MINUTES

BINDER

SEPTEMBER 1978

TENTATIVE AGENDA
INTERAGENCY AQUACULTURE MEETING
SEPTEMBER 27, 1978

Time and Place: 8:30 a.m., September 27, 1978, USFS Regional Office Conference Room, No. 553, Federal Building, Juneau.

Objectives:

1. To define the role of State and Federal agencies and the aquaculture association in relation to the overall Aquaculture picture.

2. To assess the impact of RPA, RARE II, and Forest Land Management Plans and ensuing land allocation decision on Aquaculture programs.

3. To develop guidelines for cooperation and cordination of Aquaculture activities in the State as they relate to national Forest lands.

Agenda:

To be addressed by speakers, are 1) a definitive of their organization's role in the aquaculture scene, and 2) activities during the past year and plans for next year.

8:30 - 9:00	John Sandor, U.S. Forest Service (USFS)
9:00 - 9:30	Ray Clark, USFS; Rai Behnert, USFS
9:30 - 10:00	Harry Rietze, National Marine Fisheries
10:00 - 10:15	Break
10:15 - 10:45	Jack Milnes, S. SE. Reg. Aquaculture Assoc.
10:45 - 11:15	Derek Poon, N. SE. Aquaculture Assoc.
11:15 - 11:45	Bob Roys, Alaska Dept. of Fish and Game (ADF&G)
Lunch	
1:00 - 1:30	Representative, U.S. Fish and Wildlife Service
1:30 - 2:00	Dick Neve, U of W, Fisheries Research Institute
2:00 - 2:45	Open discussion
2:45 - 3:00	Break
3:00 - 4:30	Group develop cooperative approach to Aquaculture programs in Alaska. Discussion leader: ADF&G.

AQUACULTURE POLICY STUDY GROUP MEETING
September 8 1978

Six major areas of concern were chosen to be addressed by the study group. Members were assigned to each area and are to report to the full committee at the next meeting. The six major areas and the members assigned to each are as follows:

I. Clearly define the State's policies on Aquaculture - examine existing statutes/ resolutions/policies - A written draft is to be submitted to the full committee by Bob Burkett and John Sund. They will be assisted by John Williams.

II. Stock Management

A. Mixing of wild and hatchery stocks
B. Returns to common property fishery
C. Harvesting of stocks
D. Site selections
E. Brood stocks

A verbal review will be given by the Department of Fish and Game which will preview the Department's policy manual.

III. Define roles of organization and groups.

A. Capabilities of each group.
B. Agencies that oppose Aquaculture or certain projects.

John Williams will present a written condensation of previously written comments and agency interviews.

IV. Land Use Problems - Land use classifications to be discussed at the October 3 meeting in Juneau with the Forest Service.

V. Cost/Benefit Analysis of Private and State Projects

A. Financing of projects
B. Who should build/operate projects

Armin Koernig will work with the Departments of Revenue and Commerce and Economic Development to present a report to the group. Bob Grogan will assist.

VI. Research Base

A. Research problems
B. Who should carry out research.

No assignment made.

THE STUDY GROUP WILL MEET ON OCTOBER 4th at 9:00 A.M. IN ROOM 417, CAPITOL BUILDING

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Sused

APC Gardiner 9/8/78

morning presentation

Problem & Possible Study Areas

1. Management of stocks
   - A. Mixing of wild & hatchery stocks
   - B. How much of returns to common property fisheries
   - C. Harvesting & marketing of returns
   - D. Brood stock policies
   - ~~E. Site selection~~
2. Defining roles of Organizations & Groups
   - A. Agencies that oppose aquaculture of certain projects
   - C. Research & development
3. Site selection / Land use problems
   - ~~A. Brood stock policies~~
   - B. Land use classification
4. Cost / Benefit Analysis of Private & State Projects
   - A. Who should build them / operate them
   - B. How should projects be financed (level of need)
5. Clear definition of state's policies on aquaculture
   - A. examination of existing statutes / regulations / policies
   - B. social aspect of ~~raising~~ maintaining
   - C.

~~C. Research Base for decision making~~

Problem & Possible Study Areas

1. Management of stocks
   - A. Mixing of wild & hatchery stocks
   - B. How much of returns to common property fishery
   - C. Harvesting & marketing of returns

2. Defining roles of Organizations & Groups
   - A. Agencies that oppose aquaculture of certain projects

3. Site selection / Land use problems
   - A. Brood stock policies
   - B. Classifications

4. Cost / Benefit Analysis of Private & State Projects
   - A. Who should build them / operate them
   - B. How should projects be financed (level of need)

5. Clear definition of state's policies on aquaculture
   - B. examination of existing statutes / regulations / policies

AQUACULTURE POLICY STUDY GROUP

September 8, 1978

Juneau, Alaska

Mission: Format and Direction of Study.

I. Assumptions

1. The private nonprofit legislation is the rea on for existence of the program and its' participating groups. Therefore, it should be a common ground of agreement.

2. Where the legislation is unclear or ambiguous, the study should develop corrective suggestions for changes in statute.

3. Operating from a base of enabling legislation, with proposed corrections as necessary, the Aquaculture Policy Study Group should develop a study outline designed to identify the groups involved, their capabilities, activities, and how these can be ultimately synthesized into a coherent program.

Outline of Study

I. Present Status

A. Listing of groups having aquaculture capability within State

(F.R.E.D., Regional Associations, PNP, University of Alaska, Forest Service, Other).

B. Capabilities of these groups

1. F.R.E.D.

a. biology
b. pathology
c. genetics
d. engineering
e. biometrics
f. administrative
g. interagency coordination
h. management
i. strategic planning

2. Repeat for Regional Associations, PNP, etc.

C. Activities of these groups

1. F.R.E.D.

a. enhancement
b. rehabilitation
c. coordination

d. education
e. other

2. Repeat for Regional Associations, PNP, etc.

II. Description of Alaska Aquaculture Legislation

A. Groups created by enabling legislation

B. Mission(s) delegated by legislation to groups

C. Comparison of activity of each group to that mandated by law

III. Assessment

A. Overlap

1. capability

2. activity

3. legislation

B. Comparative Analysis of Aquaculture Groups

1. capabilities - who has what capabilities

2. legislative - comparison of activity of group to that given it by law

IV. Synthesis

Who should be doing what?

Should relate to activities that are carried out in the context of

(1) overall program objectives

(2) unavoidable interim needs that must be met on a short term basis.

OCTOBER 1978

GENERAL OUTLINE

MINUTES
AQUACULTURE POLICY STUDY GROUP
October 4, 1978

CALL TO ORDER (Attendance list attached)

STUDY REPORT AND GROUP DISCUSSION COVERING THE FOLLOWING SUBJECTS:

STUDY REPORT - John Williams

STATUTES AND ROLES (Chart contents attached)

ADF&G

FRED

REGIONAL PLANNING TEAMS

REGIONAL ASSOCIATIONS

PROBLEM RE: INSPECTION COSTS

PROBLEM RE: LACK OF FUNDING FOR PLANNING

STATEMENT RE: NATIONAL MARINE FISHERIES RESEARCH SUPPORT AND EXTENSION WORK (Bob Simpson)

QUESTIONS RE: DETERMINATION OF REASONABLE HATCHERY COSTS

NEED FOR PROPER MANAGEMENT TO RECOVER HATCHERY COSTS

ADVISED OF BOARD OF FISHERIES HARVEST PLAN

LEGAL AND OTHER PROBLEMS

QUESTION RE: HATCHERY AUTHORITY TO HARVEST

PROBLEM RE: COPYRIGHTS ON FISH

SUGGEST AUDIT OF FRED PROGRAMS AND PERFORMANCE

DISCUSSION OF FRED FUNCTION, PROBLEMS, STATE REGULATION

SUGGESTED POSSIBLE BENEFIT FROM OFFSHORE DRILLING

DOUBLE STANDARD RE: PUBLIC AND PRIVATE HATCHERIES

FRED - NO SYSTEMATIC MANAGEMENT PLAN FOR HATCHERY
PROJECT REVIEW

SITE SELECTION

PROPOSED GOAL STATEMENT - John Sund

AQUACULTURE - SOCIAL, ECONOMIC, BIOLOGICAL CONFLICT
Somerville

CONSTITUTION ON RESOURCES

SUGGESTIONS THAT GOAL STATEMENT INCLUDE: Processing and
Subsistence

OBJECTION TO GOAL STATEMENT - Burkett

NEED FOR ESTABLISHMENT OF PROCESS FOR RECONCILING
COMPETING GOALS

POLICY & PROCEDURES MANUAL OVERVIEW - Dr. Kaill
(Overview attached to minutes)

NEED FOR REGIONAL FACILITY PARAMETERS

REGIONAL PLANNING TEAMS

STATE PLANNING TEAM

APPLICATION OF BOARD OF FISHERIES POLICIES

HATCHERY PROJECTS ON BOND ISSUES

FEDERAL INVOLVEMENT

INVESTIGATE COST BENEFIT ANALYSIS - Doernig and Milnes

INVESTIGATE BASE RESEARCH - Poon

ADJOURN 4:40 p.m.

MINUTES
AQUACULTURE POLICY STUDY GROUP
October 4, 1978

CALL TO ORDER

Chairman Gardiner called the meeting to order at approximately 9:20 a.m. (Names and addresses of those present for the meeting are contained on the attendance sheet appended to these minutes.)

STUDY REPORTS

Referring to the six major areas of concern to be addressed by the group, Chairman Gardiner called for reports on areas of study assigned at the group's previous meeting September 8, 1978 (Study Outline appended to these minutes), advising that John Williams would commence presentation on Item III - Roles of Organization and Groups.

STATUTES AND ROLES

Mr. Williams displayed handwritten charts setting forth the statutes relating to and role analysis of aquaculture throughout the state (Chart contents included as attachment to these minutes), indicating areas of conflict with an asterisk. The last chart displayed by Mr. Williams outlined possible Legal Questions and Other Problems, and Mr. Williams advised he would deal with those areas following discussion of role conflicts.

ADF&G

Referring to the Alaska Department of Fish and Game, Mr. Williams stated that under AS 16.10.443 the Commissioner is responsible for making "every effort to advise and assist in planning and construction" of hatcheries. The statute is vague in that it is up to the Department to decide what "every effort" entails. This is a problem area in that Department function is often in direct competition with private producers.

INSPECTION COSTS

A further problem in the area of Fish and Game was attested to by group member Armin Koernig when he advised of an unfair situation arising for facilities such as Sand Point, located a great distance from Fish and Game headquarters, which must bear costs of inspection such as meals and lodging.

FRED

Referring to his chart for the FRED Division, Mr. Williams advised that AS 16.05.092 states that FRED shall "encourage private investment, all things necessary." The statute

is, again, vague concerning assistance which should be given to private non-profit hatchery programs. Dr. Mike Kaill from the FRED Division agreed that the statute in this area is very ambiguous.

REGIONAL PLANNING TEAMS

Referring to Regional Planning Teams, Mr. Williams stated that the responsibility of the Team is not defined, he further questioned whether the Team is precluded from expanding its membership.

REGIONAL ASSOCIATIONS

Turning to Regional Associations, Mr. Williams advised that the statute charges that Associations be created for enhancement of salmon. The charge is vague and conflicts with FRED authority. Under the Association's Self Role of "enhancement and rehabilitation of salmon stocks," it is unclear just exactly what the Associations can do.

LACK OF FUNDING FOR PLANNING

Statement was made by group member Jack Milnes to the effect that Regional Planning Teams have little or no dollar commitment to their planning operation. The Planning function represents a tremendous charge, but unfortunately shows no dollar return for the time and people that should be specifically committed to working on planning. He concluded his remarks by advising that there is a definite expense to performing the planning function, while actual planning dollars are very small.

SIMPSON NATIONAL MARINE FISHERIES RESEARCH SUPPORT

Group member Bob Simpson from National Marine Fisheries attested to support from Federal research and development products which have universal benefit, i.e., improved incubation to increase survival, or strategy for release which maximizes survival. He further advised that his agency has to avoid site-specific activity, or advice to a particular hatchery; however, Marine Fisheries does make its research known in a format which can be used by all. Responding to a question from group member William Sheridan of the U. S. Forest Service, Mr. Simpson referred to correspondence of March 18, 1976, setting forth and establishing policies for research responsibility, advising that it is difficult not to become involved in site work, but Marine Fisheries research should be directed toward evolution of salmon generally. He further allowed that sometimes it is necessary to go to a particular site to conduct needed study.

Mr. Simpson further stated that Marine Fisheries does extension work to deliver the products of the agency's work, and advised of a problem presently being experienced resulting from a large number of requests for assistance from village groups. The agency only has a dozen people, and while requests are generally for Bill Hurd to come out to the village, the agency does not want Mr. Hurd in the position of traveling all the time. NMF EXTENSION WORK

Questions were raised concerning AS 16.10.450 regarding use of income from the sale of salmon and salmon eggs for payment of hatchery costs and regional association costs, whereafter surplus income "shall" be expended on other fisheries activities of the association. It was felt the statutes do not give a clear portrait of what is to be accomplished. HATCHERY COSTS

Statement was made regarding the Department of Revenue's concern for the 200 million dollar funding authority granted under AS 16.10.500, and the need for definition of "reasonable operating costs." Barbara Sorenson from the Dept. of Revenue responded that some guidelines will be provided by the IRS in that it will be interested in seeing that the hatchery operation remains non-profit. IRS will audit everything and takes a different view from that of enhancement, meaning that if the hatchery does not remain non-profit, it will lose its permit. Group member John Sund advised that the preferable classification for hatcheries under IRA Code 501(C) would be (C)3, adding that in terms of audit, the operator is going to have to show that his costs are reasonable in comparison to other similar operations, thus establishing a criteria for determining reasonable costs.

Statement was made that the problem was not IRS involvement or determination of costs but proper management to recover reasonable costs. Dr. Kaill advised that it was his understanding that after the hatchery has recovered its costs, the fish belong to the fleet. John Williams replied that the statute does not spell out what will happen in this area, and that is a problem the Group must deal with. Chairman Gardiner advised that it appeared the Group must construct a mechanism for management of returning fish. Response was made to the effect that the foregoing represents more of a financing problem. If a hatchery has the right amount of operating capital, it can survive the PROPER MANAGEMENT TO RECOVER HATCHERY COSTS

ups and downs of harvest; it depends upon who controls the spicket and funding. John Williams advised that the Board of Fisheries has moved into this area with a Harvest Plan, so a structure is currently in place. Rita Miller stated that the annual report form is broken down into two parts: one for Fish and Game, and the other for the Department of Revenue, adding that she assumed reasonable cost information would be determined from these forms. John Sund responded that the annual report required by Fish and Game does not represent an enforcing mechanism. Dr. Kaill allowed that the compliance requirement permits the Commissioner of Fish and Game to revoke a license. Mr. Sund replied that while the Commissioner may do so, revocation has nothing to do with the annual report.

DOES ANNUAL REPORT SET FORTH REASONABLE COSTS

Mr. Sund further stated that the Harvest Plan should provide guidelines enabling hatchery operators to establish needs which could be submitted to the Board of Fisheries. Armin Koernig advised that Prince William Sound will be monitored in an attempt to establish standards for escapement which can be used by hatcheries (private non-profit). The standard could then be used as an allocation process for hatcheries. The process is new,and it is yet uncertain whether the mechanism will work.

BOARD OF FISHERIES HARVEST PLAN

Dr. Kaill advised that the above-mentioned processes represent a combined function between the Dept. of Commerce and Fish and Game. He added that Fish and Game is currently working with Commerce to "bring it around," and suggested that a representative from Commerce be included within the Group.

SUGGESTION THAT COMMERCE BE REPRESENTED

John Williams next directed attention to the chart containing Legal Questions and Other Problems, advising that statutes relating to the areas in question are vague and pose interpretative problems. He further asked if it was the Group's wish that these problems be resolved by legislation, mentioning that alternative resolution rests in the courts. The Group concurred with Mr. William's feeling that clarification of the statutes would, hopefully, eliminate the overlap in function.

LEGAL AND OTHER PROBLEMS TO BE RESOLVED BY LEGISLATION

Armin Koernig made reference to the Community and Regional Affairs opinion concerning Regional Authorities, and Mr. Williams referred to Sec. 380, advising that a Regional Authority has political subdivision status.

REGIONAL AUTHORITIES POLITICAL SUBDIVISION STATUS

Derek Poon advised of a problem unique in his region containing a non-active sector. The problem relates to drafting of harvest management plans, particularly relating to Sheldon Jackson, and effective implementation of cost recovery. In Southeast Alaska the fishermen want to be given first opportunity to harvest the fish. An acceptable agreement must be reached from both the point of view of the fisherman and hatchery operators. POON, PROBLEM AT SHELDON JACKSON

Jack Milnes raised a question concerning whether the law addresses the legal authority of the hatchery to harvest fish. While the hatchery has authority to sell fish, it cannot do so without authority to harvest. Also, if the hatchery is not the harvester of these fish, who has such authority? John Sund advised that an opinion has been filed on the above issue, and Dr. Kaill added said opinion was rendered to the Board of Fisheries, adding that the above represents another area involving both Commerce and Fish and Game, requiring coordinated effort and addition of language to the effect that limited entry gear in the area receives first shot at the harvest. MILNES, CAN HATCHERY LEGALLY HARVEST

Armin Koernig attested to the lack of control on copyrights for fish. Existing copyright provisions relating to beach seine are entirely unsatisfactory, and this area presents a real jungle as to what the legislature or the Board of Fisheries means. Mr. Koernig advised that the Group must come to some decision on this issue, adding that he believed it would have to be clearly stated that the hatchery has authority to catch these fish. COPYRIGHTS ON FISH

John Sund advised that a new category of those able to catch fish should be established: (1) commercial fishermen, (2) sport fishermen, and (3) hatchery operators. The present opinion appears to be that a hatchery operator cannot conduct such harvest and must hire someone to perform recapture for him. NEW CATEGORY, HATCHERY OPERATORS

Chairman Gardiner suggested the Group draft a proposal resolving the hatchery harvest problem. Dr. Kaill advised that the Limited Entry Board also poses a problem in that it is not equipped to deal with hatcheries. SUGGESTION, DRAFT HARVEST PROPOSAL

Discussion followed concerning evaluation of FRED programs and performance, resulting in the opinion that outside audits of such programs and the results of said audits should be made available to the committee.

FRED PROGRAM & PERFORMANCE AUDIT

Dr. Burkett advised that he did not know whether failure of the planning function is due to lack of funding, or simply the failure of people to come together and effect the planning function. The function of the FRED Division is to encourage private investment, but FRED is approaching this function in a cautious manner. On the other hand, FRED is watchful for opportunities to bring people into investment in this area, and one of the Division's prime concerns at this time is the development of fish food in the State of Alaska. Dr. Burkett stated that he believes the word "encourage" needs to be more definitely defined, further advising that while the Division can provide advice to individuals interested in building a hatchery in the State, the Division is not a financial advisor or investment house.

FRED FUNCTION

Armin Koernig stated that the FRED Division has had many technical, personnel, etc. problems which have kept it from being as effective as it could be. Statement was made to the effect that an additional problem exists in that FRED is now charged with the task of getting the salmon industry back on its feet. The state is on the low side of the learning curve and trying to draw all facets together. What is needed is an orchestrater to pull these aspects into place. Armin Koernig advised that, at present, the private sector is not free to develop the hatchery industry because of the need to meet state regulations.

FRED PROBLEMS

STATE REGULATIONS

Statement was made that programs to rehabilitate the fishing industry within the state could learn a lot from the oil companies through their offshore drilling operations.

BENEFIT FROM OIL OFFSHORE DRILLING

John Williams advised that he would complete work in his area of study and disseminate a written summary of his findings to committee members.

Derek Poon attested to the existing double standard in policies applying to FRED and hatcheries in the private sector, advising that private facilities are expected to acquire data no other agency must supply.

POON, DOUBLE STANDARD PUBLIC v. PRIVATE HATCHERIES

Chairman Gardiner asked if the above-mentioned apparent double standard results from problems with statutes, regulations, or policy, and Mr. Poon replied that it appears to be a policy problem. Mr. Sund further advised that the previously mentioned annual report is required only of the private sector and not FRED.

Dr. Mike Kaill advised that Swan Lake represents a public facility which is just in the "start up" stage and has been submitted to the Regional Planning Team for review. He further mentioned that some private hatcheries appear to go "through a lot of hoopss" because their projects are experimental and not really representative of situations falling within the double standard problem area. Mr. Koernig advised that the state just doesn't have a systematic management plan to follow when effecting proposed hatchery project reviews.

FRED, NO SYSTEMATIC MGMT.PLAN FOR HATCHERY PROJECT REVIEW

Responding to a question concerning whether FRED is required to adhere to the same rules governing a private hatchery, Dr. Kaill stated that financially it is impossible for FRED to do so because bond issues are involved in FRED projects. Biologically, however, FRED must meet the policies applied to private hatcheries concerning disease control and genetics.

HATCHERIES, DIFFERING FINANCIAL ARRANGEMENTS

Bob Simpson advised that he could anticipate a difference in dealing with private versus public hatcheries, especially regarding surplus fish, and further stated that he did not believe management functions had yet been sufficiently developed to deal with this problem.

Rita Miller attested to a range of problems falling under a general category wherein the state has set in motion a process that pits government against private investment in a competitive function which the government regulates, advising that she was not sure such an arrangement could ever work.

PUBLIC AND PRIVATE HATCHERIES, STATE REGULATION

Chairman Gardiner asked if Department policy is the same for both FRED and the private sector as to site selection and which sites are available. Dr. Kaill advised that such a problem had arisen in Prince William Sound and the state relinquished the site to a private developer. He

SITE SELECTION

further advised that the site goes to the authority most capable of developing a hatchery there. Armin Koernig took exception to Dr. Kaill's statement, advising that his group conducted site surveys in the Sound in 1975, identifying 15 sites. Esther Lake was to be the next project. The state selected this site and his group said no. Now the group is dividing its defined sites between the state and the private sector.

AVAILABILITY OF SITES SUCH AS KLAWOCK TO PRIVATE SECTOR

Chairman Gardiner commenced discussion concerning the Klawock Hatchery and the availability of community services at the site versus prohibitative costs factors surrounding a site such as Dahl Island, asking if a site like Klawock with its attendant amenities would be available for development through a Regional Association. Dr. Kaill advised that he believed such sites were available, stating that at present the planning team is looking at Swan Lake. John Sund referred to a Department policy statement dated October 1974 (to his knowledge not updated or revised), advising that the Klawock Lake site, when measured against current statutes, appears to violate all of them. He further stated that Klawock represents a mix up from the past when planning teams were not yet functioning. He advised that with the teams now operating, perhaps such mix ups can be avoided in the future, adding that it appears the Department has violated its own policies in the past and Mr. Sund questioned whether such violations would continue in the future.

Bob Simpson advised that he had helped write the above-mentioned regulations at a time when hatcheries first began developing in Alaska, adding that the policies state they can be changed as needs change, further advising that with the inception of Regional Planning Teams, circumstances have changed, and the policies are in need of updating although they were proper for the time written.

FINANCING PRIVATE v. PUBLIC

Jack Milnes advised of his concern for financing and its total impact on the state, the state budget, and the private sector. Mr. Sund stated that the financing issue revolves around financing of private versus public facilities and where the funding will come from.

A brief discussion concerning the properties of aquaculture within the State followed, whereafter the committee took a short recess.

RECESS 11:20 a.m.

RECONVENE 11:30 a.m.

Upon reconvening, John Sund proposed the following goal statement for the study group:

PROPOSED GOAL STATEMENT

> A healthy salmon industry, paying its own way, providing employment, return on investment, and pleasure in recreation (sport fishing), by the year 2000.

Referring to "paying its own way," Mr Sund advised that prior to 1968, the salmon industry was the greatest state revenue producer. Since that time, the greatest revenue has come from the oil industry. He further advised that the Group should discuss whether "paying its own way" should include regulation of the industry.

Concerning "providing employment," Mr. Sund advised that such employment involves one of the functions of government which is to provide that which people do not provide for themselves.

Mr. Sund stated that he hoped that by analyzing aquaculture, the group could come up with reasons why and how it could function concerning what should be done for the future, including statutory changes if necessary, creation of new entities, and/or destruction of outdated entities.

IS AQUACULTURE RESOURCE OR PEOPLE ORIENTED

Dr. Burkette advised that he believed the group should approach aquaculture problems from the direction of a resource industry and couch its goal statement in those terms. Chairman Gardiner then asked group members if they wished to view the salmon industry from a resource or a people oriented outlook, adding that he tends to look from a people point of view while the Department takes the resource viewpoint. Dr. Burkett stated that the Department views aquaculture from the philosophy of a healthy resource; nothing else is involved. Armin Koernig advised that in the early days of Alaska, no attention was paid to the resource itself but rather to the economic income of the industry. He felt the committee should attempt to effect a well balanced resource that is a social/economic industry as well. Bob Simpson advised that National Marine Fisheries prefers to see salmon runs enhanced rather than enhancing the industry.

