologist stationed in Nome. The salmon fisheries in eastern Norton Sound have grown substantially during the past six years. Because of a lack of personnel and the immense size of these areas, only minimal monitoring of these expanding fisheries has been possible. This proposal addresses the need perceived by both the public and the Department to upgrade management activities in eastern Norton Sound. This proposal would provide the funds to establish a new assistant area management biologist position for eastern Norton Sound. This position would compile and analyze data required to effectively manage this expanding fishery. Implementation of this project would cost \$53,600 the first year most of which would be used to support 12 man months of permanent employee services.

Kuskokwim Bay Salmon Tag and Recovery Study

Fishermen in the Goodnews Bay district of the Kuskokwim River management area have petitioned the Board of Fisheries and the Department of Fish and Game to expand the legal fishing district to include waters outside of the Goodnews Bay entrance. This request was made because much of the area currently open to fishing becomes exposed mudflats during the daily tidal cycle. This severely limits the number of adequate fishing sties. The Board of Fisheries had not permitted an expansion of the boundaries because of the possibility that salmon bound for the other areas may be intercepted. The Department of Fish and Game has no information on the origins of salmon which may be intercepted if the boundaries were expanded. In order to determine if boundary expansion would result in significant interceptions, we would propose to conduct a tag and recovery program in the proposed expanded boundary area. The first year cost is \$34,400 and the project requires 9 man months of seasonal employee time.

Yukon and Kuskokwim River Salmon Forecast Study

Forecasts of the annual runs of salmon returning to the Yukon and Kuskokwim Rivers are not currently being made. The Department is rapidly upgrading management and research activities on these river systems and will soon have large data bases from which forecasts can be made. In addition, a substantial amount of information which could be used to make forecasts is available in various Departmental publications. This proposal will provide funding for a staff biologist to: (1) organize the existing data bases and construct computer data files, (2) examine existing data for utility in forecasting and identify critical information gaps, and (3) plan methods by which needed information can be acquired to improve the forecast. The first year cost of this project is \$89,200 and would include 12 man months of permanent employee services and 8 man months of seasonal employee time.

Stebbins-St. Michael Salmon Study

In recent years local residents have expressed interest in developing a commercial salmon fishery adjacent to the villages of Stebbins and St. Michael in southern Norton Sound. The Board of Fisheries has rejected these proposals because it is presumed that local streams do not support stocks of sufficient size to support a commercial fishery and that this fishery would intercept stocks bound for other river systems where they are fully utilized. The proposed research would determine: (1) the abundance and species composition of salmon in the streams which drain southern Norton Sound; (2) the timing and origin of salmon migrating through the nearshore waters adjacent to Stebbins and St. Michael; and (3) the feasibility of establishing a commercial fishery in this area. The research requires four new seasonal positions, would take three years to complete and consists of a tagging study, a survey of local spawning streams, and collection of data from the existing subsistence fishery. First year costs of the three-year project totals \$35,100.

Commercial Fishery Gear Selectivity Study

Mesh size restrictions for Alaskan commercial fisheries have been employed extensively by the Board of Fisheries. The rationale for these various restrictions has been quite complex and has been based upon local area fishery concerns, either biological or socioeconomic in nature. Mesh size in gill nets primarily affects the size of fish captured, regardless of species. Because the age at sexual maturity for males and females varies both between and within chinook, chum, sockeye and coho salmon populations, the actual sex ratio and age class composition of escapements can be significantly affected by the mesh size regulations pertaining to any gill net fishery that the populations pass through. Likewise, any regulation that affects the composition of the effective breeding population of any species may cause long-term changes in the genetic composition of that population and certainly has the potential to alter the long-term yield derived from exploited stocks. However, the Board of Fisheries has not been provided with a comprehensive study of the biological and economic consequences of various mesh size restrictions that might be employed in Alaskan fisheries. In order to provide such a planning document for the Board of Fisheries the Department proposes to gather, compile and analyze new and existing information on this subject over the course of three years. First year cost is estimated at \$45,000.

Sonar Enumeration of Salmon in the Upper Yukon River

Limited aerial survey data suggests that significant spawning populations of Yukon River chinook and chum salmon are located in the Yukon Territory, Canada. Accurate information on the timing and magnitude of the escapement of these stocks would provide fishery managers a valuable tool in regulating the harvest so as to achieve maximum sustained yield. In addition, recent and planned expansion of the commercial fishery at Dawson, Y.T., Canada, requires that the

Department have precise estimates of the contribution of Canadian stocks to the fisheries of the Yukon River. Such information would be of significant value in formulating an Alaskan position during U.S.-Canadian fishery interception negotiations. Estimation of the escapement of salmon into Canada would be made by deploying a specially designed sonar enumeration system near the U.S.-Canadian border at Eagle. The first year cost of this project is estimated at \$110,000.

#### Upper Tanana Coho and Chum Salmon Studies

The upper Tanana River and its tributaries produce significant numbers of chum and coho salmon which contribute to commercial, subsistence and sport fisheries in the region. This study is directed at gathering basic biological information on these chum and coho stocks. Distribution, abundance, and age composition information of the contributing stocks coupled with assessment of egg density and survival would provide valuable information to fishery managers in making regulatory decisions and in assessing subsequent affects of those decisions. The anticipated first year cost of this three year project is \$34,500.

#### Port Clarence Salmon Research

In the Port Clarence management district pink, chum and sockeye salmon stocks are heavily utilized by subsistence fisheries. The sockeye salmon run to Salmon Lake appears to be depressed while pink and chum salmon runs in the same vicinity are healthy. Insufficient data is currently available to implement a stock specific management program which will protect the sockeye salmon resource while permitting harvest of the pink and chum salmon runs. The Department proposes to collect and analyze the data required to develop more stock specific management for this area. Specifically, the Department will collect information on the temporal and spatial pattern and magnitude of the subsistence catches, and escapements of these stocks. The first year cost of this project is estimated at \$40,000.

#### Yukon and Kuskokwim Smolt Studies

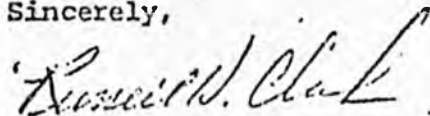
Enumeration of emigrating salmon smolt is used by the Department to forecast future years' returns and as an aid in evaluating optimum escapements in several rivers of the State. Implementation of similar efforts in both the Yukon and Kuskokwim rivers may be useful to accomplish similar objectives for the chinook, coho and chum salmon resources of these rivers. Unfortunately, application of existing technology which was designed for much smaller rivers is not readily applicable to the main stems of the Yukon and Kuskokwim rivers. Because of this problem, the Department would have to either research and develop new methods for enumerating the smolt migrations in the main stems or deploy numerous enumeration sites along key tributary rivers. A careful cost and feasibility study would have to precede any large scale field studies. The Department estimates that first year costs for such a study would be \$150,000.

False Pass Tagging Research

Tagging studies conducted in the vicinity of False Pass show that many chinook, chum, coho, sockeye and pink salmon bound for rivers of Western Alaska pass through this area on their spawning migration. A more complete knowledge of the run timing and migration patterns of the various stocks passing through that area may be useful in formulating improved stock specific management strategies. This project would be accomplished by charter of a large purse seine vessel to capture salmon for tagging in the False Pass Area. Each salmon captured would be tagged and recovery would primarily rely upon returns by commercial fisherman in the Bristol Bay, Kuskokwim, Yukon, Norton Sound and Kotzebue areas. The first year cost of the project is estimated at \$150,000.

I hope this information is useful to you and should you require any further assistance please don't hesitate to contact me. Thank you again for your interest in our program:

Sincerely,



*for* Ronald O. Skoog  
Commissioner  
465-4100

Attachments

'cc: Senator George Hohman  
Senator John Sackett  
Doug Pope  
Ron Lehr  
Steve Pennoyer  
Ron Regnart

Projects planned for the gathering and evaluation of comprehensive information about salmon stocks in the A-Y-K region.