BOTH RESOURCE AND SOCIAL ECONOMIC INDUSTRY

Jack Milnes read Article VIII of the Alaska State Constitution, concerning natural resource policy, advising that the Constitution makes clear that use of the resource be directed toward the people. CONSTITUTION ON RESOURCES

Suggestion was made by Barbara Sorensen that language be included within the goal statement to cover processing within the industry, advising that processing has not heretofore been addressed by state policy. SHOULD PROCESSING BE INCLUDED IN GOAL STATEMENT

Further suggestion was made that provision for subsistence fishing be included within the statement, and Mr. Sund advised he had no objection to the inclusion of subsistence. He further stated that he believed the group needed a statement set within a time frame in order to produce a definite goal against which the group can measure accomplishments. GOAL STATEMENT TO INCLUDE SUBSISTENCE

Dr. Burkett objected to the proposed statement asking when it was decided the group should have such a statement, what the advantages to having one are, and who decided to effect such a statement. Chairman Gardiner advised that the decision had been made at the previous meeting of the group when Dr. Burkett and Mr. Sund were directed to come up with a goal statement. Mr. Sund formulated the wording and put it before the group. Dr. Burkett advised that he assumed the goal statement was going to be tabled as a possible area of pursuit. Dr. Kaill advised that he thought the purpose of the group was statutory clarification, and Armin Koernig attested to the need for a goal statement from which the group could work forward. OBJECTION TO GOAL STATEMENT

A brief discussion followed concerning whether or not there was need for a goal statement, after which the committee recessed for lunch.

LUNCH RECESS 12:05 p.m.

RECONVENE 1:40 p.m.

Discussion resumed concerning the need for a group goal statement, and Dr. Kaill proposed language providing for "optimum yield for the state salmon fisheries," advising that such a goal doesn't really mean anything until the group gets down to its real objectives. KAILL, GOAL LANGUAGE

Sandy Somerville advised that he believed a goal statement to be useful to the extent it would acknowledge that there is both a social and economic system at work here as well as a biological function. It would acknowledge conflicting economic, social, and biological needs, although the resources and needs would vary from region to region. Value judgments would be made by each region to determine how it will proceed in developing its resource, remembering that these economic, social, and biological needs are at odds, and each region must determine what is most important and what comes first. The group must design a process for reconciling competing goals.

SOMERVILLE, SOCIAL, ECONOMIC BIOLOGICAL CONFLICT

GROUP MUST ESTABLISH PROCESS FOR RECONCILING COMPETING GOALS

Mr. Sund read a section from the letter of intent formulating the study group, advising that the directive covers a lot of ground. He further stated that he believed the group could very easily agree on a goal, but he would prefer to have goal areas broken down and measurable against time.

Mr. Somerville suggested that assignments be made for developing goals in economic, social, and biological areas, advising that he felt the Alaska Department of Fish and Game would be in conflict with some of the guidelines the group might establish, adding that the group would have to get a concensus in each separate area. Mr. Sund advised that he would try to include all these areas in his statement citing as an example of Department action the Bristol Bay closure; a biological decision made without regard to economic or social results. He added that he did believe it necessary to set some statement down on paper in order to determine a realistic method for attaining the goal. Mr. Somerville stated that the question would remain as to where the checks rest, who makes the decision to intervene in action taken in the industry, who invests authority to integrate regional plans and reconcile competing interests.

Chairman Gardiner attested to the problem of different types of fishermen fishing the same area within differing time frames, advising that the Department has no method for evaluating its decisions. There should be some guidelines such as those governing Canadian and American catches.

PROBLEM DIFFERENT GEAR FISHING SAME AREA

Mr. Somerville advised that regional plans should make very clear statements of goals in a region where economic, social, and biological needs conflict. They would also define management goals, and goals for economic sharing of the income. The group must acknowledge that it understands the competition between these needs. Chairman Gardiner advised that he felt favorably toward Mr. Somerville's suggestion.

Jack Milnes advised that the goal statement is already in the Constitution of the State, stating that what the group must do is determine how to interpret the Constitution, adding that he was not addressing aquaculture but salmon restoration. Legislature has already been used in this area but it has not sufficiently defined functions. The group needs to start with some specific interpretations of what it is going to do.

SHOULD GOALS BE SET BY REG.PLANNING TEAMS

Dr. Burkett raised a question concerning the area encompassed by the group, advising that some of the previously discussed problem areas are the responsibility of the Regional Planning Teams. He further advised that in the course of operation, goals can change and flexibility is needed, adding that concerning the people and many areas involved, he believed goal determination should be set at the regional level.

FUNDING FOR REG. PLANNIN TEAMS

Mr. Sund spoke to problems with Regional Planning Teams arising from the fact that they are composed of half volunteer participants (fishermen, etc.) and half paid participants (employees of the Alaska Department of Fish and Game), advising that he didn't believe the power to function could be given these people without funding. Apparently funding is provided through Fish and Game which poses a problem in that getting funding out of Fish and Game has proven to be a"disaster." He advised that if the state is going to push responsibility on the Regional Teams, it is going to cost approximately $100,000 to $200,000 per year, per region (approximately $1,000,000 statewide).

Chairman Gardiner advised that Regional Planning Teams would be discussed at a later time and directed group attention back to the pending agenda.

POLICY & PROCEDURES MANUAL OVERVIEW

Dr. Kaill furnished group members his Overview of Policy and Procedures Manual (copy attached to these minutes), advising that such policies have tried to deal with genetic problems of natural versus hatchery salmon.

stated that the policies developed are being reviewed by the Governor's Office. Where the manual really "bogs down" concerns the decision as to who will do what--areas covered by the group in its morning discussions.

Dr. Kaill advised that the outline breaks down into two sections: (1) Private hatchery application and planning process and (2) Compilation of research, education, etc. for planning function. Dr. Kaill proceeded with the following outline review:

1. Application requirements - This refers to the forms, etc. Department has attempted to come close to middle line with new forms.

2. Siting criteria - Taken out of existing policy (1974 policies established by then Commissioner Brooks) and statutes directing management in favor of natural fish.

Rita Miller advised that the outline seemes to be good, but wondered if policies couldn't be better applied by making the outline a salmon aquaculture outline, rather than applying it simply to private non-profit facilities. Dr. Kaill responded that some of the policies have been directed strictly to private non-profit facilities to eliminate funding problems. Mr. Somerville suggested that policies, while making distinctions between public and private, cover both facilities.

COULD POLICIES APPLY ACROSS THE BOARD TO BOTH PUBLIC AND PRIVATE HATCHERIES?

3. Use of natural lakes by private hatcheries - this area relates to salmon stock and genetics, including the manner in which brute stock is taken and minimal samples.

Dr. Kaill advised that the manual represents an attempt to get the policies out for review and receive impact back; it is not in final unchangeable form. Rita Miller advised that again, she didn't see any policies that shouldn't apply "across the board." Dr. Kaill referred to 8, Responsibility for marking and evaluation of hatchery return - advising that this function differs between public and private operators. It is an option for the private operator, but the Department will fund such a function if used at public hatcheries. The

Department has placed special demands on private hatcheries which do not apply to public operations, because public operations are essentially research functions.

Derek Poon suggested that had such policies been in effect and applied to public operations, FRED disasters such as Crystal Lake might have been avoided. He further recommended that the Group address correspondence to Commissioner Skoog, requesting that manual review and release be given highest priority, and private and FRED areas be defined. Chairman Gardiner advised that he would take responsibility for writing Mr. Skoog.

Dr. Kaill apologized for having only a manual overview to present to the committee, advising that he was not at liberty to distribute policies not yet reviewed by the commissioner.

Mr. Somerville advised that he felt intent should be to get a draft of the manual as soon as possible, and review it with Regional Teams for their input.

POLICIES WITHIN U. S. ENVIRONMENTAL IMPACT REVIEW

Barbara Sorensen asked Dr. Kaill if the policies and procedures included within the manual fall within U. S. Environmental Impact review, and Dr. Kaill replied that Environmental Impact review would appear to be the approach the Department is trying to take, but at present it is still "in house."

Chairman Gardiner requested that policies which apply to both FRED and private hatcheries be designated as such. Dr. Kaill advised that transportation of Salmon and eggs and transfer of diseased eggs from one point to another would apply across the board. Regarding marketing and evaluation, program compliance will involve resolution of "reasonable operating costs," and what happens to left over fish. Handling of surplus fish by a private hatchery involves entering into a contract for use of these fish, while such a problem does not exist at public hatcheries because they involve only enhancement.

Derek Poon asked if there is any reason why all of number I, directed toward FRED hatcheries, should not fall under C 2, (Procedures) Application review and approval. Dr. Kaill replied that one problem in effecting the above would be the fact that FRED projects begin as bond issues. He further alluded to state problems with art in public buildings and EEO requirements.

NO RETURN HATCHERIES

John Sund attested to concern on the part of fishermen regarding hatcheries which do not produce return, and a desire on the part of fishermen to comment on where FRED and private hatcheries are to be located. Dr. Kaill responded that all hatchery projects henceforth would be reviewed by Regional Planning Teams.

SURPLUS HARVEST

Chairman Gardiner raised questions concerning the proposed procedures for surplus harvest, advising that such fish can depress the market and cause quality problems.

REGIONAL FACILITY PARAMETERS

Derek Poon advised that he felt one of the things the group should do is look at the Regional facilities and parameters under which they operate, and analyze returns to these hatcheries, been, advising of the poor quality of return at Starigaven, disease, etc.

Dr. Burkett attested to his observation of a movement of many people into the decision making process, advising that while the movement is larger than any single issue, nothing happens quickly.

Armin Koernig advised that he didn't believe FRED had yet made a decision whether program costs will be reimbursed or taken out of the general fund. Barbara Sorensen responded that FRED manages for escapement, not return or absorption of costs.

REGIONAL PLANNING TEAMS

Returning to his Overview, Dr. Kaill advised that policies for Regional Planning Teams are based on the Prince William Sound model of 3 on 3, adding that employees of Fish and Game serve as staff for the planning team. Jack Milnes asked Dr. Kaill if he was aware of prior reservations concerning the 3 on 3 model, asking why the Department had not effected a different balance. Dr. Kaill responded that he was aware of such reservations, but that Fish and Game had objections to balances other than 3 on 3. Mr. Milnes asked who would make the final decision, and Dr. Kaill replied that he believed it would be made by the commissioner.

Concerning II, Regional Comprehensive Salmon Planning, Dr. Kaill advised that the Department has devoted a great deal of time in this area, advising that he didn't know how the manual would come out in this area. Chairman Gardiner asked if statutory changes would still have to be effected here, or would proposed policies, if adopted, be good enough. Dr. Kaill replied that he didn't know how to respond to the above question, advising that the first thing the Group should do is get a legal opinion that will stand up. Mr. Somerville replied that the Group is going to know whether statutes require change after digesting Department comments and interpretation. If there is conflict, legislation might be the only remedy. Dr. Burkett advised that proposed policies cover a lot of new ground and some would have to be applied to determine whether or not they are workable.

WILL PROPOSED POLICIES NEGATE NEED FOR STATUTORY CHANGE?

Concerning II B, Regional Comprehensive Salmon Planning Policies, Derek Poon advised it would be useful to have Department interpretation of the authority contained therein, stating that he has had conversations with management to the effect that Regional Teams are not really going to be that big a part of the overall plan.

PLANNING TEAMS IN RELATION TO OVERALL PLAN

Chairman Gardiner posed the problem of authorities unable to take action when policies are violated, suggesting that a section be established dealing with force and effect of the plan.

AUTHORITIES FORCE AND EFFECT

Derek Poon attested to problems resulting from flow charts placing the State Planning Team between Regional Planning Teams and the commissioner. Dr. Kaill advised that while a State Planning Team does exist, it has not conducted any business, adding that he does not know the intent behind such a team. Mr. Somerville advised that the regional planning concept originally came from the State Planning Team, adding that he believes such a team to be necessary because Department plans function statewide, but its function in relation to the regional teams is unclear. Chairman Gardiner stated that legislative intent was such that the Regional Plans and Planning Teams were to go directly to the commissioner's office. Dr. Kaill advised that he has taken all plans directly to the commissioner. Mr. Somerville advised of his concern that the commissioner

STATE PLANNING TEAM

receive an unedited version of the plan, directly from the Planning Team.

Addressing the scope of regional planning, Mr. Milnes advised that Regions have some very specific feelings about what should be included within their scope, adding that the purpose of the Group is to advise the Department of what the people want, not accede to what the Department wants. REGIONAL SCOPE

Referring to numbers 5 and 6 (Plan development, and Public involvement),Dr. Kaill advised that these policies cover situations in need of clarification, and would allow "chunks" of a plan to be taken care of on an emergency basis, as well as get the public "on track" as quickly as possible. Mr. Milnes asked if policies describe the method for public involvement, and what happens to feedback. Dr. Kaill replied that he didn't believe policies define method, advising he was unable to answer the feedback issue. PLAN DEVELOPMENT PUBLIC INVOLVEMENT

Concerning the Planning Team, Dr. Kail stated that meetings would be called as necessary, and the chairman would serve for that meeting, relinquishing such duties thereafter. A quorum consists of 4, (two from each side) and substitutions must be okayed in advance. Support staff will be assigned to assist Planning Team members and will report back to them. PLANNING TEAM MEETINGS

Derek Poon advised that suggestion had been made that Planning Team meetings coincide with Board of Fisheries meetings, asking if such suggestion has been followed. Dr. Kaill advised that he didn't believe it had been, but didn't see why meetings should not be so scheduled. Mr. Sund advised of problems arixing when meetings do not coincide with staff schedules; Armin Koernig attested to problems arising from designees appearing unannounced at meetings; and Mr. Milnes advised that he believed meeting schedules should remain flexible within each region.

Armin Koernig raised questions concerning reasons why the Department has not followed Board of Fish policies, asking if anyone has ever seen a management plan for Fish and Game. Dr. Burkett advised that everything cannot fall in place at once, adding that he would investigate. Chairman Gardiner asked if it was the BOARD OF FISHERIES POLICIES

Board of Fisheries intent that its policies apply to all facilities, and Mr. Koernig responded that the policies deal with returns to private and public hatcheries.

HATCHERY PROJECTS ON BOND ISSUES

Mr. Milnes advised of a problem arising from the fact that preferred hatchery projects are listed on the bond issue prior to review by Regional Teams. Derek Poon stated that to the best of his knowledge, harvest management plans have to be approved before the project can go ahead, but such requirement does not apply to FRED projects, adding that to his knowledge there is no harvest plan for Snettisham. Again, Mr. Poon attested to existance of a double standard in that when FRED does not comply with requirements, such as a harvest plan, it goes ahead and puts the project on the bond issue anyway, but under the same circumstances a private project would not get its permit.

DOUBLE STANDARD RE: REQUIRE-MENTS

POLICIES TO BE APPLIED TO NEW AND EXISTING FACILITIES?

Chairman Gardiner advised that he would ask (in his correspondence to Commissioner Skoog) if newly established policies would apply to existing as well as new facilities.

FINANCING

Armin Koernig raised questions concerning financing plans and whether they apply to both public and private facilities, and attested to a problem concerning allocation of returning fish to peer groups, advising that an answer in this area will necessitate a political decision by the Board of Fisheries, but it should be addressed and conclusions drawn before hatcheries are built. Regional Planning Teams will have the authority to remove a project from the bond proposal if the fishermen think they will never be able to afford to pay for it.

RECESS 3:55 p.m.

RECONVENE 4:05 p.m.

Upon reconvening, John Williams advised that he would be mailing a written report of his study, together with answers to posed legal questions, as well as a draft of a proposed statutory change making hatchery operators legal harvesters.

Armin Koernig and Jack Milnes will investigate cost benefits of private and state projects reporting on what approaches can be taken by the Group and detailing means to accomplish such analysis. COST BENEFIT ANALYSIS

Derek Poon advised that he would take on area VI, Research Base, and report back at the next meeting. RESEARCH BASE

Jack Milnes advised that federal agencies operating in areas similar to those encompassed within Group review could yield valuable assistance, and John Williams stated he would contact federal agencies to determine if Regional Planning Teams could function within federal areas. Mr. Sheridan advised of a possible functioning problem in that Regional Planning Teams consist of State Department of Fish and Game Personnel as well as regional people. FEDERAL INVOLVEMENT

Dr. Kaill attested to the commissioner's recognition of need for federal participation, advising that the Forest Service is an ex-officio member on teams having forests in their regions.

Mr. Milnes advised that he believed the Group should have a clear understanding that it represents a pilot stage and as such has limits. It needs phased plans and criteria for and method of evaluating each stage of its function.

Mr. Sheridan advised that in reality the Forest Service is kind of on the sidelines, but intends to cooperate to the extent possible once a game plan is worked out.

Responding to a suggestion from Dr. Kaill that Commerce be included within the group, John Williams advised that Commerce currently has study funding, and could upon recommendation, conduct necessary studies.

Chairman Gardiner advised that the Group would meet again in approximately three weeks. Group members will be furnished written notice of such meeting as well as a copy of today's minutes.

The meeting adjourned at approximately 4:40 p.m. ADJOURN

AQUACULTURE POLICY STUDY GROUP

NAME	ADDRESS	AGENCY
Bob Blake	Box 939, Cordova 99574	
Bob Burkett	FRED, Juneau	ADF&G
Don Collingsworth	Subport Bldg, Juneau	ADF&G
Albert Collotzi	Pouch 6606, Anchorage 99502	U.S. Forest Service
Ivan E. Every	Rt 1, Box 970, Kenai	CIAA
James E. Fisher	2221 E. Northern Lights Blvd. Suite 126, Anchorage 99503	USDA - Representative
Terry Gardiner	Box 6092, Ketchikan	Alaska Legislature
Bob Grogan	Pouch WF, Juneau 99811	Legislative Finance Div.
Ernie Haugen	Box 1049, Petersburg 99833	Alaska Legislature
Floyd E. Heimbuch	Box 850, Soldotna 99669	Cook Inlet A.A.
Jack P. Jacobsen	Box 8794, Ketchikan	SSRAN - President
Mike Kaill	FRED Div. Subport Bldg, Juneau	ADF&G, FRED Division
Curt Kerns	3211 Providence, Anchorage 99504	Sea Grant
Armin E. Koernig	Box 191, Cordova 99574	PWSAC
Rita Marie Miller	Box 786, Sitka	NSRAA
J. N. Milnes	SSRAA, 307 Mill #5, Ketchikan	SSRAA
Sig Olson	Box 1628, Juneau 99802	U.S. Forest Service
Derek Poon	Box 786, Sitka	NSRAA
Dick Reynolds	Pouch EE, Juneau 99811	Dept. of C&ED
Bob Roys	FRED, Juneau	ADF&G, FRED Division
John Sandor	Box 1135, Juneau 99802	U.S. Forest Service
Jev Shelton	853 Basin Road, Juneau 99801	NSRAA
Bill Sheridan	Box 368, Juneau 99802	USDA - Forest Service
Bob Simpson	Box 1668, Juneau 99802	Nat'l Marine Fisheries
Sandy Somerville	Smith Tower, Seattle 98104	Martin-Simonds Assocs.
Barbara Sorensen	Pouch SA, Juneau 99811	Dept. of Revenue
John Sund	1285 Tongass, Ketchikan	SSRAA
Ken Thompson	Box 1980, Sitka 99835	U.S. Forest Service
John Williams	Pouch Y, Juneau 99811	Legislative Affairs Agcy.

AQUACULTURE POLICY STUDY GROUP MEETING
September 8 1978

Six major areas of concern were chosen to be addressed by the study group. Members were assigned to each area and are to report to the full committee at the next meeting. The six major areas and the members assigned to each are as follows:

I. Clearly define the State's policies on Aquaculture - examine existing statutes/ resolutions/policies - A written draft is to be submitted to the full committee by Bob Burkett and John Sund. They will be assisted by John Williams.

II. Stock Management

A. Mixing of wild and hatchery stocks
B. Returns to common property fishery
C. Harvesting of stocks
D. Site selections
E. Brood stocks

A verbal review will be given by the Department of Fish and Game which will preview the Department's policy manual.

III. Define roles of organization and groups.

A. Capabilities of each group.
B. Agencies that oppose Aquaculture or certain projects.

John Williams will present a written condensation of previously written comments and agency interviews.

IV. Land Use Problems - Land use classifications to be discussed at the October 3 meeting in Juneau with the Forest Service.

V. Cost/Benefit Analysis of Private and State Projects

A. Financing of projects
B. Who should build/operate projects

Armin Koernig will work with the Departments of Revenue and Commerce and Economic Development to present a report to the group. Bob Grogan will assist.

VI. Research Base

A. Research problems
B. Who should carry out research.

No assignment made.

THE STUDY GROUP WILL MEET ON OCTOBER 4th at 9:00 A.M. IN ROOM 417, CAPITOL BUILDING

STUDY REPORT

STATUTES AND ROLES

ADF&G - Commissioner

16.05.020(2) Manage, maintain, improve, extend.

16.05.050(3) Hatcheries, pipelines, rearing ponds, fishways, other.

* 16.10.400(f) Clarify streams for enhancement in conjunction with comprehensive plan

16.10.420 Approve egg procurement
placement
salmon release
Order egg destruction
Specify hatchery harvest
Approve egg sales

16.10.430 After comment of RPT, revoke permits, Alter conditions of permit

* 16.10.443 Make every effort to advise, and assist in planning, construction, or operation of hatchery within time and resource constraints.

SELF ROLE

* Leadership role in fisheries and aquaculture planning, management, and regulation

Maintain proper spectrum of activities to guarantee financial success of acquaculture without jeopardizing natural stocks or other valued fisheries.

Responsible for having all prerequisite disciplines for salmon rehabilitation.

FRED DIVISION

* 16.05.092 Comprehensive state plan; encourage private investment - all things necessary.

BOARD OF FISHERIES

16.10.221 Generally regulate taking of fish

16.10.440 Regulate take of hatchery fish, implement 400-470

REGIONAL PLANNING TEAMS

* 16.10.375 Subject to Commissioner's approval, develop comprehensive salmon plans, including public and private hatcheries.

Consists of Dept. personnel and representatives of qualified regional associations.

REGIONAL ASSOCIATIONS

* 16.10.350 Enhancement of salmon production

16.10.400 Preference rights to hatchery permits

* 16.10.600 Create regional authorities

16.10.450 Funds use specified

16.10.470 Annual Report

SELF ROLE

Organize regions

* Enhance and rehabilitate salmon stocks

Build and operate salmon hatcheries

Stream Clearance

Provide input to policy makers

Encourage investment

* Fully develop natural production capabilities

PNP's

16.10.400 Receive permits to build and operate salmon hatcheries

16.10.420 Pay for departmental expenses related to examinations

U.S.F.S

Cooperative agreements with Fish and Wildlife Managers

Protect and enhance habitat

Provide for sustained yields

* List known potential aquaculture sites

Facilitate permit granting

Lead in EIS completion

NMFS

Provide scientific and technical support

Cooperative agreements with fisheries managers

Comment on federal permits

EIS comments

U.S. FISH & WILDLIFE SERVICE

?

Game refuges, military lands, Indian reservations

Comment on federal permits

LEGAL QUESTIONS

Non-hatchery enhancement activities of regional associations

Regional authorities (CRA)

Non-departmental or regional association members on RPT's
(USFS, NMFS activities with RPT's)

Scope of regional plans
Force and effect of regional plans.

* (Cost recovery of non-association hatcheries
* hatchery harvest of fish?)

OTHER PROBLEMS

Reasonable operating expense

Information dissemination

Permit Processes

Financing (including state and private investment)

Interaction of federal authorities with regional associations

FRED Evaluation

RPT funding

Overview of Policy and Procedures Manual, in draft, ADF&G

I. Private Nonprofit Hatchery Program

A. Goals

1. Contribution to Common Property Fishery
2. Contributions possible through non association hatcheries.

B. Policies

1. Application requirements
2. Hatchery siting criteria
   - Harvest management consideration
   - Natural stock consideration
   - Consideration for siting
   - Site evaluation
3. Use of natural lakes by private hatcheries
4. Salmon stock genetics
   - Protection of genetic variance
   - Population mixing
5. Control of fish disease
   - Protection of wild stocks
   - Rearing, movement, release of infected fish
   - Stock selection
   - Hatchery practices
   - Chemotherapy
   - Consistency of public and private aquaculture Policies
6. Transportation of salmon and eggs
   - Importation and exportation of salmon and eggs
   - Transplantation of salmon and eggs
7. Basic harvest management plans
   (See Alaska Board of Fisheries Provisional Policy Number: 78-39-FB)
8. Responsibility for marking and evaluation of hatchery returns
9. Program compliance

C. Procedures

1. Preliminary and final applications
2. Application review and approval
3. Operations review
   - Annual report submission
   - Review by RPT, ADF&G Staff, Commissioner of ADF&G
   - Annual report format

II. Regional Comprehensive Salmon Planning

A. Goals

1. Creation of cooperative planning process
2. Development and publication of plan document

B. Policies

1. Scope of regional comprehensive planning (RCP)
2. Roles and responsibilities of Regional Planning Team
   - Role of the RPT
   - Responsibilities in hatchery application review
   - Responsibilities in annual review
   - Responsibilities in development of Regional Comprehensive Salmon plans
3. Composition of the RPT
4. Support RPT

5. Plan development
   Relationship between on-going programming and the development of RCP
6. Public involvement

C. RCP Procedures
   1. Planning team meetings
      Chairman
      Meeting frequency
      Quorum and voting
      Staff support
   2. Plan review and approval

APSC 10/4/78

Proposed goal statement.

A healthy salmon industry, paying its own way, providing employment, ~~and~~ return on investment, and pleasure in recreation, (sports fishing) by the year 2000.

quantify specific strategies.

PROBLEM AREAS DISCUSSED BY THE GROUP

1. Should inspection costs be borne by distant hatcheries?

2. How to alleviate lack of planning function funding.

3. Is there a need to define "reasonable costs" for private hatcheries, or will IRS set standards?

4. Is there need for mechanism for management of returning fish, or will Board of Fisheries Harvest plan cover this area?

5. Need to resolve copyright problem on fish?

6. Need to alleviate problem arising from government and private sector in competing industry regulated by government. Is there a double standard when applying regulations between public and private facilities?

7. Site Selection - Are desirable sites equally available to both public and private sector?

8. Should acknowledgement and resolution of social, economic, biological conflicts within the industry be resolved at Regional level?

9. Can a hatchery legally harvest fish? - Williams to draft proposed legislation.

10. Will proposed policies and procedures apply "across the board" to private and public facilities?

11. Will adoption of policies and procedures manual negate need for statutory change?

12. What is position of Regional Planning Teams in relation to State Planning Team?

13. Do Board of Fisheries policies apply to all facilities?

14. Are proposed policies and procedures to apply to new as well as existing facilities?

SUGGESTIONS MADE BY THE GROUP

1. A representative from the Dept. of Commerce be included within the study group.

2. FRED programs and performance be audited and a copy of the audit report furnished the study group.

3. Need for a goal statement and evaluation process.

4. Need for federal and regional team interaction.

NOVEMBER 1978

11/1/78

NOTICE OF MEETING

THE NEXT MEETING OF THE AQUACULTURE POLICY STUDY GROUP WILL BE HELD WEDNESDAY, NOVEMBER 29, 1978, 1:00 P.M. in ROOM 421, STATE CAPITOL BUILDING (House Finance Committee Room), JUNEAU, ALASKA. YOU WILL RECEIVE AN AGENDA LATER THIS MONTH.

Terry Gardiner, Chairman
Box 6092
Ketchikan, AK 99901

MINUTES
AQUACULTURE POLICY STUDY GROUP
November 29, 1978

Chairman Gardiner called the meeting to order at approximately 1:30 p.m. (Names and addresses of those present for the meeting are contained on the attendance sheet appended to these minutes.) CALL TO ORDER

He advised that he believed group effort should be directed toward solutions for aquaculture problems rather than further discussion of problem areas and submitted a five-item agenda for group review (copy of agenda and appended material attached to these minutes). AGENDA He further advised that review of matters scheduled on the agenda would commence with Item No. 5 (Review of proposal by Miller and Associates in regard to a financial analysis of salmon aquaculture), and that Item No. 4 would not be discussed during the meeting due to the absence of John Williams from the Juneau area. MILLER AND ASSOCIATES

Concerning Item No. 5, Chairman Gardiner advised that all group members should have received a copy of the financial analysis prepared by Miller and Associates. He stated that Mr. Miller had not been hired to perform the analysis but through contact with the Chairman unrelated to group efforts had expressed a desire to submit a proposal for review--that is where the proposal originated.

Armin Koernig advised that he had primarily been working on a preliminary assessment concerning what should be accomplished by the group in the socio-economic area, stating that the group must formulate: KOERNIG SOCIO ECONOMIC AREA

1. A clear statement of problems encountered in both public and private sectors.

2. Investment capital needed for both public and private facilities.

3. Economic analysis of the enhancement effort to provide the industry direction in the future, hopefully providing answers to some of the following questions:

   a. How much should be invested (privately and publicly)?

b. How is funding going to be invested?

c. How much is it going to cost to produce fish?

d. Who is going to benefit from these fish?

Mr. Koernig attested to the unavailability of figures satisfying the above questions from state agencies, advising that he believed the group should solicit assistance from consulting financial experts. Mr. Koernig questioned how long the general public would be willing to continue to invest in public and private hatcheries if such projects are not able to demonstrate beneficial return on the investment. Mr. Koernig concluded his statement advising that he believed everyone recognizes that aquaculture needs to secure some data in order to evaluate where it should be going.

Derek Poon stated that the group needs to identify what kind of questions it should be asking concerning socio-economic benefits behind the 1.3 million dollar investment, advising that the group should have before it several proposals for study.

Mr. Milnes suggested that the group consider as an additional social goal the understanding that the system should pay its own way. Mr. Koernig advised that Mr. Milnes' suggestion raised an additional question for group consideration: Is there a benefit to a subsidized system? Analytical work would determine whether it is possible for the system to pay its own way or whether a subsidy is necessary plus give insight to such questions as:

1. Should needed funding come from the Renewable Resource Fund?

2. General Fund?

3. Fisheries Fund or other sources?

4. How can the state more wisely use its resources through enhancement to produce benefits.

Chairman Gardiner, referring to figures furnished him by Jay Hogan, advised that last year the state's budget amounted to 1 billion 71 million dollars while revenue amounted to 1 billion 5 million dollars (the state brought in 66 million dollars less than it spent). Revenue for the coming year is anticipated at 1 billion 21 million dollars. The fact that the state has not experienced a budget increase of less than 13% in the last few years would indicate that if the state has new facilities coming on line this year, such facilities are coming "out of someone's pocket." There are no surplus state funds available for loan. Mr. Gardiner advised that financial problems are not matters of concern for regional groups alone but pose a statewide problem and constitute valid reason for formulating concrete financial plans.

STATE BUDGET DEFICIT

Mr. Koernig agreed with Chairman Gardiner, advising that while the private sector of the economy is characteristically identified with profit, the 3 million dollar loan fund for construction of facilities is not sufficient for private needs. The state cannot continue to invest money without a system of checks and balances provided by financial planning, demonstrating economic justification. If the group proposes to raise the loan limit from 3 million dollars to 6 million dollars, it must be able to prove that such a raise is feasible. The group needs definite proof for both the legislature and the general public to establish cost benefits. The group should have a financial plan that maps out investment strategy for the next 20 years.

NEED FOR FINANCIAL ANALYSIS

Mr. Frank Orth of Earl R. Combs, Inc. raised questions concerning the group's intent, asking:

MR. ORTH

1. Does the group want to hire a consultant to evaluate the technical aspects of enhancement, or

2. Does it wish to go backward and have assistance in developing a strategic plan for salmon enhancement.

He further advised that he believed it would be better for the group to go backward and develop the strategic plan. The group should define its planning needs, allow consultants to bid on providing such a plan, and following verbal proposal presentation by interested consultants, the group should hire the necessary work done. Mr. Orth concluded his

statements, advising that should the group decide to have a technical analysis performed, it would be of no value without a strategic plan.

Dr. Burkett stated that he didn't believe going backward would improve the present situation, advising that he believed the group should simply consider what is presently being done and move foreward from that point.

Derek Poon advised that he had understood Mr. Orth to mean, when suggesting the strategic plan, that formulation would commence from the status quo. Mr. Orth replied that Mr. Poon's understanding was correct and that "go back" had been a poor choice of words. He further advised that the original enhancement plan was a political plan which did not take into consideration many "real world issues," advising that the group should, beginning from its present position, develop a plan for the future.

Dr. Davis from the Alaska Department of Fish and Game stated that he believed the planning function to be the responsibility of regional teams, and Mr. Orth responded that he didn't believe regional plans could function without a statewide plan, advising of institutional conflicts within regions which he didn't believe the regions could overcome at this time.

Mr. Floyd Heimbuch advised that he believed statewide aquaculture groups were in need of a plan justifying requests for salmon production, and Barbara Sorenson stated that she believed what the group should do is evaluate what is in place now and determine what it means economically for both state-operated and private sectors, evaluate production in terms of who benefits, and from that analysis come up with a plan.

Derek Poon recommended that Mr. Orth be requested to provide recommendations for planning, and present such ideas to the group, adding that the group needs to agree that such a proposal is valid. Dr. Burkett inquired concerning time and money constraints upon Group activities, and Chairman Gardiner responded that the Group only has one hundred thousand dollars to spend, adding that if the Group intends to act during the upcoming legislative session, it doesn't have much remaining time.

Mr. Orth again attested to the need for a planning process rather than economic analysis containing no plan into which analysis figures could be plugged.

NEED FOR SUBSIDY?

Mr. Curt Kerns raised questions concerning methods for making enhancement costs appear in the cost of the product, and Armin Koernig attested to the need for determination of:

1. Whether a subsidy if needed.

2. To what degree it is needed.

3. Who pays the bill.

He added that aquaculture to date has spent too much time on biology; it is not tome to take a look at the economic side and force work in this area to catch up with biological work.

Derek Poon stated that he believed the group should:

1. Agree that it needs to get a financial handle on the social economic side of enhancement.

2. Define the scope of the work and get an analysis everyone can understand.

Chairman Gardiner advised that the group has already defined six study areas to which it intends to devote substantial effort, and Mr. Orth set forth the following process for obtaining necessary financial analysis:

1. Prepare a statement of the work to be performed.

2. Contact sources capable of performing such work, requesting that they furnish proposals.

3. Obtain proposals in a timely manner for review by the group.

4. Select outstanding proposals and have consultants make verbal presentation before the group.

5. Select consultant.

Ken Leon spoke to the inability of consultants, without first hand knowledge of private and public sectors performances, to evaluate the economic future and provide

direction, adding that he did not believe enough cycles had elapsed in either the private or public sector from which data could be compiled.

Chairman Gardiner directed Armin Koernig and group members of Mr. Koernig's choosing to define proposed analysis areas and get them down on paper for the purpose of hiring a consultant.

KOERNIG TO DEFINE FINANCIAL ANALYSIS NEEDS

Group attention was next turned to Agenda Item No. 1 (Presentation on salmon aquaculture research, coordinated by Derek Poon). Mr. Poon advised that R & D emphasis should be in proportion to the value of the resource. He then set forth a brief survey of yearly rates of fry return at Sheldon Jackson, Auke Bay, and Little Port Walter, attesting to the need for correlation between what is released and what returns. He further stated that under an Oregon program, existing since 1968, returns have been .2 to .5%, while FRED Division coho returns in Southeast Alaska have been well under 1.% although the projected economic calculation is 10%.

POON AQUACULTURE RESEARCH

Mr. Poon stated that aside from economics, biology is what is going to actually accomplish enhancement, attesting to the need for:

1. Management of enhancement.

2. Management of existing stocks.

3. Increased rate of return.

He advised that the goal of researchers is to take raw data and communicate significant data to interested parties, both public and private.

Mr. Poon further attested to the tremendous diversity of aquaculture resources, and set forth the following areas of need:

1. Need for management of natural stocks. Such management is particularly difficult in Southeast because of mixed stocks. The state does not have enough information on management of natural stocks.

2. There is little information on life history research.

3. Understanding of mortality rate on salmon is very low.

4. Need applied research in aquaculture technology.

Mr. Poon distributed to Group members copies of a Canadian publication relating to:

1. Inability to determine where enhancement is justified.

2. Utilization of single stocks or mixed stocks, adding that single stock approach should be modified to cover all enhancement.

3. The fact that the purpose of aquaculture is increase the overall benefit.

Mr. Poon concluded his remarks advising that R & D support is very important to aquaculture, adding that he hoped his presentation has put it in proper perspective.

WILLIAM HEARD

William Heard of National Marine Fisheries advised that the basic objective of research conducted through Marine Fisheries is to develop Alaska's fishing resources. He stated that his agency currently operates its main facility the Auke Bay Laboratory (established in the late 1950's) and two aquaculture field stations, one at Auke Creek (a small scale incubation facility) and a more extensive facility at Little Port Walter.

Mr. Heard directed Group attention to Item No. 2, in the black binder (copy appended to these minutes) prepared by John Williams, setting forth Marine Fisheries' role in aquaculture within the state. In addition, Mr. Heard distributed to group members NMFS Current Year Task Plan and a bibliography of publications related to salmon aquaculture research activities of the Auke Bay Laboratory dated November 29, 1978. (Task Plan and bibliography attached to these minutes)

Mr. Heard advised that Marine Fisheries deals with research and is not responsible for management. Its second most important function, after research, is publication and dissemination of information, accomplished through work shops, seminars, college-to-college discussions and conferences, technical society involvement, etc.

Mr. Heard attested to lack of increased funding for research resulting from President Carter's veto of aquaculture programs. He added that all new fishery developments

within the state represent research, and Marine Fisheries is in the R end of R & D. Marine Fisheries has developed a clearing house concept in order to keep up on what's being done within the state. It is also attempting to document the early days of aquaculture in Alaska to the turn of the century. He concluded his remarks stating that Marine Fisheries solicits advice from its constituents.

Jack Milnes raised a question concerning the leverage of biological research upon the total aquaculture budget, and Mr. Heard replied that R & D represents approximately 2 to 3% of the total 300 million dollar budget. RESEARCH LEVERAGE

Responding to questions concerning criteria for initiating research projects, Mr. Heard advised that Marine Fisheries' primary function, within its constraints and guidelines, is to perform research projects in areas in which information is most needed.

Mr. Ray Hadley with Sea Grants at the University of Alaska attested to constraints placed upon his area of research within the University, advising that groups such as the present Group on Aquaculture supply the leverage for undertaking projects. In addition, the University needs group backing for legislative financing to acomplish requested projects, and publish results upon completion. HADLEY SEA GRANTS

Mr. Curt Kerns with Sea Grants at the University in Anchorage advised of the use of questionnaires to solicit areas of needed research, and reiterated Mr. Hadley's request for support before the legislature for research financing.

Mr. Heard advised that the Auke Bay Laboratory is currently experiencing its second year of increased salmon research funding in seventeen years, advising that the increase was a direct result of Alaskan aquaculture groups working through Alaska's congressional delegation in Washington. Mr. Heard added that during the past five or six years, Marine Fisheries has had an important level of support from the Alaska Department of Fish & Game in the area of combined funding projects.

Ken Leon from the FRED Division of the Alaska Department of Fish & Game advised that the Department's efforts are almost totally directed toward production. He LEON ON FRED

next read a list of species, locations, and categories of research conducted by the Department. Mr. Leon attested to areas of greatest Departmental thrust such as incubation, loading density of hatchery space, subgrade development from gravel to astro-turf, etc., displaying a graph portraying world progress in incubation knowledge resulting from applied research. In addition, the Department is working on such projects as suitability of glacial water in rearing, short term rearing, heated water for rearing chinook and rearing of species in water temperatures differing from normal environment.

The Pathology department is working on vaccines against disease as well as fungus control, and currently has vaccinated fish returned to salt water where the vaccine will hopefully prove beneficial.

Mr. Leon further advised that the Department is attempting to develop a system of data collection and processing in which information would be available via computer terminal for retrieval statewide. FRED DATA COLLECTION

Mr. Koernig attested to the need for annual reports from the Department's fifteen facilities, and Derek Poon asked if a listing is available detailing information and programs accessible to groups on aquaculture, and Dr. Burkett distributed a listing of FRED Research (copy attached to these minutes). KOERNIG AND POON ON NEED FOR ANNUAL REPORTS

Chairman Gardiner questioned Mr. Leon concerning the Department's data processing system and the data to be computerized, and Mr. Leon advised that the Department intended to arrange information in such a way that when a species is selected, one may determine what is available on it, what results various facilities have accomplished, etc. Derek Poon advised he would rather see the actual reports from the facilities. Dr. Burkett advised that with the number of facilities and amount of information available the Department needs some type of data storage and retrieval system--a good information system.

Chairman Gardiner next directed Group attention to Agenda Item 2 (Review of Aquaculture Policy Manual recently distributed by ADF&G), and Joe Davis advised that approximately 80 copies have been distributed, indicating a great deal of interest in the industry. ADF&G AQUACULTURE POLICY MANUAL

He further stated that the Department intended the draft to serve as the basis for proposed policies and procedures, allowing everyone to look at it and make recommendations. The Department is taking a

very cautious approach in this area where there is a definite need for policies, but where the program is evolving so quickly, perhaps policies and procedures should not be too set.

Mr. Davis warned of inconsistencies in the draft, advising that some editorial changes were accomplished following copying, adding that the Department would like to receive all comments by January 31, 1979, and that comments should be sent directly to him. The Department will prepare a summary of comments which will be available to all and a copy forwarded to the Commissioner. If all comments are received by the 31st, the Department hopes to have a final draft in early spring, and the Department anticipates upgrading the manual annually.

POLICY DRAFT RECOMMENDATIONS DUE 1/31/79

Mr. Davis, speaking to procedures dealing with annual reports and the concept of regional planning teams, advised that the Department does not know whether these areas will work until they have been tried.

Mr. Koernig inquired concerning whether the Department is totally satisfied with the draft or whether there is debate and controversy within the Department. Mr. Davis advised that there is a certain amount of controversy but no real opposition. Mr. Koernig expressed concern that certain areas of the manual do not meet regional corporation intent and inquired concerning the method for having regional wishes included as state policy.

Chairman Gardiner advised that the group's intent is to review the manual and as a group come up with recommendation for the Department. Dr. Kaill stated that many of the policies within the manual are not new but existing statutes, while others were standing policies established by Jim Brooks. Some were implied policies which have now been set forth for the first time, and some are new policies.

Chairman Gardiner directed that Group members review the manual and submit objections to specific areas in writing, such written form to include be a recommendation as to how the policy should be changed.

Armin Koernig inquired concerning what effect the group's recommendations would have upon policies and procedures, and Dr. Burkett replied that he did not

know, advising "we will have to wait and see." Chairman Gardiner stated that goup recommendations could also be taken to the legislature for implementation and have equal opportunity for acceptance as were they submitted to the Department.

POLICY MANUAL RECOMMENDATIONS DUE IN FEBRUARY

Chairman Gardiner advised that the Group would anticipate meeting sometime the first part of February to work out recommendations for the Policy Manual.

NEXT MEETING

He further advised that the Group would next meet January 5, 1979.

ADJOURN

The meeting adjourned at approximately 5:00 p.m.

ATTENDANCE

AQUACULTURE POLICY STUDY GROUP

NOVEMBER 30, 1978

NAME	ADDRESS	AGENCY
Terry Gardiner	Box 6092, Ketchikan	State Representative
Derek Poon	Box 786, Sitka	NSRAA
Barbara Sorensen	Pouch SA, Juneau 99811	Dept. of Revenue
Frank Orth		Earl R. Combs, Inc.
Bill Marsh		NSRAA
John Sund	1285 Tongass, Ketchikan	SSRAA
J. N. Milnes	307 Mill #5, Ketchikan	SSRAA
Ken Leon	FRED Juneau	ADF & G
Bob Burkett	FRED, Juneau	ADF & G
Joe Davis	FRED, Juneau	ADF & G
Armin Koernig	Box 191, Cordova 99574	PWSAC
Wallace H. Noerenberg	Consultant	PWSAC
William R. Heard	Auke Bay Laboratory	NMFS
Bob Simpson	Regional Office	NMFS
James E. Fisher	2221 E. No. Lights Blvd. Anchorage 99504	USDA Rep.
Floyd E. Heimbuch	Box 850, Soldotna 99669	Cook Inlet A.A.
R. S. Hadley	U. of Alaska - Fairbanks	Sea Grant
C. L. Kerns	3211 Providence Anchorage 99504	Sea Grant
Ivan E. Every	Rt. 1, Box 970, Kenai	Cook Inlet A.A.
Jev Shelton	853 Basin Road, Juneau 99801	NSRAA
Rita Marie Miller	Box 786, Sitka	NSRAA

Mike Kaill	FRED, Subport Bldg. Juneau	ADF & G
Bill Sheridan	Box 368, Juneau 99802	USDA Forest Service

ATTENDANCE

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copy of material mailed out

STATE OF ALASKA

THE LEGISLATURE

465-3795

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH MF—STATE CAPITOL
JUNEAU 99801

A G E N D A

AQUACULTURE POLICY STUDY GROUP
NOVEMBER 29, 1978
1:00 P.M.
ROOM 421, State Capitol Building
Juneau, Alaska

1. Presentation on salmon aquaculture research coordinated by Derek Poon
2. Review of Aquaculture Policy Manual recently distributed by ADF&G
3. Review of proposed statute change of salmon harvesting (attached to this agenda)
4. Presentation and review of October 24 report by John Williams
5. Review of proposal by Miller and Associates in regard to a financial analysis of salmon aquaculture.

LEGISLATIVE AFFAIRS AGENCY

INTER-AGENCY ROUTING SLIP

TO Representative Gardiner

w.o. 5735
Vassar

REMARKS:

Attached is a draft of one of your prefile requests. Please advise if any changes are required and whether or not you wish to have this one formally prefiled.

FROM Ken Vassar DATE 10/13/78

BY GARDINER

HOUSE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

ELEVENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the harvest of hatchery fish by salmon hatchery operators; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 16.10.440(a) is amended to read:

(a) Fish released into the natural waters of the state by a hatchery operated under AS 16.10.400 - 16.10.470 are available to the people for common use and are subject to regulation under applicable law in the same way as fish occurring in their natural state until they return to the specific location designated by the department for harvest by the hatchery operator. <u>While harvesting fish at the specific location designated by the department for harvest, the hatchery operator is exempt from any permit requirement under AS 16.43.</u>

* Sec. 2. AS 16.43.140(a) is amended to read:

(a) After January 1, 1974, no person may operate gear in the commercial taking of fishery resources without a valid entry permit or a valid interim-use permit issued by the commission <u>except as provided in AS 16.10.440(a)</u>.

* Sec. 3. This Act takes effect immediately in accordance with AS 01.10.-070(c).

Northern Southeast Regional Aquaculture Association, Inc.

P.O. BOX 786 SITKA, ALASKA 99835

(907) 747-6850

RM. 205, OLD CITY HALL BLDG.

MEMORANDUM OCTOBER 26, 1978

TO: MR. BILL HEARD, NATIONAL MARINE FISHERIES SERVICE
DR. KEN LEON, FRED, ALASKA DEPARTMENT OF FISH & GAME
MR. DONALD ROSENBERG, UNIVERSITY OF ALASKA

FROM: DEREK POON, PH.D., GENERAL MANAGER

RE: PRESENTATION ON SALMON AQUACULTURE RESEARCH AT THE NEXT AQUACULTURE POLICY STUDY GROUP (APSG) MEETING.

As a member of the APSG and on behalf of Representative Terry Gardiner, this is to request your attendance at the next APSG meeting to give a presentation on aquaculture research activities of your agency. Date of the meeting has not been announced but it will probably be in late November. Please check with John Williams of the Legislative Affairs Agency for the time slot for your presentation.

In addressing aquaculture policies, the Group may wish to make recommendations on future research directions and responsibilities. Accordingly, it will be useful reference for us if you can present the following information:

-- research objectives
-- research facilities
-- current and planned research programs
-- bibliography of research publications
-- method of disseminating research results
-- recommendations for future research directions and responsibilities

If you have any suggestions for modifications of the presentation format, please give me a call.

DP/pd

cc: Dr. Bob Burkett
Representative Terry Gardiner
Mr. Robert Simpson
Mr. John Williams

Miller & Associates, Inc. CONSULTANTS
PLANNING • MANAGEMENT • FINANCIAL ANALYSIS
EVERGREEN PLAZA BUILDING • 711 SO. CAPITOL WAY • OLYMPIA, WASHINGTON 98501 • (206) 943-3885

October 31, 1978

Representative Terry Gardiner
Chairman
Acquaculture Policy Study Group
Alaska State Legislature
Juneau, Alaska 99901
Pouch 0

Dear Representative Gardiner;

The firm of Miller and Associates, Inc. is pleased to have this opportunity to propose an economic analysis of the Alaskan salmon fishery.

It is our understanding that the State of Alaska has made a policy decision to restore Alaskan salmon runs to their historic high levels.

A decision of this nature will require not only the restoration of certain wild runs but also the creation of new runs through artificial propagation. The question becomes one of whether the cost of such an overall restoration is economically advantageous to the State of Alaska.

We believe the economic analysis of this issue is indeed a critical one. Traditional economic analyses of salt water fisheries have tended to focus on ex-vessel prices paid to fishermen and the value added to the product through canning or other market preparation activities.

We do not believe that this approach to economic analyses of the saltwater fishery adequately records the full value of the fishery.

For example, these traditional economic analyses do not recognize that the State of Alaska receives substantial tax revenues from the salmon fishery. This revenue comes from income taxes and fees paid by fishermen and processors and their employees and suppliers as well as from the indirect employment and ecomomic wealth which results from the fishery.

In addition to the substantial tax revenues to the State which could accrue from a revitalized salmon fishery, there are hidden governmental costs in the form of unemployment compensation and welfare payments which could be reduced as a result of an economically healthy fishery. These costs are again not generally recognized in traditional economic analyses of the fishery.

There are social considerations, which while difficult to place an economic value upon, should be fully recognized in an economic analysis of the fishery. Salmon fishing is a part of Alaskan culture. If the resource is allowed to dwindle, many fishing villages, towns and cities would either cease to exist or be substantially changed because there are no viable alternative economic pursuits available at these locations. The loss of these communities would unalternably change the basic social and cultural character of the state.