| Title of Proposal  | Department priority | Duration   | Year 1        | Year 2        | Year 3        | Year 4        | Year 5        | Total Cost      |
|--|---------------------|------------|---------------|---------------|---------------|---------------|---------------|-----------------|
| Origins of Chinook Salmon Intercepted by the Japanese Mothership Fishery           | High                | 3 years    | 85.2          | 120.0         | 130.0         | 0             | 0             | 337.2           |
| Stock Biology of Yukon River Chinook Salmon  | High                | Continuous | 291.2         | 228.1         | 251.0         | 276.0         | 303.7         | 1350.0          |
| Kotzebue Chum Salmon Stock Separation Studies                                      | High                | 3 years    | 84.6          | 78.1          | 85.9          | 0             | 0             | 248.6           |
| Test Fishing in the North Mouth of the Yukon River                                 | High                | Continuous | 49.4          | 41.2          | 45.4          | 49.9          | 54.9          | 240.8           |
| Assessment of Salmon Run Size in the Main Stem Yukon and Kuskokwim Rivers by Sonar | High                | 3 years    | 212.5         | 127.4         | 140.1         | 0             | 0             | 480.0           |
| Horton Sound Salmon Escapement Studies   | High                | Continuous | 70.9          | 57.1          | 62.8          | 62.1          | 76.0          | 335.9           |
| Sonar Evaluation of Salmon in the Unalakleet River                                 | High                | Continuous | 129.8         | 37.5          | 41.3          | 45.4          | 49.9          | 303.9           |
| Biometric Analysis of Arctic-Yukon-Kuskokwim Fisheries Information                 | High                | Continuous | 224.4         | 148.9         | 163.8         | 180.2         | 198.2         | 915.5           |
| Administrative Support for an Expanded A-Y-K Salmon Program                        | High                | Continuous | 709.9         | 252.9         | 278.2         | 306.0         | 335.6         | 1883.6          |
| Arctic-Yukon-Kuskokwim Region Subsistence Salmon Surveys                           | High                | Continuous | 49.3          | 54.2          | 59.7          | 65.6          | 72.2          | 301.0           |
| Upper Tanana Chinook Salmon Optimum Escapement Studies                             | Medium              | 5 years    | 169.0         | 84.6          | 93.0          | 102.4         | 112.6         | 561.6           |
| Kobuk River Escapement Studies   | Medium              | Continuous | 92.9          | 90.2          | 99.2          | 109.1         | 120.1         | 511.5           |
| Lower Yukon River Juvenile Salmon Abundance Index                                  | Medium              | 5 years    | 50.0          | 55.0          | 60.5          | 66.6          | 73.2          | 305.3           |
| Eastern Horton Sound Fisheries Monitoring  | Medium              | Continuous | 53.6          | 59.0          | 64.9          | 71.3          | 78.5          | 327.3           |
| Stebbins-St. Michael Salmon Study  | Medium              | 3 years    | 35.1          | 32.0          | 35.2          | 0             | 0             | 102.3           |
| Kuskokwim Bay Salmon Tag and Recovery Study  | Low                 | 3 years    | 34.4          | 38.0          | 20.0          | 0             | 0             | 92.4            |
| Yukon and Kuskokwim River Salmon Forecast Study                                    | Low                 | 5 years    | 89.2          | 82.2          | 90.4          | 99.5          | 109.4         | 470.7           |
| Commercial Fishery Gear Selectivity Research                                       | High                | 3 years    | 0             | 45.0          | 50.0          | 55.0          | 0             | 150.0           |
| Sonar Enumeration of Salmon in the Upper Yukon River                               | Medium              | 4 years    | 0             | 110.0         | 50.0          | 55.0          | 60.0          | 275.0           |
| Upper Tanana Coho and Chum Salmon Studies  | Medium              | 3 years    | 0             | 34.5          | 30.0          | 41.7          | 0             | 114.2           |
| Port Clarence Salmon Research  | Medium              | 3 years    | 0             | 40.0          | 45.0          | 50.0          | 0             | 135.0           |
| Yukon and Kuskokwim Smolt Studies  | Low                 | 1 years    | 0             | 150.0         | 100.0         | 110.0         | 121.0         | 481.0           |
| False Pass Tagging Research  | Low                 | 2 years    | 0             | 0             | 150.0         | 165.0         | 181.5         | 496.5           |
| <b>TOTAL</b>   |                     |            | <b>2431.4</b> | <b>1965.9</b> | <b>2156.4</b> | <b>1917.8</b> | <b>1947.8</b> | <b>10,419.3</b> |



# Alaska State Legislature

Senate

Official Business

Pouch V  
State Capitol  
Juneau, Alaska 9981

March 12, 1981

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

Dear Commissioner Skoog:

Enclosed is a copy of SCR 15 recently introduced by Senator Hohman and myself that requests the Governor to urge the Department to initiate and complete a comprehensive research program in the A-Y-K management area. Also enclosed is a copy of supplemental research projects recommended by Douglas Pope, who is currently finishing his work for the legislature on the A-Y-K Finfish Management and Marketing Project.

The purpose of this letter is to request that a meeting be scheduled between appropriate members of your department, Douglas Pope, legislators and staff to discuss these proposals and to facilitate the preparation of the fiscal note. If you have any questions, please call.