The subsistence fishery which is inseparable from much of Alaskan native American culture as well as the recreational fishery could both be irreparably harmed by a dwindling supply of harvestable salmon.

We have listed several of the major factors which we believe must be addressed in order to fully value the salmon fishery. The work plan, schedule and cost to perform this economic and social analysis are set forth in the subsequent sections of this proposal.

We believe the firm of Miller and Associates, Inc. based upon our economics and financial planning work for the Washington State Department of Fisheries and the Presidential Task Force on Northwest Fisheries is highly qualified to perform the proposed plan.

To assure the effective performance of the proposed economic analysis, we have reached agreement with William R. Wilkerson, an attorney with the Tacoma law firm of Eisenhower, Carlson, Newlands, Rega, Henriot and Quinn, to participate in all elements of the project. Mr. Wilkerson brings considerable economic, legal and governmental experience to this team, as well as much practical fisheries management experience. Most recently he has served as Chief Negotiator for the State of Washington in federal-state-tribal efforts to reach settlement of the Northwest fisheries dispute. He also served as Chairman of the Governor's Task Force for Fishing Industry Assistance (1975-76), which developed a major economic relief program for depressed Washington fisheries.

The time schedule to accomplish the work in this proposal is designed to provide information to assist and advise the 1979 session of the Alaska State legislature.

We look forward to working with you on this critically important economic and social issue.

Sincerely,

Wallace Miller

Wallace G. Miller
President

WGM/asp

WORK PLAN

The following is a series of tasks which Miller and Associates, Inc. proposes to perform in order to establish the economic and social value of expanding the Alaskan salmon fishery. This value will in turn be compared to the investment which will be required to finance this expansion.

Investment sources as well as alternative repayment mechanisms are also included in the study.

TASK #1 - Review and coordinate estimates of salmon fishery potential for expansion.

The Alaskan salmon fishery achieved historic catch levels well in excess of 100 million salmon. The Alaskan Department of Fish and Game (ADFG) estimates indicate that a salmon fishery in excess of 100 million salmon is possible. Regional Acquaculture Associations and the state have or are in the process of developing regional plans and estimates of the salmon catch potential of their regions. The historic high catch levels, the ADFG estimates and the regional acquaculture associations estimates will undoubtedly differ in the total number of attainable harvestable salmon. These historic highs and estimates will also likely differ in the species makeup as well as the actions which are necessary to restore the fishery. Some may propose, for example that the depleted salmon fishery can be restored entirely through the build-up of natural runs. Others will propose to assist the restoration of the natural runs through such actions as stream rehabilitation and stock re-planting as well as the use of a variety of artificial propagation methods which are necessary to develop new runs in areas when natural runs cannot be adequately restored.

These currently differing views as to the species makeup, the total potential catch level, and the cost of restoring the runs to historic levels need to be reconciled into a single estimate which can be used as a basis for the economic analysis of the fishery.

The Contractor proposes to accomplish this task by taking the following steps.

The Contractor proposes to meet with the regional acquaculture associations and review their estimates and plans for restoring the salmon runs within their regions. If plans and estimates have not been completed, the Contractor will work with knowlegable local association members and assist in the development of these estimates.

The Contractor will next meet with ADFG and review their estimates of potential regional run sizes, by species, as well as their estimates of cost to accomplish the restoration.

The Contractor will compare estimates of run sizes and costs and attempt to resolve any differences. If all differences are not resolved, both estimates of the restoration potential and the restoration cost (ADFG and the regional association) will be included in the next steps of the economic analysis.

Upon completion of Task #1, the Contractor would meet with the Acquaculture Policy Study Group (APSG) to review the estimates of the potential for restoring salmon runs to their historic high as well as the estimates of the cost for accomplishing the restoration. Based upon the advise and comments received from the APSG the Contractor would incorporate appropriate changes and proceed with Task #2.

TASK #2 - Economic analysis.

The economic analysis would be developed based upon performing the following steps.

Step I - The build-ups to potential run sizes will be spread out by region, by species over the number of years required to achieve that potential.

Step II - Estimates of the proportion of potential run sizes attributable to fishery restoration efforts (e.g. stream rehabilitation and artificial propagation) will be developed by region, by species, by year.

Step III - The estimated investment in stream rehabilitation and artificial propagation facilties required to achieve the potential run sizes, by region, by species will be spread out over the number of years required to achieve that potential. Annual operating costs will be separately estimated.

Step IV - The information from Step II will be compared with that contained in Step III. The increase in run sizes resulting from stream rehabilitation, artificial propagation and other restorative efforts will be compared to the financial investment required to achieve this increase. This information will be broken down by region.

Step V - An analysis will be conducted on the information contained in Step IV. Basically this information will indicate the amount of regional investment required to develop salmon runs for the area. This data in turn will

be used to develop estimates of the increases in fishermens' incomes, community direct and indirect employment and general economic wealth which will result from the salmon restoration program.

Estimates of the additional tax and other revenues accruing to the State of Alaska will be made as a result of the additional economic activity. Savings to the state resulting from reduced unemployment compensation, welfare and other payments will be made.

Step VI - Based upon the information contained in Step V, an investment break-even analysis of the salmon restoration program will be conducted. In this investment analysis the annual principal and debt service on the restoration investment and the annual operating cost of the restoration facilities will be compared to the additional tax and other revenue plus the reduced cost of government (i.e. unemployment compensation, welfare, etc.) which will accrue to the state.

Step VII - In order to convert the basis investment analysis contained in Step VI into the final economic and social analysis a number of adjustments must be made. These are: (1) to the extent that regional associations through pass-along assessments, the Federal Forest Service appropriations or other federal programs contribute to the salmon restoration investment and/or annual operating costs, these investments should be deducted from the investment and operating cost break-even figures contained in Step VI. (The resulting annual investment and operating cost estimates after these deductions are made represents an approximation of the net "bottom-line" investment to Alaskans for the salmon restoration program.

(2) The revenue to the State of Alaska, or government cost savings side of the equation must also be adjusted. The first adjustment is for the "value" of an enhanced sports fishery and subsistence fishery. (Several methods for valuing these fisheries will be developed for review and discussion with the APSG prior to the selection of the final method to be used in the analysis). A second adjustment should also be made to the increased revenue/government cost savings side of the equation. The maintenance of the small salmon fishing communities has both a cultural as well as an economic benefit to Alaska. The question which must be answered in this adjustment is, what would it cost the state in economic development programs, training programs and other acitivties to sustain these communities at the same level of economic health as the restored salmon fishery, if the salmon fishery were not restored.

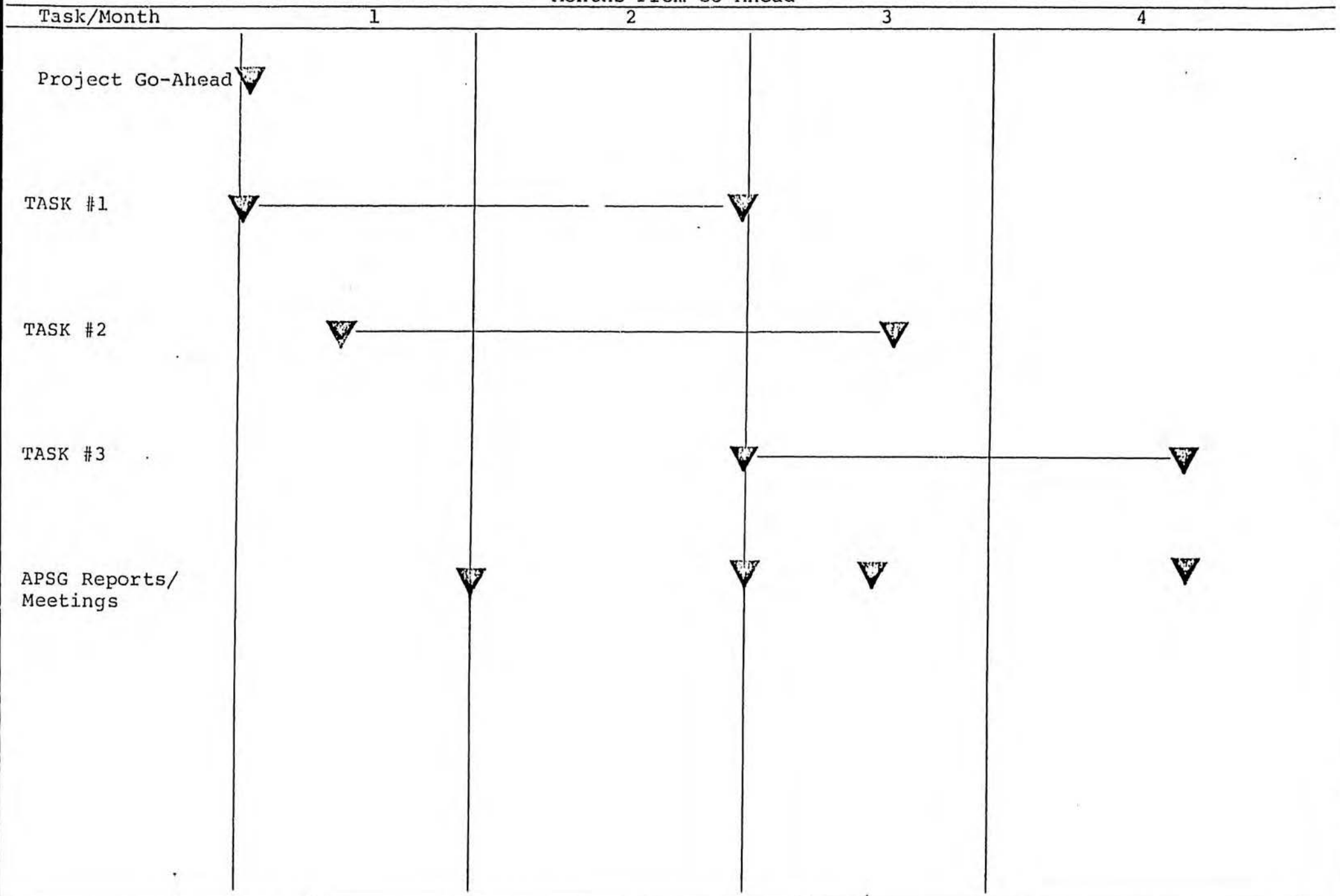
Adjustments (1) and (2) will be made to the investment break-even analysis and the final resulting economic analysis will be presented to the APSG for review and discussion. A methodology will also be developed which will provide the capability to perform economic assessments of individual rehabilitation projects in accordance with the procedures set forth in this proposal.

TASK #3 - Study documentation.

Upon completion of the proposed study as outlined, the Contractor will formally document the study findings and conclusions.

SALMON RESTORATION PROGRAM ANALYSIS

MASTER SCHEDULE



SALMON RESTORATION PROGRAM ANALYSIS

ESTIMATED COST

Direct Labor	Hours	Rate/Hour	Total
TASK #1			
W. Miller (Project MGR)	100		
W. Wilkerson (Project Consultant)	90		
TASK #2			
W. Miller	160		
W. Wilkerson	80		
TASK #3			
W. Miller	80		
W. Wilkerson	80		
Total Direct	590	$60.00	$35,400.00
Other Direct Expenses:			
Travel			
8 RT Seattle to Juneau			1,656.00
Regional Travel (Estimated cost of travel to visit regional acquaculture association etc.)			1,000.00
Per Diem			
40 Days			1,800.00
Total Other Direct Expenses			4,456.00
TOTAL ESTIMATED COST			$39.856.00

FIRM EXPERIENCE

AND

PERSONAL RESUMES

FIRM EXPERIENCE

The firm of Miller and Associates, Inc., was formed in May, 1975. The founder of the firm, Mr. Wallace G. Miller, is the former Budget Director for the State of Washington. As Budget Director, Mr. Miller became involved in establishing sound governmental planning, budgeting, and administrative practices within state government. In the process of developing effective, modern management systems, Mr. Miller acquired an extensive knowledge of governmental policies, programs, and administrative procedures. In order to share his knowledge and continue to assist units of government in solving their management and administrative problems, he formed Miller and Associates, Inc., a firm organized to serve government with a high standard of excellence.

The following consulting contracts awarded Miller and Associates, Inc., indicate that we have the experience necessary for successfully completing the proposed work and are typical of the capabilities of Miller and Associates, Inc.:

WASHINGTON STATE LEGISLATURE - Prepared a comprehensive fiscal, management and program review of the primary and secondary public education systems of the State of Washington. This comprehensive review resulted in several important pieces of new legislation being enacted. The prospect is for additional legislation to be proposed in future sessions of the Washington State Legislature.

OFFICE OF THE GOVERNOR, STATE OF ILLINOIS - Conducted an extensive study of the budgetary and fiscal management policies and practices of the Chicago Public School System and the Chicago Board of Education. This study covered employee compensation and staffing for all the district's educational and service programs, the district construction program as well as the Chicago system of taxation. Study results are still being reviewed with the likelihood that many of the recommendations will be implemented.

WASHINGTON STATE DEPARTMENT OF SOCIAL AND HEALTH SERVICES - Developed a new concept for the delivery of mental health care in the State of Washington. Drafted a State Mental Health Financial Plan based upon this concept which will be implemented during the next three years.

WASHINGTON STATE DEPARTMENT OF FISHERIES - Developed a comprehensive financial plan and bond issue to finance a major construction program aimed at greatly increasing the number of artificially and naturally propagated salmon in Washington State. Current estimates indicate the construction program will be in the range of $40 million.

WASHINGTON STATE OFFICE OF COMMUNITY DEVELOPMENT - Conducted an evaluation of the Indian Employment and Economic Assistance Program to determine the effectiveness of the program in assisting Indians in achieving employment and economic self-sufficiency goals.

WASHINGTON STATE DEPARTMENT OF VETERANS AFFAIRS - Developed a master plan for state-wide delivery of services and prepared an overall financial plan and budget to assist the newly formed agency in becoming established.

WASHINGTON STATE DEPARTMENT OF SOCIAL AND HEALTH SERVICES - Conducted a review of the current method of distributing State support for county probation programs and developed several alternative funding methods which would ensure greater funding equity among the counties and improved program financial stability.

WASHINGTON STATE BOARD FOR COMMUNITY COLLEGE EDUCATION - Conducted an evaluation of the Council on Post Secondary Education's recommended revisions to the higher education instruction budget formula and their financial impact on two-year institutions.

WASHINGTON STATE HOSPITAL COMMISSION - The firm was engaged to conduct an extensive review of the State Hospital Commission's budgetary policies and accounting methodology for providing growth and development allowances in the rates charged by non-profit hospitals. This study has been favorably received in two national healthcare publications.

SPOKANE COUNTY COMMISSION - Conducted a management and organization study of the Motor Vehicle Licensing Section of the Spokane County Auditor's office. The study involved an analysis of the organization, workload, and operating procedures of the Motor Vehicle Licensing Section and included specific recommendations for improving the efficiency and effectiveness of the program.

WASHINGTON STATE SUPERIOR COURTS - Completed a comprehensive cost-benefit analysis of a proposed management information system for the twenty-eight Superior Courts in the State of Washington. This study has been cited by the National Center for State Courts as a model cost-benefit analysis of judicial information systems.

PRESIDENTIAL TASK FORCE ON NORTHWEST FISHING PROBLEMS - Recently completed a contract to provide overall management services in support of the U.S. Departments of Justice, Interior and Commerce which have joint responsibilities assigned by the President to seek solutions to the fishing problems.

WASHINGTON COMMISSION FOR THE HUMANITIES - Developed a financial management and control system, a procedures manual and administrative management system to ensure accountability, control and efficiency.

STATE CAPITOL MUSEUM - Will shortly be completing a study of the feasibility of making the State Capitol Museum financially self-supporting through the sale of various types of merchandise including reproductions of antique furniture.

ILLINOIS STATE LEGISLATURE - Developed a master plan for the implementation of an automated state-wide financial reporting system for the Illinois State Legislature. Work is underway in installing that system.

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE - Currently completing a study of implementation of Title IX of the Education Amendments of 1972 in the states of Alaska, Washington, Idaho and Oregon.

SPOKANE COUNTY COMMISSION - Currently under contract to reorganize the staffing patterns and work flow processes of the County Treasurer's Office. The study emphasizes greater efficiency, improved investment earnings and more timely financial status reporting.

Wallace G. Miller, President
Miller and Associates, Inc.

Education

B.S., Accounting
Montana State University, 1957

MBA, Business Administration
University of Washington, 1964

Professional Experience

Mr. Miller recently served as Project Director for the Presidential Task Force on Northwest Fishing Problems. Major contracts completed include a statewide study of the Washington public education system for the Washington State Legislature, a study of the Chicago public education system for the Governor of Illinois, and a financial plan for a state salmon enhancement program as well as other projects described in the "Firm Experience" statement.

Prior to forming Miller and Associates, Inc., Mr. Miller was the Budget Director for the State of Washington, reporting to Governor Daniel J. Evans. While Budget Director he also held the responsibility of Director of State Planning and Director of State Accounting. In his capacity as Budget Director, Mr. Miller directed the efforts of over 80 planners, budget analysts, accountants and other professional personnel in administering the State's planning and fiscal affairs. During the eight years he managed the State's fiscal affairs (first as an assistant director, later as deputy director and then as director), no increases in basic business and individual taxes were necessary to finance the state budget.

During his career with the state, Mr. Miller developed many new budgeting systems and concepts. The Program Decision System, which was implemented in 1974 is one of the most modern program budgeting systems in the nation. Mr. Miller was also a pioneer in the development of remote job entry systems for use in state fiscal management. In the field of planning, Mr. Miller initiated the Aternatives for Washington Program, a new concept in state planning based upon citizen involvement, which has been copied by other states.

Mr. Miller is the author of a number of publications on planning and budgeting systems for state and local government which have received national recognition.

Mr. Miller, until recently, served for a number of years as an advisor to the University of Washington Graduate School of Business for accounting curriculum development.

Prior to joining the State of Washington, Mr. Miller spent nine years in various financial management positions with The Boeing Company.

WILLIAM R. WILKERSON

Biographical Data

Born Seattle, Washington, March 2, 1946. Primary and secondary education in Seattle public schools. Bachelor of Arts degree from University of Washington (History and Economics majors), 1968. Doctor of Jurisprudence (JDS) degree from University of Oregon School of Law, 1971. Admitted to practice of law in the State of Washington, 1971.

Spent four years in federal practice in Washington, D.C. Served as Assistant Director, Office of Domestic Business Policy, U.S. Department of Commerce; Legislative Counsel for International Economic Policy, Executive Office of the President; and, Special Assistant to the General Counsel, U.S. Small Business Administration. Administrative and legislative practice, involving development of international trade policy, economic development policy and planning, and business regulation (including environmental, labor, tax and trade policy).

In private practice in Olympia, Washington, from January 1975 to September 1978. Primary practice included assisting business and state agencies in resloving problems with the federal government, economic development planning, small business financing, environmental planning, and natural resources development. Served as Chairman of Governor's Task Force on Fishing Industry Assistance (1975-1976), Chairman of the Governor's Advisory Committee on Regulatory Reform (1976), and most recently as Chief Negotiator for the State of Washington on federal-state-tribal settlement activities involving Northwest treaty fishing rights.

In September of 1978, associated with the law firm of Eisenhower, Carlson, Newlands, Reha, Henriot & Quinn in Tacoma, Washington. Major fisheries and natural resource oriented clients have included the Washington Department of Fisheries, Southern Southeast Alaska Regional Aquaculture Association, Martin-Simonds and Associates, CH_2M Hill, and the the Office of the Governor of the State of Washington. Major clients with environmental and economic development concerns have included the Washington Department of Commerce and Economic Development, the Pacific Northwest Regional Commission, and the U.S. Small Business Administration.

Currently serving as Vice-Chairman of the U.S. Small Business Administration's Regional Advisory Council, Chairman of the Regulatory Task Force of the Association of Washington Business, and as an advisor to the Director of the Washington Department of Fisheries for long-term planning.

11/29/78
Wm. Heard Handout
to accompany booklet document

NMFS CURRENT YEAR TASK PLAN
TASK NARRATIVE

Alaska Salmon Aquaculture (Ocean Ranching)

DATE PREPARED
11-24-78

31. CYTP NUMBER
NWC-311.00-79-XX

32. NARRATIVE DESCRIPTION OF TASK (limit to 500 words)

This task focuses on salmon aquaculture (Ocean Ranching) in Alaska, a region with high interest and much current activity in hatchery development, both in the public and private sectors. Major areas of concern include: (1) biological factors and management strategies affecting marine survival, ocean migration patterns and distribution of juvenile salmon; (2) concepts of brood stock development including behavioral aspects of juvenile imprinting and adult homing, genetic considerations of relict, endemic and transplanted stocks of salmon; (3) biological, environmental and management interactions of hatchery - wild stock relationships and (4) other relevant priority research needs of developing ocean ranching programs in Alaska including those of the State of Alaska, private non-profit hatcheries and Regional Aquaculture Associations. Specific activities at research facilities located at Little Port Walter and Auke Creek currently are focused on pink, coho and chinook salmon with less emphasis on chum and sockeye salmon. Attention is directed toward carefully evaluating important elements of fish culture technology on the marine life stages of juvenile salmon. The effects of specific incubation and rearing treatments on ocean survival is determined through releases of fin-marked and coded wire tagged groups of fry and smolts. Marked returning adult salmon are sampled in various fisheries and at fish weirs across streams.

Contract activities planned for this fiscal year include: a construction and materials contract for completion of alternates 1 and 2 of the replacement-renovation of Auke Creek weir; a feasibility engineering contract for modifying and upgrading Sashin Creek weir; a research contract on historical aspects of salmon aquaculture in Alaska; a research contract for detailed analysis of salmon scales possibly reflecting marine environmental variables and a research contract for freshwater ecology studies on sockeye salmon in the Nushagak district of Bristol Bay.

NMFS CURRENT YEAR TASK PLAN
TASK NARRATIVE

Alaska Salmon Aquaculture (Estuarine Determinants of Salmon Survival)

DATE PREPARED 11/24/78

31. CYTP NUMBER

NWC-310.00-79-XX

32. NARRATIVE DESCRIPTION OF TASK (limit to 500 words)

The long-range objective of this task is to evaluate hypotheses on causes of variable marine survival of pink and chum salmon fry. Marine survival of pink salmon fry, for example has varied over 20-fold in 7 years of record at Auke Creek and has varied over 75-fold in 37 years of record at Sashin Creek. The study is coordinated with the ABL marine ecosystems program, Causes Underlying Recruitment Variability in Ecosystems (CURVES) and interfaces with that program to obtain ecosystem data and descriptive oceanography, share vessel time, and share information on larval and juvenile fish, predators, and competitors of the estuarine ecosystem. Pink and chum salmon were selected as target species because of their role in developing public and private aquaculture; their relative and potential enhanced abundance in the larval and juvenile fish populations; and the probability of significant impacts on estuarine ecosystems due to enhanced abundance. The knowledge gained from these studies will form an essential element of the information base needed by the North Pacific Fishery Management Council in evaluating and forecasting the impact of natural and man-caused factors upon marine resources and by the Regional Aquaculture Associations in planning and implementation of salmon enhancement projects. Laboratory studies will seek to describe feeding tactics, digestion rates, and food requirements of fry under known ecological conditions. Field studies will include bioassays of selected estuarine habitats using calibrated hatchery fry. Hypotheses of brood year success will be developed from historical commercial catch statistics, scale analyses, and other project data and will ultimately be examined with the aid of computer simulation models of the ecosystem using inputs from the CURVES program.

This is the first year of a planned reorientation of research personnel and resources from Alaskan Salmonid Aquaculture (Ocean Ranching) and other programs into the Salmon CURVES task. The reorientation will include completion of cooperative studies with the State of Alaska for evaluation of Lake Nunavaugaluk salmon enhancement; upgrade of the Auke Creek weir; and selection and testing of equipment and techniques for the field and laboratory studies. Field studies will be conducted primarily at Auke Bay with additional sites at Lisianski Inlet and Tenakee Inlet to be studied less intensively to represent differences in the ecosystem associated with relative proximity to the Gulf of Alaska.

Contract activities that are planned for this fiscal year are as follows: Continuation of $50 k contract to University of Washington, FRI, to evaluate use of artificial fertilizers to increase sockeye salmon smolt production from the lakes of the Nushagak District, Bristol Bay, Alaska.

Heard 2nd Handout Bibliography

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1/ In addition to formally published literature, several kinds of unpublished manuscripts and reports are also listed. These include manuscripts at some stage of a peer review process, completed manuscripts on file in the ABL Library (MR-F series), and Processed Reports for limited distribution of preliminary data.

11/29/78 Dr. Burkett Handout

F.R.E.D. RESEARCH

Species

Chum	Sockeye
Coho	Rainbow
Pink	Sheefish
Chinook	Grayling

Chum at Beaver Falls, Snettisham, Crystal Lake, Klawock, Hidden Falls, Clear, Kotzebue, Russell Creek, Tutka, and Halibut Cove.

Coho at Starrigavan, Snettisham, Crystal Lake, Klawock, Hidden Falls, Fish Creek, Big Lake, Elmendorf, Fort Richardson, Little Port Walter, Seward Lagoon, Kachemak Bay, Halibut Cove, Fire Lake and Kasilof.

Pink at Starrigavan, Tutka, Kitoi, Halibut Cove, Auke Bay, Little Port Walter and Anan Creek.

Chinook at Deer Mountain, Beaver Falls, Starrigavan, Fish Creek, Snettisham, Crystal Lake, Kasilof, Fire Lake, Elmendorf, Fort Richardson and Clear.

Sockeye at Auke Bay, Big Lake, Kasilof, Karluk, Kitoi, Halibut Cove, Nunavaugaluk, Moose Creek and Hidden Lake.

Rainbow at Deer Mountain, Crystal Lake, Elmendorf, Fort Richardson and Fire Lake.

Sheefish at Fire Lake and Clear.

Grayling at Fire Lake and Clear.

Incubation

Types of incubators - 502
Loading Densities - Increase from 7-12 eggs per cubic inch for chum, 10-20 per cubic inch for pinks.
Substrate - Progression from none, to gravel, to Astroturf, to Intalox Saddles.
Fry transport and handling - Volitional-type incubators, fish pumps, fry separators, pen towing.
Glacial water suitability - Incubation in glacial water such as Kenai Lake.
Accelerated incubation - 0-age smolts

Rearing

Short-term fry rearing - Pinks and chums in estuarine pens and fresh water units to measure any changes in adult survival.
Accelerated coho and chinook growth - Using heated water from power plants or hatchery heaters, 0-age smolts are produced.
Normal coho and chinook growth - Using ambient temperature water, either to produce one-year old smolts because no heat is available or to compare survival of these to accelerated smolts.
Fresh and salt water rearing - To compare efficacy of the two methods.

Types of units - To compare raceways, Swedish Ponds, net pens, cones, floating raceways.
Loading densities - Maximum in tidal flow and in piped flow-through units, reaeration.
Multiple pass systems - For increasing carrying capacities.
Diet testing - Comparing AMP (Alaska Moist Pellet) to OMP, also ADP (Alaska Dry Pellet) to improve survival, reduce cost, and to develop Alaskan industry based on better-use of fish products.

Release and Stocking

Compare timing of release - To improve survival.
Size at release - To compare and improve survival.
Estuarine productivity - To determine carrying capacity of marine waters near hatcheries and to pick best time of release.
Predation effects - To maximize survival by manipulating size of fish released and timing and place. Also to measure effects of predator control. King River Chin-

Pathology

Vaccines - To combat disease such as Vibriosis.
Disease transmission - To determine mode of disease transmission so that it can be minimized.
Kidney disease prevention - Studying the effect of erythromycin on preventing kidney disease transmission.
Hatchery disinfection - Crystal Lake and Kasilof.
Controlling fungus - Comparing use of chemicals and salt water to reduce fungus.

Genetics

Selection - Rainbow brood stocks are being selected for desirable traits.
Genetic variability - Is being measured in wild and hatchery stocks to determine need for maintaining gene pools and for incorporating additional variability in stocks.
Phenotypic traits - Studying characteristics of chinook and coho stocks to determine which donors may be most useful to programs (Speel Lake coho, King Salmon River chinook).
Age at maturity - To maximize production potentials of hatcheries and to produce larger adults.
Run timing - To allow segregation of stocks in fisheries and to provide fish to sport fishermen at appropriate times.
Maintaining stock integrities - Specifying minimum numbers of adults to spawn at hatcheries and minimize transplantation of stocks.

Carrying Capacity

Lake and stream inventory - To determine production potential of lakes and streams for rehabilitation and enhancement projects.
Lake fertilization - Improvement of production potential of lakes.

Brood Stocks

Surveying potential donor stocks for rehabilitation and enhancement projects.

Enumeration

Tagging - Technology in coded wire tagging has increased (tagging 1.0g fry).
Fish counters - Studying and utilizing sonar for smolt and adult counting. A new fry counter is being tested.

Geothermal

Surveys - To determine availability of geothermal heat for accelerated salmon production.

Induced Spawning

Gonadotropins - By accelerating spawning time, coho or chinook may be smolt size the following spring or summer.

Egg Planting

Egg planting devices - Have proven to be better than traditional shovel methods -- may be used in rehabilitation or enhancement projects such as Karluk.

Homing and Imprinting

Studies to determine time necessary for imprinting transplanted stocks, degree of straying.

Migration

Our tagging studies and commercial fisheries recovery efforts are showing migratory patterns and degree of continuous harvesting of stocks over wide areas.

Fish Passes

Baseline studies to determine need for fish passes (Anan, Apollo).
Construction and evaluation of fish passes to measure efficacy (Anan, Frazer River).
Evaluation of types of fish passes.

Habitat Alteration

Studying effects of log jam and beaver dam clearance.
Channel stabilization - Effect on escapement (Ocean River-Alaska Peninsula).

11/29/78 Handout R. S. Hadley
Alaska Sea Grant
University of Alaska

A REVIEW OF AQUACULTURE RELATED PROGRAMS AT THE UNIVERSITY OF ALASKA

November 27, 1978

RESEARCH OBJECTIVE

Aquaculture research is carried out under the Renewable Marine Resources Research program of the University of Alaska Sea Grant Program. The objective of the program is:

> *To provide new information which will assist in the development of new industries, new management techniques, or new harvesting methods which will utilize and conserve the renewable marine resources of Alaskan waters.*

Specific to aquaculture, the short-term research objective is as follows:

> *To assist in the development of the non-profit salmon hatchery through research, advisory and education programs.*

RESEARCH FACILITIES

Facilities of the University of Alaska which are utilized in aquaculture research include the laboratories and marine station of the Institute of Marine Science in Fairbanks and Seward, and the Division of Fisheries in Juneau.

All three locations possess faculty, graduate students and staff with an interest in pursuing research which would be useful to the advancement of the art of aquaculture in Alaska. These interests cover the broad areas of physical, chemical and biological oceanography, and special emphasis at the Juneau campus on fishery research in the area of genetics, fish culture, fish diseases, and fish ecology.

To a greater or lesser extent, laboratories are maintained at each location which are equipped to perform research applicable to aquaculture, including flow-through, saltwater, live tank systems.

CURRENT AQUACULTURE PROGRAMS

The following are the education, extension and research aquaculture projects which are currently carried out by the University of Alaska statewide system:

EDUCATION

Course Development: Experimental Fish Culture

ADVISORY

Marine Advisory Program, Mission B - Aquaculture

RESEARCH

Carrying Capacity of Estuarine Waters

Fishfeed Development

Genetic Interaction of Auke Creek Hatchery Pink Salmon with Natural Spawning Stocks in Auke Creek

Inheritance of Egg and Fry Characteristics in Chum Salmon

Descriptions of each project are included in Appendix A.

Additional research is underway by graduate students associated with the various University programs. The following are the areas of the student research:

Dave Urquhart - U of A, Fairbanks - Feeding ecology of pink salmon in Prince William Sound.

Dave Barnard - U of A, Fairbanks - Feeding ecology of chum salmon fry in Prince William Sound.

Andrew McGregor - U of A, Juneau - Comparison of local pink salmon stocks at Auke Creek.

METHOD FOR DISSEMINATION OF RESEARCH RESULTS

Research results are published either as technical reports or as articles in scientific journals. In all cases, copies of these reports or articles are provided to an extensive, permanent mailing list. This includes the required distribution to all University and state libraries. Additionally, information on current importance on aquaculture information is provided in the "Aquaculture News Briefs" section of *Alaska Seas and Coasts*.

The Alaska Sea Grant Program, in conjunction with the Cooperative Extension Service, maintains a Marine Advisory Program. This program provides direct one-to-one dissemination of information of interest to the marine community. Curt Kerns of the MAP staff is the Aquaculture Specialist and is responsible for the communication between the University and the aquaculture "industry."

RECOMMENDATIONS FOR FUTURE RESEARCH DIRECTION AND RESPONSIBILITIES

The University of Alaska will continue to seek new knowledge and assist in the development of new industrial development in order to meet the major objectives of the program. Major areas of research for the future are:

- Continuation of an understanding of the estuarine survival of young salmon.
- Continuation of the understanding of genetic interactions and genetic tagging.

AQUACULTURE RELATED PUBLICATIONS

Alaska Statutes: Commercial Fishing Loan Act, Salmon Hatcheries, Fisheries Enhancement Loan Program, Salmon Authorities (as amended through 1977) Compiled by E. Thomas Robinson in Aquaculture Notes, AK-SG-77-6, 17 pp.

Aquaculture in Alaska: A Resource Potential
E. J. Kelley and D. W. Hood, eds. Institute of Marine Science, Public Information Bulletin 73-1, AK-SG-73-5, 20 pp.

Artificial Salmon Spawning
Curt L. Kerns and William W. Smoker, Marine Advisory Bulletin No. 6, 1977 (in press).

Artificial Upwelling in Alaska Fiord Estuaries
W. E. Shiels and D. W. Hood, in The Northern Engineer, Vol. 2, No. 4, 1970, pp. 8-12.

Accounting for Private Nonprofit Salmon Hatcheries
E. Thomas Robinson, AK-SG-77-13 (in press).

Economic Feasibility of Private Nonprofit Salmon Hatcheries
Franklin L. Orth, AK-SG-77-4, 99 pp.

Enhancement of Primary Productivity by Artificial Upwelling
R. A. Neve', R. Clasby, J. J. Goering, and D. W. Hood, in Aquaculture Notes, AK-SG-76-8, 22 pp.

History of the Marine Hatcheries of Alaska
William R. Hunt, AK-SG-76-10, 45 pp.

Japanese and Soviet Attitudes Toward Aquaculture
Tsuneo Nishiyama, in Aquaculture Notes, AK-SG-77-2, 19 pp.

Notes on Rearing Juvenile Chum Salmon, Oncorhynchus keta, in an Artificial Upwelling System
A. J. Paul, D. W. Hood, and R. A. Neve', in Aquaculture, Vol. 9, July 12, 1976, pp. 387-390

Preliminary Study on Rearing Chum Salmon, Oncorhynchus keta, in an Artificial Upwelling System
A. J. Paul, D. W. Hood and R. A. Neve', in Aquaculture Notes, AK-SG-76-11, 6 pp.

Private Nonprofit Salmon Hatcheries in Alaska
E. Thomas Robinson, in Aquaculture Notes, AK-SG-76-1, 5 pp.

Proceedings of the Conference on Salmon Aquaculture and the Alaskan Fishing Community
Donald H. Rosenberg, ed., AK-SG-76-2, 302 pp.

Proceedings of the Second Alaska Aquaculture Conference
Brenda Melteff, ed., AK-SG-77-7, 78 pp.

Some Aspects of the Carrying Capacity of Prince William Sound, Alaska, for Hatchery Released Pink and Chum Salmon Fry
R. Ted Cooney, David Urquhart, Richard Neve', John Hilsinger, Robert Clasby and David Barnard, 98 pp.

APPENDIX A

Program: EDUCATION AND TRAINING
Project: E/59-03

Title: Course Development: Experimental Fish Culture

Principal Investigator: W. W. Smoker
Unit: Division of Fisheries

Funding Information

Present level:	SG: $0 UA: $0	Proposed level:	SG: $10,209 UA: $ 2,493
Date Initiated:	1 Nov 1978	Est. Comp. Date:	31 Oct 1979

BACKGROUND AND NEED

In recent years Alaska has made a commitment to enhance the productivity of salmon resources by means of artificial propagation. Both state government and private organizations have begun large scale programs to build and operate hatcheries and other fish production facilities. There are a number of relationships between the development and growth of fish and aspects of their environment which must be understood if the design and operation of a facility are to be successful. Some of these relationships are, for example, the effects of water quality, incubation environments, and cultural practice on development.

Students preparing for work on this new aspect of salmon resource management need to be familiar with these relationships. As a result of this need, the Division of Fisheries at the University of Alaska, Juneau, will be offering a two-semester laboratory course during the 1978-79 school year. This course will be offered to graduate and advanced undergraduate students.

As the course is currently planned, students will perform a series of demonstration experiments using salmon embryos spawned at the beginning of the course. Such experiments might include a series of embryologic preparations, comparison of different incubation environments in their effects on development, comparison between species or populations in the course of events in development, or observations of the effects of different cultural practices on the quality of fry produced. Students will gain experience in the operation of an elementary incubation facility and will gain insight into the biology and technology of propagation of fish. Furthermore, they will learn some practical elements of experimental design and analysis.

There are no other "hands-on" courses offered in the University system in which students explore the problems of fish culture. This course will fill that need and will therefore augment and complement

the program of the University of Alaska, Juneau, Fisheries Division. The course will provide training for students beginning graduate research programs.

The equipment and experience gained during the course of this project should help provide impetus for the future development of a research program in salmon aquaculture at the University of Alaska, Juneau.

Current state funding policy does not allow for special release time for University faculty to establish this type of extensive laboratory course. Currently there are no special laboratory facilities established. Considerable effort will be necessary to establish this student laboratory including construction of egg incubation equipment and development of trial demonstration experiments. Likewise, state funding is not available for the purchase of the special laboratory teaching equipment.

ACCOMPLISHMENTS

New project.

OBJECTIVE

To develop the class material and special laboratory facilities for a two-semester laboratory course in fish culture.

APPROACH

Funding under this project will allow the Principal Investigator release time from one 3 credit course for two semesters. (Normal load is 3 credit courses per semester.) This will allow the Principal Investigator the extra time necessary during the first offering of the course to develop the special laboratory experiments and to construct the special laboratory facilities. The project will also provide some of the special laboratory equipment and the installation supplies necessary for the laboratory experiments.

INTERACTION

The project interacts with Sea Grant Education and Training Project E/59-02.

EQUIPMENT

4 Health Tecna Fish Incubation Cabinets	$2,000
4 Little Giant Recirculation Pumps	320

MISSION B

Aquaculture

BACKGROUND AND NEED

While recent runs of Pacific salmon have improved somewhat, the long range trends of this $200 million a year fishery are down. Most of the decreases in the catch of salmon have been and are occurring in Alaska. Runs in other Pacific northwest states have been stabilized by extensive federal and state salmon enhancement programs.

Alaska is rapidly implementing a very large salmon enhancement program; the plans are for $400 million to be spent on private and public production facilities over the next 20 years. The idea of private investment in participation in salmon enhancement is fundamentally different in Alaska than elsewhere. The Alaska Salmon Enhancement Program (ASEP) is of a three-pronged nature: (1) traditional public sector involvement via the Alaska Department of Fish and Game; (2) regional, private nonprofit associations comprised of user groups; and (3) non-association, private nonprofit groups.

Salmon enhancement efforts in other states are largely public and serve primarily the recreation segment of the fishery; efforts in Alaska are directed predominately toward the commercial fishery. The economics are predictably much different. Higher costs incurred due to remote siting of enhancement facilities, lower product price, and the economic constraints of the marketplace all contribute toward the necessity of rapid, rigorous evolution of the biotechnology of salmon enhancement. Excitement and potentials are high, but the problems are many.

Alaska now has four regional aquaculture associations and approximately 10 non-association corporations with permits granted or being acted upon. The first returns of salmon to private facilities occurred in the summer and fall of 1977. The Prince William Sound Regional Aquaculture Corporation (PWSAC) had a return of 55,000 fish to its Evans Island Facility; the Sheldon Jackson Aquaculture training program had a return of some 110,000 fish. Several more facilities are due to go on line this coming year.

As a result of the Alaska Sea Grant Program's involvement with the formation and development of Prince William Sound Aquaculture Corporation, six major categories of need have been identified. They are:

1. Organization, finance, and business management.

2. Biological information on spawning, incubation, egg handling, and estuarine survival.

3. Engineering design.

4. Cost/benefit information.

5. Cost efficiency in subsystem design.

6. Identification of biological constraints to increase return.

It is felt that the nonprofit, private fish hatcheries will have the very positive effect of stimulating local economy, the fishing industry, and all supporting industries. Armin Koernig, President of the Prince William Sound Aquaculture Corporation, summed up the feeling behind the private hatchery scheme when he said, "These projects involve self-help and determination in the best spirit of Alaska independence."

ACCOMPLISHMENTS

In response to requests for assistance, a talent bank was established two years ago to assist the Aquaculture Agent in getting information to developing hatchery firms. To date, the following assistance has been provided:

1. Development of a Chart of Accounts for regional aquaculture associations by Mr. E. Thomas Robinson, adopted in whole or in part by all four regional associations.

2. An economic assessment of the PWSAC hatchery by Dr. F. L. Orth that has resulted in changes that have improved the economic picture for the facility.

3. Via talent bank, personnel assisted the Board of Directors of PWSAC in becoming a more effective corporation.

4. Stimulated Cook Inlet Aquaculture Association into planning several lake fertilization projects for 1979.

5. Precipitated Kodiak-area Native corporations' awareness of aquaculture; a staff person has been hired, several projects are planned by village corporations.

6. In conjunction with user groups, started the process of developing a practical diet for pink and chum salmon fry held in saltwater.

7. Working with the seafood specialist and a fish meal producer, ran a series of experiments that point the way toward the economical use of the vast quantities of fish waste produced in Alaska.

8. A major focus was the development of a Uniform Reporting Procedure for all ASEP efforts, public and private, which will provide accurate industry statistics to economists, planners, the Alaska State Legislature and other user groups.

ACTIVITIES

Aquaculture Class

Thirty-five persons were trained in basic aquaculture, salmon biology, and enhancement techniques via a course, Fisheries 393, taught in Petersburg and Kodiak. The class will also be offered in the Kenai area later this year. Many of these students were would-be or actual hatchery permit holders or corporation board members.

Aquaculture Notes

Several publications have been distributed:

- "History of Marine Hatcheries of Alaska"
- "Alaska Statutes--Commercial Fishing Loan Act, Salmon Hatcheries, Fisheries Enhancement Loan Program, Salmon Authorities"
- "Economic Feasibility of Private Nonprofit Ocean Ranching Ventures"
- "Artificial Salmon Spawning, a Manual"
- "Japanese and Soviet Attitudes Toward Aquaculture"
- "The Alaska Salmon Enhancement Program: Imperatives for Economic Success"

Additionally, the following publications are currently being readied for publication:

- "Engineering for Aquaculturists"
- "Life Cycle Costing: a Tool for Decision Making"
- "Accounting for Private Nonprofit Salmon Hatcheries"

Other Publications

A major article on the ASEP appeared in the widely distributed periodical Alaska Seas and Coasts, as does a column "Aquaculture News Briefs."

Aquaculture Distribution List

A mailing list of some 30 aquaculturists is maintained. Information of importance to Alaskan salmon culturists is rapidly disseminated. Some 40 items such as evaluations of new laws, a paper on corporate insurance, news of Canadian enhancement techniques, use of a Secci disk, sources of information, reprints of scientific articles of especially high interest, etc., were sent out. A five-page questionnaire was mailed out inquiring as to specific needs and ways to improve the distribution list service.

A Fisheries Institute was held in Petersburg that brought together the state's aquaculturists and commercial fishermen to exchange views and address issues of common interest.

OBJECTIVES

To assist in the development of the state's aquaculture potential by offering technical information to interested corporations, individuals, schools, and other government entities. During the next year, the following specific objectives will be addressed:

- To respond to requests for assistance by aquaculture groups in the areas of business management, economics, salmon hatchery techniques, chemistry, and biological engineering.
- To train individuals in hatchery techniques through the use of University of Alaska credit and non-credit courses in conjunction with other experienced state and local personnel. Coordinate training of hatchery personnel of the regional corporations working in cooperation with other federal agencies such as CETA.
- To train management officers and board members of new aquaculture corporations in principles of business management, cost accounting, and decision making vis-a-vis aquaculture.
- To disseminate results of research projects to specific user groups in a timely manner. Disseminate information on relevant state and federal legislation to user groups.

APPROACH

Talent Bank

Our best response for help can be made by utilizing a team of specialists and drawing upon the appropriate specialist or specialists for assistance to any group at any time. This "talent bank" will consist of fishery and hatchery biologists, hydraulic engineers and designers, business management specialists, chemists, and economists.

Of immediate concern is the continued need for the economist or business management specialist. Assistance in this area of need is not readily available to corporations and is too often not considered a high priority. However, failure to attend to the details of organizational management, business management, and the economics of the entire operation, will absolutely lead to failure. Therefore, based on past performances, we are expecting, that the demand for an economist and business management help will be of continued high priority.

Requests for assistance from newly developing corporations or from existing corporations will be directed through the Marine Advisory Aquaculture Specialist. He will arrange for meetings or workshops between the University personnel and the corporation. Individuals from the University will advise the corporation in their areas of expertise. There are currently 10 people who can respond to requests for assistance:

W. Phillips	Corporation management
T. Robinson	Nonprofit corporate accounting
G. Gleason	Marketing
H. Zach	Computers
R. Solie	Public sector labor relations
J. Colonell	Engineering
R. Carlson	Water management
T. Cooney	Oceanography/carrying capacity of estuaries
D. Hoffman	Business management
C. Kerns	Aquaculture techniques/facility design/ feasibility.

Others are expected to become available as the need arises.

Aquaculture Class

User group response has resulted in the creation of an Introduction to Aquaculture class which has been taught and will continue to be taught through the Division of Fisheries, University of Alaska,

Juneau, by the Aquaculture Specialist. Major approach philosophy has been to introduce students to the basics in salmon biology, hatchery technology, genetics, and management implications. Each class requires 15 lecture hours. Classes have been taught in Petersburg and Kodiak and will be taught on the Kenai Peninsula.

Aquaculture Workshops

Besides offering specific advice to aquaculture corporations, much could be gained by offering a technical business management seminar to officers and managers of all aquaculture corporations. Several such seminars are to be given for the funding year and will be planned by the School of Management and the Aquaculture Specialists.

The Aquaculture Specialist will serve as the educational coordinator between the talent bank specialist and the officers and management of the aquaculture corporation. He and the local advisory agents will assist the aquaculture corporations on a local level in implementing the finance and business management plans set forth by the talent bank. This will provide the continuity and rapid problem solving capability that an effective training program requires.

A workshop on sharing risk is planned for the upcoming year. While aquaculturists are the prime audience, a wide range of marine resource users could benefit from a better understanding of risk taking and sharing.

Aquaculture Notes

Results of University research in the field of aquaculture will continue to be disseminated through the publication of Aquaculture Notes.

INTERACTION

This project interacts with Sea Grant Renewable Marine Resource projects on Ocean Ranching.

EQUIPMENT REQUESTED

None.

Program: RENEWABLE MARINE RESOURCE
Project: R/02-01

Title: Carrying Capacity of Estuarine Waters

Principal Investigator: R. T. Cooney
Unit: Institute of Marine Science

Associate Investigator: W. S. Reeburg
Unit: Institute of Marine Science

Associate Investigator: R. A. Nevé
Unit: Institute of Marine Science

Funding Information:

Present level:	SG: $53,300	Proposed level:	SG: $74,300
	UA: $26,500		UA: $33,600
Date Initiated:	1 Nov 75	Est. Comp. Date:	31 Oct 78

BACKGROUND AND NEED

The development of private nonprofit salmon hatcheries is a reality in Alaska. This research project was initiated on request of the Prince William Sound Aquaculture Corporation (PWSAC) to examine the ability of the estuary adjacent to the Port San Juan hatchery to support the large numbers of fry pink salmon released each spring from the facility. Port San Juan is located on Evans Island in southwest Prince William Sound.

Bailey, et al., (1975) looked at the carrying capacity of a cove in southeastern Alaska with regard to its ability to support natural runs of pink and chum salmon. The results were speculative due to insufficient data, but they did point out the importance of consideration of carrying capacity when operating a hatchery or choosing new hatchery sites. It is difficult to know which factors are significant in terms of the capacity of an estuary to accommoddate high levels of fry survival; but certainly food availability, predation, competition, and variations in temperature which may affect growth rates and timing of emergence, are among the important factors.

As was detailed in a previous proposal, the literature describing the feeding dependencies of juvenile pink salmon suggests the young fishes may first exploit epibenthic and meiobenthic food sources close to home streams before assuming a more pelagic feeding role as they move out of the estuaries into the open shelf and ocean environments (Gerke and Kaczynski, 1972; Manzer, 1969; Robinson, et al., 1968). If this notion concerning an initial dependency on shallow water meiobenthic communities is correct,

the carrying capacity of a region would be more closely related to the nearshore area exhibiting appropriate "nursery" characteristics than to the productivity of the overlying waters. Nothing is known about the vulnerability of first feeding fry in the nearshore areas except that Dolly Varden trout and some other sea fishes commonly congregate around stream mouths feeding on fry as they emerge.

Our present research is designed to evaluate the extent to which the nearshore benthic community is utilized. If this habitat proves to be "critical" and limiting in the extent to which it can support large introduced fry populations, something significant will have been learned since the meiofaunal community is generally considered to be at the top of a food chain with only the larger epibenthic harpacticoid copepods occasionally being used as a food source (McIntyre and Murison, 1973). The information would be invaluable to PWSAC as an aid in selection of additional hatchery sites as well as in the advisability of holding and feeding the young fishes in the hatchery prior to release in the pelagic zone of the estuary.