Sincerely,

A handwritten signature in cursive script that reads "Frank R. Ferguson".

Frank R. Ferguson  
Alaska State Senator

## SUPPLEMENTAL A-Y-K SALMON RESEARCH AND MANAGEMENT PROJECT RECOMMENDATIONS

### A-Y-K Salmon Subsistence Use Surveys

When the Subsistence Section was created in 1978, the Commercial and Sport Fish Divisions phased out the annual surveys they had previously conducted of subsistence utilization of salmon throughout the state. However, the Subsistence Section was not funded sufficiently to perform these surveys in addition to performing the functions which were determined to be the highest priority in achieving the objectives of the new section. These surveys are essential in order to provide the Board of Fisheries with an accurate, useful and consistent data base for making use allocation decisions, and should be reinstated. Additions should be made to previous survey methods to provide for (1) summer and late fall surveys and distribution of catch calendars, as needed to obtain use data on all salmon species, (2) employment of local, bilingual technicians to perform interpreting and liaison functions in order to obtain more accurate survey results in areas where language is a barrier to communications between survey personnel and subsistence users, (3) annual coverage of all villages where subsistence fisheries occur, and (4) revision of survey content and approach, utilizing the findings of recent studies of the Subsistence Section. In addition, all data collected should be analyzed to determine estimates of total subsistence use for each village and to determine recent trends in subsistence use patterns. The findings of the survey and analysis should be compiled and presented in a comprehensive, useful annual report that is submitted to the Board of Fisheries to assist them in making use allocation decisions.

### Stock Separation Studies of Bering Sea King and Chum Salmon

Studies should be undertaken to identify streams of origin and migration patterns of discrete stocks of king and chum salmon which are intermingled with Asian stocks in the high seas fisheries of the Bering Sea and north Pacific Ocean. Discrete stocks may be identified using scale pattern or electrophoresis analysis, and migration patterns determined using a tag and recovery program. This project may best be accomplished as a joint state-federal program in which the North Pacific Fishery Management Council provides for high seas sampling and program coordination, to insure that data is useful to the Council in international negotiations.

Biostatistical Analysis of A-Y-K Research  
and Management Data

The Department has collected catch and effort data on subsistence and commercial fisheries and on salmon escapement populations in most areas of the A-Y-K since statehood. However, due to the low level of research funding, unpredictable weather and stream conditions and remote nature of the region, much of the data is somewhat incomplete and is therefore not easily utilized in formulating management strategy. This project would involve a comprehensive analysis of fishery data throughout the region to produce run size, catch and escapement estimates, and determine trends in the composition of the runs, for use in developing management plans. In addition, this research would serve as a tool for planning future research and management projects by identifying critical gaps in the resource information data base.

Yukon and Kuskokwim Salmon Escapement Monitoring Expansion

The current escapement monitoring program, particularly in the upper Yukon and Kuskokwim River drainages, is not sufficient to provide the Department with reliable indices of fluctuations in important spawning populations of king, chum and coho salmon, which are essential to formulation of stock specific management programs in these systems. Present coverage of tributary streams by aerial, boat and ground surveys and sampling of biological characteristics of spawning populations should be expanded, and the survey season should be extended to include data on late spawners. During the expanded surveys, more emphasis should be placed on reconnaissance work to determine effective locations for additional sonar, counting tower and weir escapement sites, as aerial surveys in this region have not produced reliable measures of escapement due to the turbid nature of many streams and unpredictable weather conditions.

Yukon and Kuskokwim Test Fishing Expansion

The data obtained from controlled test fishing projects is essential to developing statistically significant models of salmon runs for use in making in-season management decisions, forecasting, and planning future management strategy. The addition of new test fishing projects in key locations is therefore critical to obtaining the information base that is necessary to improve salmon management capability in the Yukon and Kuskokwim Rivers and in Kuskokwim Bay. In order to avoid excessive capital costs, this program expansion might best be conducted through contracts with local fishermen to provide test fishing services.

### Salmon Smolt Outmigration Studies

Studies should be initiated on both the Yukon and Kuskokwim Rivers to provide estimates of the number of king, chum and coho juvenile salmon migrating to the sea from freshwater rearing areas. In addition, this research would provide information on smolt migration patterns, run timing, age class structure, length and weight. These data are needed by the Department to forecast future adult salmon returns to international and domestic fisheries and to calculate optimum escapement levels.