ACCOMPLISHMENTS

A preliminary investigation of the salmon fry carrying capacity of the estuarine waters adjacent to the Prince William Sound Aquaculture Corporation's Port San Juan salmon hatchery was carried out during the period 4 April through 8 June 1976. The field party consisted of a Biological Oceanographer, Mr. Bob Clasby, and two graduate students. Selected stations were sampled in the bay and adjacent waters for temperature, salinity, nutrients, chloropyll *a*, and phytoplankton and zooplankton standing stocks. Potential salmon fry food items were collected using fine-mesh (216μ Nitex) plankton nets towed vertically or horizontally. Salmon fry were sampled with handheld dip nets.

A first order analysis of our observations indicates that the chemical and physical characteristics of the bay are governed by tidal currents moving in and out through the entrances to the north and east of Bettles Island. The predominant northeast to east winds of the area cause some wind mixing to occur within the bay. The production of organic matter and its transfer up the food chain preceded the out-migration of salmon fry by approximately one month. Phytoplankton standing stock (measured as chlorophyll *a*) exhibited a gradual increase starting in early April, peaking in late May, then declining with a slight increase again in early June. The zooplankton in the upper 20 m of the water column were most abundant between 15 to 30 April. Salmon fry emergence became significant at about this time and continued into mid June. These observations suggest that maximum zooplankton densities in the surface waters of the bay fell

below 500/m^3 prior to significant fry out-migration, although the concentration did start to increase again in late May. At this time there is no way of knowing if the low concentration of zooplankton had any effect on the feeding of the salmon fry.

Concentrations of salmon fry were observed in the nearshore areas of the bay, while none were observed in the pelagic areas. Stomach content analyses conducted on a small number of these fry indicated that they were feeding on the dominant zooplankton of the nearshore area (copepod genus *Oncaea*) which differed from that found in the pelagic areas of the bay. It appears that the nearshore habitat is unique and deserves a more concentrated research effort than was expended on this area in 1976.

The first year's effort demonstrated the feasability of collecting, processing and evaluating data in the field, and showed where to concentrate major research during the 1977 field season.

This season, April-June 1977, we expect to address two major questions: (1) What are the food dependencies of first feeding fry in the area adjacent to the hatchery and are these dependencies benthic or pelagic? and (2) What features characterize "critical habitat" for first feeding fry if the meiobenthos proves to be important, and can "habitat" be ascribed to a planktophagous feeding regime if pelagic organisms prove to be the food source?

Of secondary importance will be our efforts to gain more information about the kind of predation to which the salmon fry are susceptible and the frequencies with which it occurs. We will also take every opportunity to follow the salmon fry past their "critical" first feeding and learn what we can about feeding dependencies as the fry mature, increasing in size and swimming capability.

OBJECTIVES

To identify those parameters which, when monitored seasonally, will provide the basis for deciding on optimal release times for hatchery-raised fry. During the third year, the following specific objectives will be addressed:

- Complete studies of the nursery habitats in the estuary adjacent to the Port San Juan hatchery.
- Examine habitat and fry feeding habits off several naturally producing pink salmon streams for comparison with the Port San Juan model.

APPROACH

We plan to put a field party in the area in mid-April or at the time when fry are beginning to migrate from the hatchery

into the estuary. Personnel will complete specific studies of nursery habitats adjacent to the Port San Juan hatchery and then will conduct assessments of several other areas in Prince William Sound from a charter fishing vessel. The selection of streams or sites will be accomplished through interaction with PWSAC biologists and by consulting the historical records published by Alaska Department of Fish and Game.

This approach will characterize the final step in the sequencing of the overall project as envisioned at this point in time (March 1977). It is possible that developments emerging from efforts planned this summer will cause a revision in plans for the 1977-7 funding period.

The development and finalization of a quantitative description of "carrying capacity" will be attempted using the results of the studies examining feeding dependencies, nearshore nursery areas, food abundance both benthic and pelagic, predator-prey relationships, competitors, and temperature or other environmental factor At the least we expect to be able to rank the most obvious variables in order of importance, and to suggest some strategies for optimizing fry survival.

INTERACTION

This project interacts with Sea Grant Information and Advisory Pr A/71-05; Renewable Marine Resource Research Project R/02-05; and Program of the Alaska Department of Fish and Game.

EQUIPMENT REQUESTED

None.

REFERENCES

Bailey, J.E., B. L. Wing, and C. R. Mattson. 1975. Zooplankton Abundance and Feeding Habits of Fry or Pink Salmon, *Oncorhynchus gorbusha*, and Chum Salmon, *Oncorhynchus keta*, in Traitors Cove, Alaska, with Speculation on the Carrying Capacity of the Area. Fish. Bull. 73(4): 846-859.

Gerke, R. J. and V. W. Kaczynski. 1972. Food of Juvenile Pink and Chum Salmon in Puget Sound Washington. Wash. Dept. Fish; Tech. Rep. 10, 27 p.

Manzer, J. I. 1969. Stomach Contents of Juvenile Pacific Salmon in Chatham Sound and Adjacent Waters. J. Fish Res. Board Can. 26: 2219-2223.

McIntyre, A. D., Murison, D. J. 1973. The Meiofauna of a Flatfish Nursery Ground. J. mar. biol. Ass. U.K. 53: 93-118.

Robinson, D. G., W. E. Barraclough, and J. D. Fulton. 1969. Number, Size, Composition, Weight and Food of Larval and Juvenile Fish Caught with a Two-boat Surface Trawl in the Straits of Georgia May 1-4, 1967. Fish. Res. Board Can., Pac. Oceanogr. Group, Nanaim, B.C., Manuscr. Rept. Ser. 964, 105 p.

Program: RENEWABLE MARINE RESOURCES
Project: R/02-06

Title: Fishfeed Development

Principal Investigator: C. L. Kerns
Unit: Marine Advisory Program

Funding Information

Present level:	SG: $0	Proposed level:	SG: $10,104
	UA: $0		UA: $ 5,900
Date Initiated:	1 Nov 78	Est. Comp. Date:	31 Oct 81

BACKGROUND AND NEED

An efficacious regimen for pink (*Oncorhynchus gorbuscha*) and chum salmon (*O. keta*) has yet to be developed. While salmon ranching is burgeoning in Alaska (and elsewhere), the biological realities are that unfed salmon fry face very severe environs upon release. Short term rearing has been demonstrated to markedly increase survival, fry to adult. With the added expenses that Alaskan aquaculturists face due to the high cost of goods and services, every economic advantage must be sought. The development of a practical ration for pink and chum salmon will be of inestimable value to Alaskan salmon ranchers.

Researchers at the Pacific Biological Station in British Columbia have found that pink and chum salmon have different nutritional requirements than do king (*O. tschawytscha*) and coho salmon (*O. kisutch*). In a series of experiments on saltwater net pen rearing of the various Pacific salmon, it was noted that year after year king and coho salmon grew satisfactorily but pink and chum salmon did not. Diet has been determined to be the central problem. (The commonly used rations, Oregon Moist Pellet (OMP) and the dry ration, Abernathy, were developed specifically for king and coho.)

In the Japanese experience short term rearing, i. e., holding salmon fry until estuary conditions are optimal before release, increases the survival, fry to adult, by approximately two-fold. The increases in survival are thought to be related to the timing of the spring plankton blooms. If fry migrate before the bloom they suffer two manifestations of essentially one problem: (1) limited food supply for themselves; and (2) increased susceptibility to predation. Researchers at the National Marine Fisheries Service's Auke Bay Laboratory found that with one lot of pink salmon fry that migrated two weeks earlier than another, the survival of the later migrating fry was increased 1.7-fold over that of the earlier departing lot.

The present locally produced supply and the prognosis for the future supply of fish meals, the major component of artificial fish diets, is excellent. Alaska currently has three fish meal plants in operation; bottomfish and increased shore-based processing should increase the meal supply sharply. Crab, herring and salmon meal are currently shipped to feed mills in Oregon and Washington where with the addition of scrap fish and cereal meals they are made into salmon rations that are returned to Alaska. This obvious energy-inefficient practice started before local demand for salmon rations warranted local production. With the state's $500 million public and private salmon enhancement program just beginning, the local need for economical fish rations is sure to grow.

OBJECTIVE

To develop and test an economical dry salmon ration composed of readily available locally produced dry ingredients and a species of abundant underutilized fresh fish.

Specific objectives for this project during year one will be to test varying rations of calories to protein (c/p) (see Table I, Diet Formulations) in order to find the optimal regimen that pink salmon fry require under the local conditions of Prince William Sound. A comparison with the commercially available moist and dry ration will be made as controls (see Table II for contents of test diets).

Year two will be spent determining optimum dietary protein levels. In year three alternate waste or by-product ingredients will be explored; in addition, a statistical evaluation of the returning adult pink salmon from year one will be run.

APPROACH

Three or four test rations with varying levels of energy and protein, consequently varying ratios of c/p, will be manufactured and tested on a pilot scale level. The rations contain the same proportions of herring, salmon and crab meals, whey and vitamins. The amount of fresh fish and lipids will be varied inversely to produce the different c/p ratios. The test rations will be made by using extrusion-heat drying-cracking-screening.

Of the three levels of testing available--laboratory, pilot, and production--pilot scale was thought to provide the best mix of speed and practical significance.

Efforts to develop the ration will be shared by three groups: Seward Fisheries (SF), Prince William Sound Regional Aquaculture

Association (PWSAC), and the University of Alaska Sea Grant Program. Seward Fisheries are to supply most of the feed ingredients, some chemical analyses, and selected equipment. PWSAC will supply its facilities at Port San Juan, the manpower to feed the fish, the fish, and other assistance. It is planned that the Principal Investigator will manufacture the ration, assist with experimental design and statistical analyses, and write up the results.

INTERACTION

This project interacts with Sea Grant Information and Advisory project A/71-01 Mission B and with Renewable Marine Resource Research project on salmon ranching.

EQUIPMENT REQUESTED

5 hp meat grinder	$1,200
dryer	600
grist mill	100
dry mill	800
screens	200
nets	3,000

TABLE I

YEAR 01 DIET FORMULATION

INGREDIENTS

DIET #	DRY									WET		
	Halibut Meal	Salmon Meal	Crab Meal	Herring Meal	Whey	Wheat Germ	Yeast	Vit.	Kelp	Fresh Fish	Marine Oil	Soy Oil
1	5	15	10	5	10	5	5	2	5	31	7	--
2	5	15	10	5	10	5	5	2	5	26	7	5
3	5	15	10	5	10	5	5	2	5	21	7	10
4	5	15	10	5	10	5	5	2	5	16	7	15

Purpose: To establish optimal calorie-to-protein (c/p) ratio for pink and chum salmon fry.

TABLE II

TOTAL DIET FORMULATED PROXIMATE CONTENTS (EXPRESSED AS % DRY WEIGHT)

DIET #	COMPUTATIONS			
	CP	LIPID	ME	C/P
1	57.1	11.86	3446.4	60.4
2	52.655	16.805	3686.4	70.0
3	48.255	21.755	3926.	81.4
4	43.855	26.705	4166.4	95.

WET FRACTION DIET FORMULATED PROXIMATE CONTENTS (EXPRESSED AS % DRY WEIGHT)

DIET #	COMPUTATIONS			
	CP	LIPID	ME	C/P
DRY FRACTION 1-4				
Expressed as 57%	29.23	4.495	1837.35	62.96
(Expressed as 100%)	(51.2)	(7.89)	(3223.42)	
WET FRACTION				
(Expressed as 43%)				
1	27.825	7.36	1609.	57.8
2	23.425	12.31	1849.	78.93
3	19.025	17.26	2089.	109.8
4	14.625	22.21	2329.	159.24

Program: RENEWABLE MARINE RESOURCES
Project: R/02-05

Title: Genetic Interaction of Auke Creek Hatchery Pink Salmon with Natural Spawning Stocks in Auke Creek

Principal Investigator: A. J. Gharrett
Unit: Division of Fisheries

Funding Information:

Present level:	SG: $23,700 UA: $22,600	Proposed level:	SG: $14,571 UA: $12,037
Date Initiated	1 Nov 77	Est Comp. Date:	31 Oct 82

Director's Note:

This project was scheduled to start on November 1, 1977. Due to financial problems within the University, the start of this project has been delayed until July 1, 1978. Even with this delay, samples and some equipment and chemicals have been obtained.

BACKGROUND AND NEED

The study of the genetics of salmon possesses some important implications for both fishery and hatchery management. It is not only possible to use genetic differences between populations as a basis for stock identification, but it is also important to employ genetic considerations initially in locating a hatchery and subsequently in operating it. Unfortunately, there is little information currently available regarding the genetics of Alaskan stocks and little work is being done to accumulate such information. Since extensive construction of hatcheries is being planned throughout the state as a result of private-nonprofit hatchery legislation and of public bonds for the Alaska Department of Fish and Game, it is especially important at this time to thoroughly examine the genetics of Alaska's salmon. The implementation of these hatchery programs make it important to obtain information that may help answer such questions as: How can genetics be used to improve hatchery practice? Can "genetic tagging" be practically employed to mark different hatchery stocks? What impact do hatchery fish have on natural stocks? While it is premature to expect genetics to exert an influence in aquaculture comparable to that realized in agriculture, the potential for such significant contributions exists, and answers to the questions posed above should receive serious consideration in the development of Alaska's aquaculture programs.

The crux of most genetic considerations at the populations level is genetic variation. The genetic composition of each population

of fish displays some degree of variation and has evolved from a combination of influences such as population size, selective pressures, and immigration from other populations. Because it serves as a buffer for environmental fluctuations, genetic variation is essential for the long term survival of a population; hence, the maintenance of variation in the genetic composition of their hatchery stocks should be of major concern to fish culturists.

Variation is manifested by population differences in allelic frequencies which are determined by individual differences in allelic composition at a particular locus. Allelic differences are expressed by small structural variations in the polypeptide specified by a locus. Frequently these differences can be resolved by starch gel electrophoresis, a technique by which dif ferently charged particles (e.g., proteins) are separated in an electric field (see e.g., Gordon, 1975). Following the electrophoresis of samples, histochemical stains are utilized to identify specific enzyme activities (Hunter and Markert, 1957; Shaw and Prasad, 1970). In this way, the genetic variability present at a number of different genetic loci may be assessed. The five Alaskan species of *Oncorhynchus* have all demonstrated variability at a minimum of ten electrophoretically detectable loci and only the coho has fewer than six loci that are commonly polymorphic (Utter, personal communication).

As mentioned previously, good hatchery procedures require that genetic variation be maintained in the cultured stock. This can be done utilizing a large number of breeders taken at random from the returning adults, thereby minimizing variability losses as a result of inbreeding and inadvertant selection. Changes in variability of a stock from year to year can be monitored electrophoretically.

Genetic variability has been used extensively to identify and compare discrete populations of fishes, especially salmonids (Allendorf, 1975); and some studies have been made of Alaskan stocks (e.g., Aspinwall, 1974; Grant, 1977; Donnelly, et al., 1977). The applications of electrophoretic techniques can be further extended in a hatchery situation where it is possible to alter allelic frequencies by appropriate breeding schemes, thereby producing a stock of fish which is uniquely identifiable. Usually the enhancement of relatively rare alleles is involved in this process. Such genetic "tags" could be enormously important to fishery management because they are readily detected and relatively inexpensive to implement and recover. Because these tags are heritable, once a stock is tagged, all the descendants of that stock are also tagged.

There are two potential problems with genetic tagging; the first concerns the means of implementation and the second concerns the results. When a rare allele is enhanced in a stock, one must choose parents from the relatively small number of individuals possessing that allele. Because decreases in variability may

result if an insufficient number of breeders are used, it is important that breeding schemes employed minimize inbreeding. The second potential problem in genetic tagging results from the fact that the genetic composition of the population is altered by the process. Presumably the process acts randomly on all loci except the one involved in the tag and possibly a few loci closely linked to it; nevertheless, a rearrangement is being made which could affect the fitness of the stock. Although the possibility is small that a selective disadvantage may be conveyed to inheritors of such a tag, it is necessary that genetic tagging be critically examined under a variety of circumstances (location, species, and genetic locus) before such tagging is applied extensively.

While starch gel electrophoresis provides a powerful tool for the study of the genetics of fishes, it is limited because only a small portion of the loci present in an organism can be characterized electrophoretically. In addition, many questions remain unanswered because of their complexity. Notable are questions concerning interactions between genes and between genes and the environment; such relationships can only be generally described. Within a population, particular combinations of genetic information develop that provide a genetic strategy which allows a population to interact successfully with its environment(s). A successful strategy is not necessarily unique but it is complex and may be disrupted by the introduction of genetic information from a population that has developed a different strategy. Such a disruption may result from genetic interaction of hatchery fish (particularly those descended from transplants) with nearby natural stocks. The possibility of a loss of fitness in local natural stocks resulting from such interactions make it necessary to determine the extent to which hatchery fish interbreed with local, naturally spawning stocks. Natural stocks serve as a "reserve" to genetic variability. Thus, it is essential to the sound management of salmon fisheries that the implications of these interactions be examined. While it is not possible to assess the impact of genetic interactions of hatchery fish or native stocks, it is possible to estimate the extent of interactions. This can be done by observing the rate at which an allele enhanced in the hatchery stock increases in naturally spawning stocks with which they interbreed.

In this proposal the Auke Lake system will be used as a model system to examine the interaction of hatchery pink salmon with the naturally spawning fish in this system. To accomplish this, a relatively rare allele will be enhanced in the hatchery fish and the subsequent increase of this allele in the other portions of this system will be monitored. At the same time, the relative survival of "tagged" and "untagged" hatchery fish will be examined. Finally, the genetic compositions of all the breeding groups in this system will be determined and compared.

ACCOMPLISHMENTS

Because it is the middle of the first year of funding for this project, all the milestones listed for this year have not been achieved. Significant progress has been made, however: samples have been obtained from all breeding groups for the 1977 brood year and from the hatchery stock; equipment and chemicals necessary to initiate electrophoretic screening have been procured; and a preliminary examination of a number of enzyme systems have been done on the hatchery samples. As a result of these preliminary studies, it is apparent that the activities of some enzymes deteriorate with prolonged storage. This loss in activity indicates that in order to obtain the maximum information from a particular sample, it must be processed as soon as possible after it has been taken. An encouraging note is that laboratory facilities dedicated to research will be available by mid-summer. Presently, research must be planned around heavy class use of the only laboratory facility.

OBJECTIVE

A number of genetic problems which are important to the effective management of both Alaska's salmon fisheries and its hatcheries may be addressed by employing electrophoretic techniques. Specifically, in this project these techniques will be used to examine the genetic variability and changes in variability that occur in discrete breeding groups of pink salmon to provide some insight into the following questions:

(1) To what extent do hatchery fish interbreed with naturally spawning stocks?

(2) Do genetic tags significantly reduce the fitness of the populations into which they are introduced?

(3) Do substantial differences between distinct breeding groups exist within a stream system; and if they exist, do these differences reflect a loss in variability of the hatchery stock?

APPROACH

Use of stocks from the Auke Lake System is advantageous for several reasons:

(1) There is an operational hatchery in the system, which has been stocked from native fish.

(2) The hatchery is oriented toward research.

(3) The local stocks have been identified and the drainage system well characterized.

(4) Some assistance from NMFS Auke Bay Laboratory personnel is available for obtaining samples and identifying particular stocks. This work is obtained on a reciprocation basis.

(5) The location of the Auke Bay system is adjacent to the University, thus minimizing transportation and field costs.

In the Auke Lake system both the odd and even year cycles of pink salmon are comprised of distinct breeding groups as determined by the location and the timing of spawning. Using the 20 or more distinct loci in *Oncorhynchus* that may be examined electrophoretically (Utter, personal communication; May, 1975), we will characterize the compositions of the nine different stocks of pink salmon that have been observed in the Auke Lake system as well as the pink salmon used as hatchery stock. Information obtained from these characteristics will be used to determine the following:

(1) The extent to which variation exists within each stock.

(2) The extent of similarity between stocks.

(3) The extent of divergence between even and odd year cycles.

From these results and in cooperation with the NMFS Auke Bay Laboratory, it will be possible to choose a relatively rare allele ($0.05 < p < 0.10$) which will be enhanced in the hatchery stock for use as a "genetic tag." Such tags will be used in the brood years of 1979 and 1980. Males homozygous or heterozygous for this allele will be mated with females randomly selected from the population. As a result the frequency of this allele in the hatchery population will be increased. In 1981 and 1982, the incidence of these "tags" among fish taken from the spawning grounds will be ascertained. These "tags" provide a preliminary estimate of the degree to which salmon from the hatchery interbreed with each distinct breeding group. Increased incidence of the tag in the run as a whole in subsequent generations will provide additional information.

Additionally, since a random sample of the released juveniles is routinely fin clipped, it will be possible to examine the fitness of the genetically "tagged" fish relative to the "untagged" hatchery fish. To do this the genotypic frequencies of the returning fin clipped fish (only hatchery fish) will be compared to their frequencies at release.

INTERACTION

The project interacts with Sea Grant's Renewable Marine Resource Research projects on salmon ranching and genetic research on salmon being carried out by the Alaska Department of Fish and Game and the Auke Bay Laboratory of the National Marine Fisheries Service.

EQUIPMENT

None requested.

REFERENCES

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Aspinwall, N. 1974. Genetic analysis of North American populations of pink salmon, *Oncorhynchus gorbuscha*, possible evidence for the neutral mutation - random drift hypothesis. Evolution 28:295-305.

Donnelly, R. F., K. R. Johnson, W. H. Hershberger, and D. E. Bevan. 1977. A biochemical investigation of Kodiak Island pink salmon gene frequencies. Final Report, Contract No. 3475, Alaska Department of Fish and Game.

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Grant, S. 1977. Biochemical genetic variation in sockeye salmon: the use of biochemical markers for stock identification in Bristol Bay and Cook Inlet, Alaska. Final Report, Contract No. 3131, Alaska Department of Fish and Game, Division of Commercial Fisheries.

Hunter, R. L., and C. L. Markert. 1957. Histochemical demonstration of enzymes separated by zone electrophoresis in starch gels. Science 125:1294-1295.

May, B. 1975. Electrophoretic variation in the genus *Oncorhynchus*: the methodology, genetic basis, and practical applications to fisheries research and management. M.S. Thesis, University of Washington, Seattle, Washington.

Shaw, C. R., and R. Prasad. 1970. Starch gel electrophoresis of enzymes: a compilation of recipes. Biochem. Genet. 4:297-320.

Taylor, S. USNMFS Auke Bay Laboratory, Auke Bay, Alaska 99821.

Utter, F. M. USNMFS Montlake Laboratory, Seattle Washington 98111.

MILESTONES

Project R/02-05

Current Year

(1) Equip laboratory
(2) Develop laboratory and staining techniques
(3) Assay and compare 1977 and 1978 pink salmon runs
(4) Choose allele to be enhanced in 1979
(5) Assay other local pink salmon stocks and compare with Auke Creek fish.

1978-1979

(1) Assay 1979 pink salmon run
(2) Genetically tag hatchery fish
(3) Compare with 1977 and 1978 runs
(4) Assay and compare other local pink salmon stocks.

1979-1980

(1) Assay 1980 pink salmon run
(2) Genetically tag hatchery fish (different allele from 1979)
(3) Compare with runs of other local stocks and previous years.

1980-1981

(1) Assess interaction of hatchery fish with naturally spawning fish
(2) Assess relative survival of tagged fish
(3) Assess tagging efficiency.

1981-1982

See previous year.

APPENDIX

Procedures to be Used in Genetic Study

Sampling

Spent adult pink salmon will be obtained from each spawning site. Liver, heart, eyes, and white muscle samples will be excised from each individual. Where possible, fresh samples will be used for electrophoresis, otherwise they will be kept on ice until they can be frozen.

Downstream migrants will be sampled with small fyke nets throughout their migration period. The samples will again be used fresh when possible and frozen otherwise. The eye portion of the head will be excised for use as well as the fleshy portion of their tails.

Electrophoresis

Small tissue samples are mascerated in an equal volume of distilled water. A small rectangular piece of filter paper is dipped into the extract and inserted into a slab of gel made from hydrolyzed potato starch. Such a gel can accommodate 40 to 50 such wicks in a row. Direct current is applied to the slab so that the current flow is perpendicular to the row of wicks. After the gels have been run they may be sliced horizontally (much like peeling pages off a tablet) so that several different stains may be made for each gel. Histochemical stains specific for particular enzymes or general protein stains are used to stain these slices. Stains for more than 20 specific enzymes are available.

Sample size for comparison of groups

Sample sizes will be from 100 to 200 fish of each group being compared. This is a realistic sample size to run electrophoretically and will produce a 95 percent confidence interval of $\pm$ .03 to .04 for an allele whose frequency is .10.

Method used for genetic tagging (see Figure 1)

A relatively rare allele will be enhanced in the hatchery population by mating randomly chosen females with males heterozyous or homozygous for the rare allele. A small (approximately 1 g) muscle sample will be taken from live males which will be subsequently tagged with a numbered tag and held until it has been determined whether or not they are suitable for the experiment. At least one-half of the progeny will carry that allele (the tag). The relative frequency of the allele used should be present at .05 to .10 in the parental population. As a result of this enhancement the number of tagged individuals will increase from 2.5 to 5 fold in the offspring.

Introgression of genes from hatchery fish into naturally spawning groups

One can detect in samples of naturally spawning fish (100 to 200 fish) a contribution of 10 percent to 20 percent from the hatchery stock tagged as described above. These samples are obtained from spawnouts on the spawning grounds.

Selective disadvantage of a tag

It is necessary to determine that a particular genetic "tag" does not convey a selective disadvantage to its carrier. Approximately 10 percent of the fish released from the Auke Creek hatchery are fin clipped so they may be distinguished from naturally spawned fish when they return. By comparing the genetic compositions of returning fin clipped fish to the compositions of the released stock it will be possible to measure fitness losses greater than 20 percent to 30 percent. While this seems to be a substantial loss, there is no way to practically measure any smaller losses and even this degree of loss will require samples of 200 to 400 fish.

BASIC ENZYME PATTERNS

common homozygote AA	heterozygote AB	rare homozygote BB

INITIAL POPULATION (95% A, 5%, B)

10%	90%	10% of fish tagged

STEP 1

Screen for males heterozygous or homozygous for rare allele (about 150 will occur in 1500 returns).

Cross these males with females chosen at random:

	X	=	and ;	
males (mostly)	females (mostly)			
PARENTS		54%	46%	PROGENY

This population will stablize in one more generation if no followup selection is done:

8%	40%	52%	50% of fish tagged

STEP 2

A single followup in which both males and females are screened will produce an equilibrium population:

28%	50%	22%	80% of fish tagged

Figure 1. Methods used for genetic tagging.

Program: RENEWABLE MARINE RESOURCES
Project: R/02-08

Title: Inheritance of Egg and Fry Characteristics in Chum Salmon

Principal Investigator: W. W. Smoker
Unit: Division of Fisheries

Funding Information

Present level:	SG: $0 UA: $0	Proposed level:	SG: $4,645 UA: $0
Date Initiated:	1 Nov 78	Est. Comp. Date:	31 Oct 79

BACKGROUND AND NEED

In recent years, Alaska has made a commitment to enhance the productivity of salmon resources by means of artificial propagation. Both state government and private organizations have begun large scale programs to build and operate hatcheries and other fish production facilities.

One major source of biological concern is the effects of transplanting stocks of salmon from place to place. (This is a feature of many potential facilities.) Will the artificial maintenance of large numbers of salmon which are naturally adapted to an exotic environment reduce the fitness of neighboring wild populations by the introgression of "hatchery strays"?

The answer to this question requires a precise study of how transplanted fish home to their new natal place, i.e., the extent of straying from a transplanted stock and an answer to the question of the extent of genetic control over characteristics of the fish which are strongly related to fitness (survival and reproduction). It is the latter which is addressed here.

Breeding experiments are a means of investigation of the extent and manner of genetic control over characteristics of salmon. Brannon (1972) observed rheotaxis in artificially incubated sockeye salmon fry born of parents collected in the outlet stream or inlet stream of a lake. Fry whose parents both were from the outlet exhibited a positive rheotaxis. This would have been required of natural offspring of such parents in order for them to migrate from the spawning beds to nursery grounds in the lake. Similarly fry whose parents both were from an inlet stream exhibited negative rheotaxis. Rheotaxis of hybrid fry was indeterminate. This, then, is good evidence of genetic control over characteristics important to fitness.

Bams (1976) observed the homing behavior of two groups of pink salmon. In one, male parents had been chosen from the population

occurring naturally at a hatchery site; female parents were chosen from an exotic, distant, population. In the other group, both parents were from the exotic population. Both groups were incubated, marked, and released at the hatchery site. Homing of the hybrid group, whose fathers occurred naturally at the hatchery, was much more precise in fresh water than was homing of the group in which both parents had been transplanted. Recovery rates for the two groups in the estuarine fishery were similar.

These experiments indicate the power of breeding experiments to at least qualitatively describe the genetic basis of important characteristics of salmon. While a Ph.D. student (and Sea Grant supported research assistant) in Fisheries at Oregon State University, the Principal Investigator performed two breeding experiments with chum salmon at the Netarts Bay field station. In the fall of 1975, eggs from four female Netarts chum salmon were separated into 80 lots and fertilized by five male chum salmon from each of the following populations: Hoodsport Washington (Puget Sound), the Nemah River (Willipa Bay on the Washington Coast), and local Netarts Bay. Observations were recorded of development rate (time of hatching and swimup) for each lot or sibling group. After marking by freeze branding or fin clipping, the short-term growth rates of fry in these 80 lots were observed in a common rearing environment. Their comparative susceptibilities to a bacterial disease (Vibriosis) were observed after a controlled exposure to the pathogen in the Oregon State University fish disease laboratory.

In fall, 1976, gametes from three males and three females were collected from the Netarts Bay population; a similar collection was made from the Kilchis River population about 50 miles distant. These gametes were combined in every possible combination and incubated in replicate lots in incubators designed particularly to allow precise observation of fry emergence from a gravel substrate. In two experiments some sibling groups of these fry were exposed to natural challenges of the same bacterial disease, Vibriosis, in a sea water rearing situation.

Most of this body of data remains unanalyzed. When it is analysed it will provide insight into the suitability of breeding experiments for estimating the inherent differences between stocks of salmon. It will provide experience upon which the differences between stocks of Alaska salmon can be based. When these differences are more quantitatively understood, the policies governing location of hatcheries and transplanting of stocks can be made with better reasoning.

OBJECTIVE

To determine the effects of intraspecies hydridization on hatchery swimup behavior and susceptibility to bacterial disease stress.

APPROACH

The experiments were designed so that data could be subjected to variance analysis. Programs available in the UCLA Biomedical Computer Programs library are capable of this analysis and will be used. The library is available on the University of Alaska Computer System. Data are now recorded in a format suitable for input to the machine, obtaining analysis results should be straight forward.

INTERACTION

None.

EQUIPMENT REQUESTED

None.

REFERENCES

Bams, R. A. 1976. Survival and Propensity for Homing as affect by presence or absence of locally adapted paternal genes in two transplanted populations of pink salmon (*Oncorhynchus gorbuscha*). J. Fish. Res. Board Can. 33:2716-2725.

Brannon, E. L. 1972. Mechanisms controlling migration of sockeye salmon fry. Int. Pac. Salmon Fish. Comm. Bull. 21. 86 pp.

JANUARY 1979

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF CHANGED MEETING DATE

AQUACULTURE POLICY STUDY GROUP

PLEASE DISREGARD THE NOTICE DATED 12/27/78 WHICH SCHEDULED THE AQUACULTURE POLICY STUDY GROUP MEETING ON JANUARY 5.

CHAIRMAN TERRY GARDINER HAS SET THE MEETING FOR WEDNESDAY, JANUARY 10, 1979, 9:00 A.M. in ROOM 421, STATE CAPITOL BUILDING, JUNEAU, ALASKA. AT THIS MEETING THE GROUP WILL REVIEW PROPOSALS AND SELECT A CONSULTANT FOR THE FINANCING STUDY.

* * * * * *

31-Q1LH

STATE OF ALASKA

12/28/78

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF CHANGED MEETING DATE

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* * * * *

STATE OF ALASKA

12/27/78

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF MEETING

THE NEXT MEETING OF THE AQUACULTURE POLICY STUDY GROUP WILL BE HELD FRIDAY, JANUARY 5, 1978, 1:00 P.M. IN ROOM 421, STATE CAPITOL BUILDING (House Finance Committee Room), JUNEAU, ALASKA. AT THIS MEETING THE GROUP WILL REVIEW PROPOSALS FOR DEVELOPMENT OF A DETAILED WORK PLAN FOR THE AQUACULTURE POLICY STUDY GROUP WHICH HAVE PEEN SUBMITTED BY CONSULTANTS.

* * * * * *

AQUACULTURE POLICY STUDY GROUP
January 10, 1979
9:55 a.m.

CALL TO ORDER

Chairman Gardiner called the meeting to order at approximately 9:55 a.m. (attendance list appended to these minutes).

PURPOSE

He advised that the purpose of the meeting was discussion of consultant proposals submitted in response to the Group's request for development of a work plan for Aquaculture within the State.

CONSULTANT PROPOSAL REVIEW POSTPONED

Chairman Gardiner suggested that due to the absence of a number of the Group's membership, action on the pending proposals (from Earl R. Combs, Inc.; Miller & Associates, Inc.; and Barbara Sorensen) be delayed until the Group's next meeting scheduled for February 5 and 6.

NEXT MEETINGS FEBRUARY 5 & 6, 1979

The Chairman advised that copies of the proposals would be mailed to absent members for review prior to the February meetings. He further advised that the agenda for the upcoming meetings would include:

UPCOMING AGENDA

(1) Discussion of Aquaculture Study Proposals

(2) Recommendations for the Alaska Department of Fish and Game Aquaculture Policy Manual

(3) Miscellaneous proposals - information provided by John Williams.

AQUACULTURE IN HAWAII

Jack Milnes furnished the chairman copies of an outline for aquaculture development in Hawaii, asking that the outline be mailed to all members of the Group and that Mr. Grogan procure the documents set forth in outline from the State of Hawaii.

MR. TRACY RARE II LAND DECISION

Mr. Bob Tracy of the U. S. Forest Service in Juneau appeared before the Group commenting upon land status in Prince William Sound and Southeast Alaska as a result of administrative land selections under Rare II, advising that such selections may have implications for aquaculture development.

He displayed maps of the Tongass and Chugach National Forests, stating that within Wilderness classifications exceptions or exclusions would have to be made for aquaculture development.

Mr. Heimbuch asked if a Wilderness designation would be more restrictive than HR 39, and Mr. Tracy replied that he did not believe the proposed action would be more restrictive, adding that the Forest Service is in the process of developing regulations for management of the lands. WILDERNESS vs HR 39

Referring to National Monuments (Admiralty Island and Misty Fjords) Mr. Tracy advised that regulations for management are being developed and it now appears there is leeway for conducting some type of activity as long as such activity meets the requirements of the Antiquities Act. NATIONAL MONUMENTS

The Rare II decision announced by Secretary Bergland places land into three categories: RARE II DESIGNATIONS

(1) Wilderness

(2) Non-Wilderness

(3) Undecided areas requiring further planning before a designation is made.

Wilderness areas will allow no development activities pending determination by Congress as to whether or not these areas will be established Wilderness. WILDERNESS

Non-Wilderness areas permit activities to be undertaken after April 15, 1979, contingent upon approved plans. NON-WILDERNESS

Undecided areas permit no development activities until the necessary planning has been completed and the areas designated either Wilderness or Non-Wilderness. UNDECIDED

Chairman Gardiner questioned Mr. Tracy concerning exemptions included within the 1964 Wilderness Act, advising that he understood such exemptions would likewise need be included within current congressional action establishing the Wilderness. Mr. Tracy advised that the Chairman's understanding was correct.

Mr. Tracy referred to his maps of the Tongass and Chugach areas, advising that under the Rare II decision total acreage has been thus classified:

Tongass TONGASS

5.4 Million Acres - Wilderness

7.3 Million Acres - Non-Wilderness

3.5 Million Acres - Undecided

16.2 Million Acres

Chairman Gardiner stated that from the above figures it is his understanding that approximately 1/3 of the Tongass has been designated Wilderness and the remaining 2/3 is in some form of restricted status, meaning that approximately 1/2 of Southeast Alaska could end up in some form of Wilderness status. Mr. Tracy responded that the Chairman's understanding was correct.

Concerning the Chugach area, Mr. Tracy advised that CHUGACH the administration had already testified before congressional committees recommending Wilderness sites on the Kenai and Polish Fjord. He added that these areas were not included in the Forest Service inventory of land when it was compiled. Additional Wilderness areas proposed under Rare II include Afognak Island and an area on the Kenai near the Moose Range boundry. There are two areas on the Kenai included within the Non-Wilderness designation, while the rest of the acreage on the Kenai is in the undecided/planning category.

Chugach

233 Thousand Acres - Wilderness

237 Thousand Acres - Non-Wilderness

2 Million 800 Thousand Acres - Undecised

69 Thousand Acres - Previously proposed Wilderness

Referring to the above figures set forth by Mr. Tracy, Mr. Heimbuch stated it was his understanding that national legislation could alter the designations set forth under Rare II, and Chairman Gardiner advised that congressional action would supersede anything effected by the administration, but the President could also veto such congressional action.

EFFECT OF CONGRESSIONAL LEGISLATION

Mr. Fisher raised a question concerning whether environmental impact statements would be necessary for hatcheries contemplated within Forest Service management plans. Mr. Tracy replied that it would depend upon the magnitude and significance of the hatchery activity. The Forest Service would prepare an environmental analysis on any project, and on the basis of that analysis would decide whether an environmental impact statement is needed.

ENVIRONMENTAL IMPACT STATEMENTS

Mr. Davis raised a question concerning the Cannery Creek Project on Prince William Sound, and Mr. Tracy advised that the Secretary had excluded that area from the Rare II decision.

CANNERY CREEK PROJECT

Discussion followed on difficulties encountered in mining activities (Borax--road construction) on restricted lands and the overall affect of Native Land Claim Selections.

The meeting adjourned at approximately 10:55 a.m.

ADJOURNMENT

ATTENDANCE
AQUACULTURE POLICY STUDY GROUP
JANUARY 10, 1979

Bob Tracy	Forest Service	Juneau
Bill Sheridan	Forest Service	Juneau
Ivan E. Every	Cook Inlet Aquaculture	Kenai
Floyd E. Heimbuch	Cook Inlet Aquaculture	Soldotna
James E. Fisher	U.S.D.A Rep.	Anchorage
Conner Sorensen (for Barbara Sorensen)	R.R. 4, Box 4903-8	Juneau
Joe Davis	A.D.F. & G.	Juneau
Bob Burkett	A.D.F. & G. FRED Division	Juneau
Jack Milnes	SSRAA	Ketchikan
Ernie Haugen	Legislature	Juneau
Terry Gardiner	Legislature	Juneau
Armin Koernig	PWSAC	Cordova
Bob Grogan	Legislative Finance	Juneau

FEBRUARY 1979

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF MEETING

AQUACULTURE POLICY STUDY GROUP

THE AQUACULTURE POLICY STUDY GROUP WILL MEET TUESDAY, FEBRUARY 13, 1979, 9:00 A.M. IN THE GOVERNOR'S CONFERENCE ROOM, 3rd FLOOR, CAPITOL BUILDING, JUNEAU, ALASKA. THE FOLLOWING ITEMS WILL BE ON THE AGENDA:

(1) Review of proposals and selection of a consultant for the Financing Study.

(2) Formulation of input for the Department of Fish & Game Aquaculture Policy Manual.

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF MEETING

AQUACULTURE POLICY STUDY GROUP

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON FEBRUARY 5th AND 6th IN THE COMMISSIONER OF ADMINISTRATION'S CONFERENCE ROOM ON THE 10th FLOOR OF THE STATE OFFICE BUILDING, JUNEAU, ALASKA. THE MEETINGS WILL START AT 9:00 A.M. ON BOTH DAYS.

THE FOLLOWING ITEMS WILL BE ON THE AGENDA:

(1) Review of proposals and selection of a consultant for the Financing Study.

(2) Formulation of input for the Department of Fish & Game Aquaculture Policy Manual.

ENCLOSED FOR THE REVIEW OF THOSE WHO DID NOT ATTEND THE JANUARY 10 MEETING ARE COPIES OF PROPOSALS RECEIVED.

MINUTES
AQUACULTURE POLICY STUDY GROUP
FEBRUARY 13-14, 1979

TUESDAY - FEBRUARY 13, 1979

Call to Order

Chairman Terry Gardiner called the meeting to order at 9:15 AM in the Governor's Conference Room, Third Floor, Capitol Building.

Roll Call

See attached attendance list.

Agenda

1. Selection of consultant for salmon study.

2. Recommended changes for Department of Fish and Game Aquaculture Policy and Procedures Manual.

Salmon Fisheries Plan

Committee members discussed the various proposals that had been submitted for the salmon fisheries plan. Those included the letter proposal by Barbara Sorensen, Miller & Associates, Inc. and Earl R. Combs, Inc. Ms. Sorensen advised that her letter proposal in no way fell into the same category as the other two proposals. Her plan was more of an expanded one that could not possibly be done in the time constraints involved in this particular study.

Introduction

Jack Milnes introduced Bill Spear, Trustee, Alaska Renewable Resources Corporation. Mr. Spear outlined the purpose for which the corporation was formed and encouraged all participants to get a copy of the Act establishing the corporation which was passed in the last days of the previous legislative session. The address for the Alaska Renewable Resources Committee is P. O. Box 1647, Juneau, Alaska 99802.

Salmon Proposals Continued

Discussion ensued on the proposals of Earl R. Combs, Inc. and Miller and Associates, Inc. It was the consensus of opinion that both firms are qualified to do the study, as well as having qualified staff. However, the Miller report appeared to be more specific and was written in such a manner as to indicate a better understanding of the tasks at hand, with the exception of Task 3.

Acting Chairman

At 9:45 AM Chairman Terry Gardiner appointed Bob Burkett, ADF&G, as Acting Chairman, inasmuch as he had to participate in open session of the legislature.

Salmon Proposals Continued

It was the consensus of opinion of the group that the program needed a strong project leader for liaison between the contract consultant and the group. John Williams recommended that Bob Grogan be selected as that project leader. There was concern among the group that the results of the study must be completed before the end of this legislative session. John Williams indicated that that was not essential and that additional monies could be allocated, if necessary, for the group to get together. Acting Chairman Burkett moved to table the selection of the consultant until after Chairmam Gardiner returned. There being no objection the matter was tabled.

Redraft of Task 3

A committee of the whole went into discussion on better guidelines for the successful contractor as far as Task 3 of the study.

Break

The meeting recessed at 12 Noon, scheduled to reconvene at 1:30 PM.

Salmon Study

Upon reconvening at 1:30 PM the following was selected as the Task 3 guidelines for the Alaskan Salmon Fisheries Study:

1. To inventory both micro and macro economic evaluation systems in use in the state and elsewhere in fisheries, as well as in other resource areas.

2. To identify the economic parameters, both quantifiable and non-quantifiable, and the various methods of analyses that can be applied to these parameters.

3. To select those parameters that would be effective in making an economic evaluation appropriate to the State of Alaska.

4. In light of Tasks 1 and 2 of the request for proposals, furnish a recommendation of the most appropriate parameters and the means to analyze them.

Armin Koernig of PWSAC advised that he felt there was a need for a state coordinator between Fish and Game and Congress concerning the D-2 lands issue lobbying effort. He felt that without such a coordinator various groups might be representing conflicting stands on various issues.

Chairman Gardiner resumed the Chair at 2:15 PM.

Motion

Chairman Gardiner moved and asked for unanimous consent for the selection of Miller and Associates, Inc. to prepare the analysis of the Alaskan Salmon Fishery, Tasks 1, 2, and 4 as submitted in their January 2, 1979 response to the group request proposal and following the amended Task 3 as drafted heretofore by the study group. There being no objection, the motion carried. Chairman Gardiner agreed with the necessity for appointing a coordinator between the Legislature, the group, and the contractor. He therefore agreed to appoint one or more persons employed in the Legislative Finance Division to perform these duties. The group urged that the contract be drawn by March 1, 1979 and that they meet with the consultant at about that time.

Aquaculture Policy and Procedures Manual

Various members of the group advised that they had already submitted in writing their recommendations for changes to the Fish and Game Aquaculture Policy and Procedures Manual.

New Agenda Item

Jack Milnes recommended as an agenda item the matter of the $40,000 remaining from the original $90,000 appropriation received and whether it could be used in some positive way.

Aquaculture Policy and Procedures Manual Continued

Again Chairman Gardiner indicated his hope that the committee as a whole could come up with recommendations to the Fish and Game rather than each separate organization submitting criticism with the possibility of no positive recommendations following. The committee as a whole then commenced reviewing the Policy and Procedures Manual item by item starting with the Definitions and Terms sections.

At 3:30 PM Chairman Gardiner again excused himself turning the Chair back over to Acting Chairman Burkett.

It was suggested that a group workshop might be the more appropriate forum for recommendations to the Policy and Procedures Manual.

Break

The meeting adjourned at 4:10 PM with various members of the study group to meet in a work session immediately following.

WEDNESDAY, FEBRUARY 14, 1979

Call to Order

The meeting was called to order at 9:10 AM by Chairman Terry Gardiner, who appointed Bob Burkett as Acting Chairman, due to the fact that he has to attend legislative committee meetings.

Aquaculture Policy and Procedures Manual

Discussion again ensued on recommendations for the Policy and Procedures Manual. Various hatchery representatives indicated the problems that presently existed in the fishery including facilities with no brood stocks; the need for help managing mixed stocks; the lack of an inventory; and problems of site selection. It was the feeling of the hatchery representatives that the Department of Fish and Game should take the biggest risks. It was their opinion that that Department had the least to lose and thus should give the hatchery every benefit of the doubt.

Break

A 15 minute recess was called at 10:35 AM, reconvening at 11 AM. Ivan Every spoke to the need for corrective legislation concerning the initiative process. It was his opinion that the initiative process should only be allowed to occur once instead of looming over the industry as a constant threat.

Jack Milnes spoke concerning his position with the Renewable Resources Corporation.

Policy and Procedures Manual Continued

It was the concensus of opinion of the group that Goal Statement No. 1 was adequate and that Policy Goal Statement No. 2 should be deleted. Inasmuch as time was running short, Armin Koernig agreed to have his own secretarial staff type up the agreed upon recommended changes to the Policy and Procedures Manual and submit them to Legislative Finance, where they would then be distributed with the Minutes to the members of the Committee.

Break

The meeting adjourned at 12 Noon.

Terry Gardiner	Legislature
Curt Kerns	Sea Grant
Ivan E. Every	C.I.A.
Patrick M. Connell	Legislature
Bill Marsh	NSRAA
Bob Burkett	ADF&G, FRED Division
Sig Olson	USFS
Joe Davis	ADF&G
Margaret Branson	Legislature
Judy Jones	Reporter
Armin F. Koernig	PWSAC
John Williams	LAA
Barbara Sorensen	Revenue
J. N. Milnes	SSRAA
Wm. Spear	Alaska Renewable Resources Corp.
John Sund	Speaker of House Office
Romayne Kareen	Internal Audit
William Sheridan	Formerly USFS now ADF&G
Bob Grogan	Legislative Finance

July 1979
Meeting

MARCH 1979

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

NOTICE OF MEETING

AQUACULTURE POLICY STUDY GROUP

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON SATURDAY, MARCH 3, 1979, 9:00 A.M. IN ROOM 423, CAPITOL BUILDING, JUNEAU, ALASKA. THE PURPOSE OF THE MEETING IS TO REVIEW A PROPOSED CONTRACT WITH MILLER ASSOCIATES.

* * * * * *

31-Q1LH

Alaska State Legislature Ph: 465-3795
3796

JUNEAU ALASKA

NOTICE OF MEETING

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON MAY 7, 1979, 9:00 A.M. IN ROOM 423 OF THE STATE CAPITOL BUILDING, JUNEAU.

THE FOLLOWING IS A PROPOSED AGENDA.

PROPOSED AGENDA

INSTITUTIONAL AND POLICY ANALYSIS: The contractors will present an investigation of policy and organizations having an effect on the salmon fishery. They will present an assessment of the areas and the extent to which identified policy and organizational problems have a detrimental effect on achieving any desired goals.

ECONOMIC EVALUATION: The contractors will present a discussion of macro and micro economic evaluation methods and perameters; particular emphasis will be placed on those parameters that have an effect in making economic evaluations of the salmon fishery.

SEARCH FOR GOALS: The contractors will present information regarding goals for fisheries, goals for the salmon industry which have been previously established, criteria for goal selection and will encourage comments from the committee regarding possible new goals.

FINANCIAL PLANNING: The contractors will discuss the existing elements of the financial system in the context of the economic analysis as well as those changes which will be necessary to achieve possible future goals.

MINUTES
AQUACULTURE POLICY STUDY GROUP
MARCH 3, 1979

SATURDAY - MARCH 3, 1979

Call to Order

Chairman Terry Gardiner called the meeting to order at 9:15 AM in Room 423 of the State Capitol Building.

Roll Call

See attached attendance list.

Agenda

Meeting with Miller and Associates, successful contractor for the salmon fisheries plan.

Introduction

Wally Miller of Miller and Associates introduced himself as well as Bill Wilkerson of Eisenhower, Carlson, et al. and Dan Malick of Leonard Lane and Associates.

Discussion on Contracts

Mr. Miller advised that his firm was open for questions and discussion on the contract. He wanted as much input from the group as possible as to how they wanted the study conducted. Bill Marsh of NSRAA suggested monthly meetings between the policy study group and the consultants or their representatives throughout the program. Mr. Wilkerson advised that although they would be willing to do so, that he didn't feel that it was absolutely necessary due to the fact that Leonard Lane and Associates had a Juneau office and would be close at hand to answer questions and to accept input. The pros and cons of soliciting federal funds for the program were discussed. The result was that funding from all areas should be looked at in order to enhance the success of the program.