This project should be incorporated as an ongoing program of the Department, in which initial studies focus on gathering reconnaissance information on run timing, distribution and migration patterns of the various species as well as gathering the necessary information to select key sites for future enumeration projects. Later studies would include collection of smolt for sampling age, weight and length characteristics and eventually sonar counters would be installed at key locations to provide the Department with consistent annual indices of smolt survival.

### Estuarine and Near Shore Marine Salmon Rearing Investigations

Juvenile salmon originating in the Yukon, Kuskokwim and Norton Sound drainages rear in near shore areas of Norton Sound and the Yukon-Kuskokwim Delta during their early marine life. The identification of important marine rearing areas is needed in order to effectively evaluate impacts of planned OCS development in this region. After migration patterns and important rearing areas have been identified, future studies should focus on growth and survival factors for juvenile salmon in these areas. These data will be valuable not only in planning for development, but also in estimating oceanic survival and therefore improving the ability of the Department to forecast future runs.

### Yukon and Kuskokwim River Stock Separation Studies

The Yukon River king and fall chum scale analysis program should be refined, and a similar program should be initiated to identify separate stocks of Kuskokwim River king salmon. In addition, tagging studies are needed to determine the migration patterns of king, fall chum and coho stocks in the Yukon River to utilize findings of the stock identification program in the formulation of stock specific management strategies for domestic fisheries. All stock identification work on these river systems will also contribute substantially to efforts to formulate international management strategies which will reduce interceptions of Yukon and Kuskokwim River salmon in the Bering Sea and North Pacific Ocean.

### Yukon and Kuskokwim Gear Selectivity Studies

The Board of Fisheries is continually presented with proposals to establish new regulations concerning allowable gear types in various subdistricts of the Yukon and Kuskokwim Rivers. However, the Board has not been provided with the necessary information regarding the biological effects such regulations would have on salmon populations, on which to evaluate the proposals. Existing data should be analyzed and additional data gathered, as needed, to determine the selective effects of utilization of set gillnets, drift gillnets, and fishwheels on the biological characteristics of escapement populations of king, chum and coho salmon in the Yukon and Kuskokwim Rivers.

### False Pass and Kuskokwim Bay Tagging Studies

King and chum tagging studies should be conducted in False Pass and Goodnews Bay with recovery in the Goodnews, Kanektok, Kuskokwim and Yukon Rivers to determine the extent to which cape fisheries are intercepting Yukon and Kuskokwim River stocks and to develop the necessary information on the run timing and migration patterns to be used in formulating more stock specific management strategies. Earlier studies conducted in both of these fisheries have yielded useful information that the Department has incorporated into management plans, but further refinement of strategies is needed to maximize utilization of these stocks, while providing for escapement needs.

### Yukon and Kuskokwim King and Chum Forecasts

Forecasts should be developed for king and chum salmon in the Yukon and Kuskokwim Rivers in order to facilitate industry and Department planning and to contribute to international fishery management plans for the Bering Sea and north Pacific Ocean. Collection of the necessary baseline environmental and habitat data on which to base forecasts, including records of air and water temperatures, streamflow and spawning substrate, should be initiated immediately in conjunction with other field research projects in the A-Y-K region.

### Yukon River Mouth Entry Pattern Investigations

The unpredictable pattern of entry of salmon stocks into the three major channels of the mouth of the Yukon River is a problem which has hindered management of this area considerably and has caused great economic hardship to local fishermen in recent years. The factors which contribute to the entry pattern in any particular season are largely unknown. Existing data should be analyzed and additional data gathered, as needed, to formulate a forecasting system for the Yukon River mouth area. This effort

should be coordinated with ongoing studies of oceanographic factors which may influence the entry pattern, and should include additional test fishing and commercial catch monitoring and sampling, as necessary, to obtain baseline data.

#### Kotzebue Sound Chum Salmon Stock Separation Studies

Tagging studies and additional scale analysis studies should be undertaken to determine migration patterns and run timing of discrete stocks of chum salmon from the entrance of Kotzebue Sound to the Kobuk and Noatak Rivers. These data are needed to develop a more precise, stock specific management strategy for the Kotzebue commercial fishery that will ensure protection of the less numerous Kobuk River chum run, which supports substantial, upriver subsistence utilization, while allowing harvest of Noatak River stocks. Development of such a management program is particularly critical to the protection of Kobuk River stocks in light of the planned Noatak River chum hatchery. In addition, a comprehensive tag recovery program in test fisheries and in subsistence and commercial fisheries and spawning areas throughout the Kotzebue Sound area, will add considerably to the Department's data base on the timing and distribution of the area's chum stocks and the degree to which stocks are intercepted in mixed stock fisheries.

#### Kobuk River Escapement Monitoring

The current escapement monitoring program on the Kobuk River should be expanded to provide a more consistent and reliable data base on which to evaluate stock specific management strategies in the Kotzebue commercial fishery. This data base will be particularly important in determining the impacts on Kobuk River subsistence fisheries of harvesting Noatak hatchery stocks in the mixed stock Kotzebue fishery.

#### Unalakleet Fishery Monitoring

Monitoring associated with inseason management of the Unalakleet district, where the major commercial salmon fishing effort occurs in Norton Sound, has not kept pace with the growth of the fishery. Additional management capability and support gear are needed to provide for a more extensive season, expanded coverage and more timely inseason management of the salmon fishery in this district.

### Norton Sound Escapement Monitoring

The current escapement monitoring program in Norton Sound is limited to two counting towers in the Moses Point District (district 3) and annual and ground surveys of about 20 spawning streams. This program should be expanded to include (1) additional enumeration sites on important spawning streams such as the Nome River, where intensive commercial, sport and subsistence use occurs, and (2) early and late season aerial and ground surveys to obtain king and coho as well as chum and pink escapement estimates.

### Southern Norton Sound Escapement Survey

A reconnaissance survey should be conducted to determine estimates of run size and run timing in southern Norton Sound spawning streams to provide the Department with the necessary information to determine whether or not a commercial fishery which utilizes local stocks can be opened in the Stebbins-St. Michael area, without significant interception of Yukon and Unalakleet River stocks. Tagging studies may also be necessary to make this determination.

### Port Clarence Salmon Research

Proper management is hindered in the Port Clarence District due to lack of baseline data on the local salmon populations. The Salmon Lake sockeye run appears to be depressed and may be below threshold population levels due to heavy subsistence use, however, a complete closure of this fishery would result in a closure of the area's chum and pink subsistence fisheries which appear to be healthy, but are intermingled with the sockeye run. Tagging studies, subsistence surveys, sampling of subsistence catches, escapement surveys and sampling of spawning populations are needed to obtain information on the run timing, run magnitude, current levels of utilization and basic life histories of these salmon, in order to formulate a stock specific management program that will permit maximum utilization of chum and pink runs, while protecting the sockeye population. In addition, it should be determined whether the sockeye population is below threshold levels and what, if any, rehabilitation measures will be needed to restore the run to its former levels. This program is envisioned as a joint effort of the Division of Commercial Fisheries and the Subsistence Section.

### A-Y-K Sonar Enumeration Projects

In addition to those projects currently included in the FY 82 Budget Request, the following Sonar enumeration projects should be undertaken in the A-Y-K region:

Yukon and Kuskokwim River Fan Scan Sonar- Inseason management of the salmon fishery in the Yukon and Kuskokwim Rivers has been severely restricted by the inability of fishery managers to obtain accurate, timely estimates of run timing and magnitude in the wide, turbid lower river areas, where the major commercial fishing effort occurs. A highly sophisticated prototype fan scan sonar unit which is capable of providing such inseason management data, was developed by the Bendix Corporation and field tested by the Department in the Kuskokwim River, above Bethel, during the 1980 season. The results of the first field test of this new unit appear to be reliable, however, additional field testing is necessary to determine its precision and limitations. The development and application of fan scan sonar technology is critical for improving inseason management on the Yukon and Kuskokwim Rivers and throughout the A-Y-K, and appropriate measures should be taken to advance its progress.

Unalakleet River Sonar Enumeration- Management of Unalakleet River stocks is currently based on catch per unit effort data from the commercial fishery and late season aerial escapement surveys, neither of which provide sufficient, timely, estimates of run strength for optimum inseason management. Enumeration of salmon escapements, using two side scan sonar units and a boat fishing program to allocate sonar counts, by species, in the lower portion of the main Unalakleet River, would provide the timely, reliable, estimates of salmon escapements that are needed to implement a more precise management system for the district's commercial fishery.

Sonar Project Support Gear- The support gear and personnel needed to adequately conduct sonar enumeration projects throughout the A-Y-K should be provided so that maximum monitoring coverage can be obtained from all units.