Various tentative guidelines provided by the group included, among other things:

1. Maintaining the Alaska way of life on which no monetary amount can be set.

2. The State of Alaska's fiscal situation and its impact on the program.

3. The possibility of private financing taking over publicly supported projects.

4. Looking into the State's present investments to determine if this might not be a good investment under the permanent fund.

5. The fact that the Alaska Constitution as well as existing statutes would need to be reviewed in order to perform tasks 1 and 2. The questions is "is our Legislative package adequate"? Mr. Miller advised that he had already reviewed our Alaska Constitution and was struck by the strength in its language. Wherein most constitutions were vague using terms such as "may", Alaska's Constitution for the main says, "shall".

6. Miller advised that an important ingredient to the success of the program was the need for long-term financial authority as well as long-term management authority.

7. The need to minimize the competition between the fisheries, i.e. competition between salmon and bottom fish.

8. An evaluation of the permitting process.

The consultants were advised that the Fish and Game engineering staff coordinates the permitting process and can possibly be of assistance to them. Mr. Milnes advised that Jeanne Sandy had a graph on the permitting procedure and could provide them with this information.

9. The suggestion was made that the consultants secure ideas from sportsmen's associations.

Wally Miller advised that he would be obtaining a list of all members of the group as well as their telephone numbers and would be contacting them for input. He further advised that this was not merely a "paper study" and they would be talking with people from all sectors in order to get input.

Federal Fisheries Program

Mr. Wilkerson advised that it was a 99% possibility that the Forest Service would be moved to the Department of Natural Resources. Some members expressed their regret due to the excellent cooperation between the Forest Service and the State Department of Fish and Game.

Chairman Gardiner advised that he had been to Washington, D.C. and met with members of the National Resources Committee to discuss the D-2 issue. He advised he learned that there would definitely be federal oversight due to subsistence. He was surprised to learn that Alaska's Congressional delegation had already conceded this.

It was suggested that the consultants call upon Bob Grogan frequently inasmuch as he would be able to provide them with lots of information as well as the location thereof.

Mr. Miller advised that he would be needing a copy of the Little Study on "bottom fish".

Break

The meeting adjourned at 12 Noon.

AQUACULTURE POLICY STUDY GROUP

Bob Burkett	ADF&G, F.R.E.D.
Terry Gardiner	Alaska Legislature
Bob Grogan	Legislative Finance Division
Floyd E. Heimbuch	Cook Inlet A.A.
Joe Davis	ADF&G, F.R.E.D.
Curt Kerns	Sea Grant
Armin E. Koernig	PWSAC
J. N. Milnes	SSRAA
Bill Marsh	NSRAA
Bill Sheridan	Formerly USFS now ADF&G
Barbara Sorensen	Department of Revenue

GUESTS IN ATTENDANCE

Margaret Branson	Legislature
Wally Miller	Miller & Associates
Bill Wilkerson	Eisenhower, Carlson, et al
Dan Malick	Leonard Lane & Associates
Ron Wenty	

MAY 1979

MINUTES
AQUACULTURE POLICY STUDY GROUP
MAY 7, 1979

MONDAY - MAY 7, 1979

Call to Order

Chairman Terry Gardiner called the meeting to order at 9:25 a.m. in Room 423 of the State Capitol Building.

Roll Call

See attached attendance list.

Agenda

A combined presentation by Wally Miller of Miller and Associates, Inc., Bill Wilkerson of Miller and Associates, Inc. and Dan Malick of Leonard Lane and Associates of the beginning investigative work done by the contractors for the salmon fisheries plan.

Presentation of Study

Mr. Malick made the first presentation on Institutional & Policy Analysis. He referred to a chart which was an analysis of federal, state and local governments and other entities having an effect on the fisheries. He wanted comments from the group on observations they might make about the organizational complexities of trying to get a fisheries program in operation.

Mr. Wilkerson followed up with a presentation of his investigation of key federal institutions involved in the concept of salmon resource development in regards to funding and regulatory activities. He discussed the relationship between established federal fisheries programs and the State of Alaska as to the problems already faced by the state in regards to federal control and jurisdiction of Alaska land and waters. He advised, in conclusion, that at this time, as far as the federally-funded EDA is concerned, there has been no real contribution at the federal level in terms of constructing hatcheries or development of the salmon resource.

Summary

Mr. Miller commented, in summary, that Alaska has a choice of simply reacting to what the federal government does or to decide on a program and pursue that and believes that their presentation has suggested the latter as a means of accomplishing the goal of a salmon resource development program.

Mr. Malick then summarized his presentation on the Alaska Salmon Resource Development Program. Referring to the chart, he advised

that looking at each of the individual institutions a lot of variations between the specificity and clarity of their programs and goals can be seen, and a clear picture cannot be gotten of what the Alaska Salmon Resource Development Program is doing as a single entity. He concluded that maybe one of the things that will come out of here is the group can see that program as a single entity directed towards a goal and then having the institutions themselves direct the way in which the program can achieve its goal. The question is the direction the group can head towards.

Break

Meeting recessed at 11:45 a.m., scheduled to reconvene at 1:15 p.m.

Economic Evaluation

Upon reconvening at 1:30 p.m., Mr. Miller made his presentation on economic evaluations of salmon enhancement projects which encompassed the macro and micro economic evaluation techniques as applied to salmon fishing. In conjunction with this study, he presented an analysis of survival rates by species (Pink, Sockeye, Chum, Coho and Chinook) for artificial and natural salmon propagation methods. He advised that the data used are not reflective of Alaska returns, because there is a critical lack of information on expected returns in Alaska. However, he advised that the two prepared analyses can be used as models for comparing and computing survival rates for analyzing alternative propagation methods for the Alaska Salmon Resource Development Program.

Barbara Sorensen, of the Department of Revenue, advised that data is available but not readily available. Before compilation of all the pertinent data can be accomplished, a budget appropriation must be made for a data system. She further advised that the new commissioner has been made aware of the problem, but no decisions have been made regarding an appropriation.

Discussion

Members of the group discussed the first two presentations. Their input included:

1. The various economic benefits of the development of the salmon resource to the state.

2. The benefit in regard to each area's particular needs.

3. The cost benefit to fishermen.

4. A major factor: will the price of salmon continue to increase?

5. The value of presenting the project as one economic package - not just as a benefit to fishermen or the state.

6. Financial responsibility: who pays?

Financing and Search for Goals

Mr. Miller resumed the presentation with a discussion of the basic problems related to financing and information regarding goals for fisheries, goals previously established for the salmon industry and the establishment of criteria for selecting goals for this particular project.

Other Matters

Ron Wendte advised the group that he had just been made aware of a meeting scheduled this week by Pete Jeans to push a high-level discussion in the administration to end the private aquaculture program. The meeting will be attended by Specking and representatives from Fish & Game and Commerce to decide whether the program should continue to exist.

There ensued discussion among the members of the group and Mr. Miller regarding the ramifications of the possibility of the ending of the program.

Close of Presentation

Mr. Miller advised that he will contact individual members for information before continuing compilation of data for the study.

Final Discussion

Last-minute suggestions were offered by Terry Gardiner and Derek Poon for the group to consider.

Terry Gardiner suggested using the George Inlet facility and the Klawock facility for some experimental input of data to use with the suggested models of salmon propagation methods and survival rates just to get an idea of how these models would work for the Alaska data.

Derek Poon suggested, due to rising costs, investigating the possibility of investing in a faciliity and waiting to supply it with brood stock.

Break

The meeting adjourned at 5:10 p.m.

AQUACULTURE POLICY STUDY GROUP

Bob Burkett	ADF&G, F.R.E.D.
Joe Davis	ADF&G, F.R.E.D.
Terry Gardiner	Legislature
Floyd Heimbuch	Cook Inlet A.A.
Armin Koernig	PWSAC
Bill Marsh	NSRAA
Tom Meyer	NSRAA
Paul McCollum	A.V.C.P. - Fisheries Develop. Corp.
Pat Petuchov	NSRAA
Derek Poon	NSRAA
Bill Sheridan	Forest Service
Barbara Sorensen	Department of Revenue
Don Walker	NSRAA
Ron Wendte	SSRAA

GUESTS IN ATTENDANCE

Margaret Branson	Legislature
Carl Gonder	Leonard Lane & Associates
Dan Malick	Leonard Lane & Associates
Wally Miller	Miller & Associates, Inc.
Bill Wilkerson	Miller & Associates, Inc.

Alaska State Legislature

Ph: 465-3795
3796

JUNEAU ALASKA

NOTICE OF MEETING

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON MAY 7, 1979, 9:00 A.M. IN ROOM 423 OF THE STATE CAPITOL BUILDING, JUNEAU.

THE FOLLOWING IS A PROPOSED AGENDA.

PROPOSED AGENDA

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5

ACQUACULTURE POLICY

STUDY GROUP

MEETING

MAY 7, 1979

ommercial Fisheries Program:

- Established by AS 16.05.090 but powers and duties not statutorily specified

TYPE:

- Division within the State Department of Fish & Game

SIZE:

- 160 PFT requested for FY 80
- 3 PPT requested for FY 80
- 140 Temp requested for FY 80

STRUCTURE:

- Division organized into five components
- 25% of resources in research component
- 45% of resources in management component
- 10% of resources in administration component
- 14% of resources in federal aid programs component
- 7% of resources in special projects (primarily federal aid)

GEOGRAPHICAL LOCATION:

- Statewide responsibilities
- Staff located statewide

FUNDS:

- $1,374,000 federal receipts requested for FY 80
- $443,000 General Fund requested for FY 80 (exclusively matching funds)
- $9,137,000 General Fund requested for FY 80
- $25,000 program receipts requested for FY 80

PRIMARY CONSTITUENTS:

- Commercial fishermen and seafood processors
- General public as consumers of commercial salmon products
- General public as sport users of adequately protected and maintained natural resource
- Subsistence fishermen as users of adequately protected and maintained natural resource

GOALS:

- o Protection of fisheries resources through prevention of loss due to inappropriate harvest methods and regulation of other fisheries to prevent unacceptable incidental harvests
- o Maintenance of fisheries resources through maintenance of brood stock levels of resources currently capable of producing optimum yield
- o Rehabilitation of fisheries resources by selectively protecting depressed stocks from harvest to increase the level of brood stock availability to levels capable of producing optimum yield
- o Development of new fisheries through research and regulation efforts

OBJECTIVES:

- o Maintain statewide commercial natural stock salom harvests at an average annual level equal to or above 49 million
- o Rehabilitate depressed stocks to increase average annual commercial harvest to 69 million of natural stock by 1990
- o Maintain statewide subsistence harvest of 600,000 to 1,000,000 salmon annually
- o Maintain Cook Inlet commercial harvest of salmon at 4 million annually and rehabilitate fishery gradually to 4.7 million annual natural stock harvest
- o Maintain Southeast commercial harvest of salmon at 15 million annually and rehabilitate fishery gradually to 25 million annual harvest
- o Maintain Arctic-Yukon-Kuskokwim harvest of salmon at 2 million annually and rehabilitate fishery gradually to 4 million annual harvest
- o Maintain Bristol Bay harvest of salmon at 9.8 million annually and rehabilitate fishery gradually to 14 million

PROGRAMS:

- o Primary strategy, in concert with the Board of Fisheries, is stock regulation by allocation of resources to users(total allocation is surplus beyond brood stock needed to maintain optimum resource yield)
- o Stock regulation accomplished through regulation of season openings and closures, harvest methods, and types and amount of fishing gear
- o Research and federal aid programs generate new knowledge on various aspects of fish species life history and provide the necessary knowledge and methodology for scientific management of fish resources
- o Assess total population abundance, distribution, migration routes, and timing of major salmon stocks
- o Apply biometrics and computer technology to data analysis to improve effectiveness of management and research programs

PROBLEMS:

- o Not enough funds for adequate research on life cycle of species and habitat
- o Not a lead agency---reactive once problems develop

M E M O R A N D U M

TO: WALLY MILLER

FROM: WILLIAM R. WILKERSON

DATE: May 2, 1979

RE: OUTLINE OF PRESENTATION ON FEDERAL INSTITUTIONS

I. INTRODUCTORY REMARKS

A. Summary of findings.

B. Summary of conclusions.

II. DIRECT FISHERIES PROGRAMS

A. General authority.

1. U.S. Department of Commerce Organic Act.
2. Fish and Wildlife Act of 1956 (reorganization plan No. 4, 84 Stat. 2090, October 3, 1970).
3. Agricultural Marketing Act of 1946.
4. Saltonstall-Kennedy Act of 1954.

B. Fisheries management and enforcement.

1. Fish and Wildlife Act of 1956.
2. General authority of National Oceanographic and Atmospheric Administration (NOAA).
3. Fishery Conservation and Management Act of 1976 (FCMA).
4. Black Bass Act.

C. Fish production.

1. Fishery research and experimentation program.
2. Food and Agriculture Act of 1977.
3. Loans for production of fish (Consolidated Farm and Rural Development Act).

D. Research and cooperation in resource development.

1. Cooperative agreements with nonprofit organizations, etc. (15 U.S.C. §1525).
2. Harvest Development Research (16 U.S.C. §§744 & 745).
3. Sea Grant Programs (33 U.S.C. §§1121 et seq.).
4. Commercial Fisheries Research and Development Act of 1964 (16 U.S.C §779).
5. The Food and Agriculture Act of 1977 (7 U.S.C. §3171).
6. The Defense Production Act of 1950.
7. The Anadromous Fish Conservation Act (16 U.S.C. §757).

E. Financial and technical assistance.

1. Section 607 of the Merchant Marine Act of 1936, as amended (46 U.S.C. §1177).
2. Title XI of the Merchant Marine Act of 1936, as amended (46 U.S.C. §§1271-80).
3. Fish and Wildlife Act of 1956 (16 U.S.C. §742c).

4. Fishing Vessel Construction Differential subsidy (U.S. Fishing Fleet Improvement Act-46 U.S.C. §§1401-13).
5. The Fishermen's Protective Act of 1967 (22 U.S.C. §§1971-79).
6. The Public Works and Economic Development Act of 1965 (42 U.S.C. §§3121, et seq.).
7. Small Business Administration Act (15 U.S.C §§631 et seq.).
8. The Small Business Investment Act (15 U.S.C §§1661 et seq.).
9. The Farm Credit Act of 1971 (12 U.S.C. §§2071 et seq.).
10. National Consumer Cooperative Bank Act (92 Stat. 499, August 20, 1978).
11. Fishery Cooperative Associations (15 U.S.C §§521-22).

*See also Saltonstall-Kennedy Act above.

F. OTHER

A number of programs relating to export and import of fisheries products, federal purchase and distribution of fishery products, provision of product safety, quality and marketing of consumer products, and foreign investment in U.S. fisheries regulations, have been identified. These programs are not discussed herein because of their relative indirect impact on fisheries resource development.

Additionally, a number of federal programs have less obvious impact on fisheries resource development.

Included are programs within the Bureau of Indian Affairs relating to fisheries development through the Alaska Native Claims Act, research programs involving the relationship of forest product and fisheries industry interests conducted by the U.S. Forest Service, consumer protection programs conducted by the Federal Trade Commission, and programs described below involving regulation of fisheries resource development programs.

III. NON-FISHERIES REGULATORY PROGRAMS

A. Environmental.

1. Corps of Engineers permits under §10 of the River and Harbor Act.
2. Corps of Engineers permit under §404 of the Federal Water Pollution Control Act Amendments of 1972.
3. Environmental Protection Agency certification under §401 of the Federal Water Pollution Control Act Amendments of 1972.
4. Preparation of Environmental Impact Statement pursuant to the National Environmental Policy Act.
5. Certification of federal consistancy under the Coastal Zone Management Act.
6. Various approvals by other federal agencies-see SSRAA permit list.
7. Waste effluent treatment requirements pursuant to Federal Water Pollution Control Act, as amended.

B. Resource management.

1. Fishery Conservation and Management Act (see above).
   a. Relation to coastal zone management.
   b. Relation to National Environmental Policy Act.
   c. Relation to Federal Administrative Procedures Act.
   d. Relation to activities of Forest Service.
2. U.S. Fish and Wildlife Service (see above).
3. National Marine Fisheries Service (to include the Anadromous Fish Conservation Act, the Fish and Wildlife Act of 1956, and the Federal Aid and Fish Restoration Act).

C. OTHER

A number of other federal regulatory programs affecting vessel and gear operation and harvesting techniques, regulation of fishermen and crews, regulation of vessel operation, regulation of seafood processing, product quality and marketing, and regulation of fisheries importing and exporting activities have been identified. Because of their comparatively indirect impact on fisheries resource development programs and activities, these programs will not be discussed in detail.

III. RELATIONSHIP BETWEEN FEDERAL FISHERIES PROGRAMS AND STATE OF ALASKA - POINTS FOR DISCUSSION

A. Bulk of Alaska land and waters under federal control and jurisdiction.

B. Fisheries related employment in Alaska, nineteen

percent (19%) of total employment; twenty-three percent (23%) including indirect effects.

C. Fisheries revenues account for seven percent (7%) of Gross State Product; indirect twelve percent (12%) of GSP.

D. Little federal contribution to salmon development projects in Alaska.

E. Two Hundred Mile Limit Alaskan fisheries account for eighty percent (80%) of nation's potential harvestable resource.

F. Alaska salmon resource development program -- two-pronged approach (ADF&G, PNP).

G. Alaska Coastal Zone Management (CZM) [illegible] earliest stage of development.

H. Federal CZM program [illegible] federal and state agencies [illegible] environmental issues.

I. Alaska has no port authorities, only boroughs, unorganized boroughs and municipalities.

J. Local government authority relatively flexible in terms of ability to conduct development activities.

K. Major problem of local communities in Alaska is raising sufficient capital for public works and infrastructure.

L. Fishing community relationship with fisheries management agencies largely adversary.

M. Relationship between ADF&G and Regional Aquaculture Association largely adversary.

N. State legislature [illegible] to fund new [illegible] programs at this time (possible exception is bottomfish).

O. PNP assessment program [illegible] up in litigation.

P. Management problems derived from hatchery versus natural stocks, problem of mixed stocks not

adequately addressed - raises political problems.

Q. Impact of D_2 Legislation on aquaculture not yet clear - fishermen and regional association concern over Borax.

R. Role of sports and subsistence fisheries in resource development program and planning not clear.

S. Regional management issues raised by federal and state legislation.

ECONOMIC EVALUATION

DISCUSSION OUTLINE

I Micro-Economic Evaluation Systems Reviewed

Kramer Chin & Mayo, Inc., Alaska Salmon Study, 1975

Frank Orth, The Economic Feasibility of Private Nonprofit Salmon Hatcheries, 1977

International Pacific Salmon Fisheries Commission, Proposed Program For Restoration & Extension of The Sockeye & Pink Salmon Stocks of The Fraser River, 1972

J.C. Barclay, Department of Fishery & The Environment, Benefits and Cost of Salmon Enhancement, 1978

Washington Department of Fisheries, Economic Evaluation of The 1967 Sport Salmon Fishery, 1970

Crutchfield & MacFarlane, Economic Evaluation of The 1965-66 Salt Water Fisheries of Washington, 1968

Alaska Life Cycle Cost System

A.D. Little, Development of a Bottomfish Industry For Alaska, 1978

Superior Court MIS Cost Benefit Analysis, Miller & Associates, Inc., 1977

Weingartner, The Excess Present Value Index, 1963

Starr, "The Mini-Max Valve", 1963

May, etal, Introduction to Financial Accounting, 1975

Fremgen, Accounting For Managerial Analysis, 1976

Center For Northern Educational Research, Alaskan Inter-regional Cost Differentials

II Micro-Economic Systems General Findings

1. There is a substantial variation in economic evaluation techniques applied to the fishery. These techniques range from simple cost/benefit ratios to complex formulas incorporating the time value of money.

2. The Alaska Life Cycle Cost System offers a comprehensive cash estimating and investment analysis modeling capability. The model, which is now becoming operational, does not contain much in the way of historical costs for use in salmon rehabilitation planning, nor does it include information relating to differing rates of return (benefits) of salmon. Both the historical cost and benefit information could be added to the system's data base as the data becomes available. This would make the system more useable in evaluating artificial propagation projects.

3. In performing economic evaluations of salmon enhancement projects, there is a critical lack of information regarding the expected returns for varying propagation methods for each species.

4. There are three economic evaluation perspectives which must be defined if the economic benefits of salmon enhancement are to be understood. One perspective is that of an "investment banker" who is concerned about the return on a specific proposed capital investment. The second view is that of a fisherman whose concern about the project is the net increases in allowable harvest for fishermen resulting from the project. The third economic evaluation perspective is that of the State of Alaska. The economic evaluation of the State for the most part is a macro-economic perspective which reflects the costs incurred in the form of grants, loss of interest income from providing low interest loans and other investments it makes in the fishery. Offsetting these costs, the State obtains, increases in personal and corporate income tax revenues (both direct and indirect) as well as other taxes and revenues. Reduced unemployment compensation taxes, welfare payments and other types of public aid are also factors which should be considered in the economic evaluation from the State perspective. Because the perspectives as well as their method of economic evaluation differ, investment bankers, the State and fishermen may judge the value of projects differently.

5. The current practice in economic evaluation is to evaluate each project separately. This project by project approach does not have the synergy of a systems or area-wide approach. For example, the project by project approach does not take into consideration economies of scale in operation, increases in harvest stability (particularly on the down side risk) which might be available from projects with marginal economic returns or the higher returns which can result from sizing the amount of investment to the scope of the economic opportunity.

6. Climate and access vary greatly in Alaska, both of which have a major impact on capital investment and operating costs for otherwise comparable projects.

7. Salmon prices vary greatly by region in Alaska which can have direct effect on the economic viability of a project or area-wide development plan.

8. While the economic goals and the means selected to achieve these goals may vary among the regional acquaculture associations, the recommended economic evaluation procedures should be flexible enough to accomodate these differences.

9. While the agricultural sector of the American economy has many parallels to the harvesting of fish, such incentives as investment tax credits, soil banks, modern equipment, government funded technology, low interest loans, price supports, crop insurance and others, have become such a part of the financing of agriculture that agricultural economic evaluations include many factors which are not presently at work in the fishery.

10. In addition to the substantial lack of information on expected returns of harvestable numbers of salmon for varying propagation methods, insufficient attention has been paid to the economic effects and examining of alternative propagation methods.

III Macro-Economic General Findings

1. A key ingredient in evaluating the economic value of the salmon fishing to the State of Alaska is the ability to reasonably accurately estimate the total tax revenue which annually accrues to the State from this industry.

2. Currently, the only information available on State tax receipts from the fishery is the raw fish tax. Personal and corporate income tax information for residents and non-residents is not available in a readily useable form.

3. Input/output analyses which identify the secondary multiplier effect of direct employment in the fishing industry, have not been conducted. Because of the large percentage of non-residents in the direct and indirect labor force, Washington State input/output ratios are not applicable to Alaska.

4. Based upon this lack of reasonably accurate information, the State of Alaska is not in a position to evaluate its return on its investment in the fisheries. Moreover, the lack of this information effectively precludes the State from explicitly formulating a fisheries economic development policy.

5. Department of Revenue research personnel are well aware of the information problem and are equipped to deal with the problem if authorized to do so.

Micro-Economic Techniques and Parameters

1. Attachments 1 and 2 to this report present an analysis of survival rates by species for alternative propagation methods. The data contained in this analysis were compiled with assistance of Washington State Fisheries and other biologists. THIS DATA MAY NOT BE REFLECTIVE OF RETURNS IN ALASKA. DATA WHICH ARE MORE REFLECTIVE OF ALASKAN RETURNS WILL BE COMPILED AND INCLUDED AT A LATER DATE.

   The importance of attachments 1 and 2 not in the numbers presented, but INSTEAD IN THE PROCESS USED TO COMPARE AND COMPUTE SURVIVAL RATES WHICH PROVIDE AN EFFECTIVE MEANS FOR ANALYZING ALTERNATIVE PROPAGATION METHODS.

2. As indicated in Attachments 1 and 2, survival rates vary significantly from species to species as well as by propagation method. Operating and capital investment costs also vary greatly by propagation method. The different combinations of results and costs creates a wide variety of alternatives which can be used in planning and evaluating salmon enhancement projects.

3. It is currently fashionable to use cost-benefit ratios to evaluate the relative "goodness" of capital projects. Several of these methods are:

   (a) $\frac{\text{Total Estimated Revenues}}{\text{To The Estimated Costs}}$ = Cost Benefit Percent or Ratio

   (b) $\frac{\text{Present Value of Estimated Revenues}}{\text{Present Value of Estimated Costs}}$ = Cost Benefit Percent or Ratio

   In technique (a) annual revenues and costs are estimated either based upon constant dollars or inflated/deflated amounts which reflect price changes in the value of fish and operating expenses. Revenue dollars are either expressed in prices paid to fishermen or in terms of the market value to the processors.

   In technique (b) price changes are incorporated as well as a discount rate. The purpose of the discount rate is to equalize the differences in the time value of money by expressing all future cash flows (both income and outgo) in terms of the present (discounted) value.

4. The use of return on investment is a more traditionally accepted method, by financial institutions of evaluating the relative "goodness" of capital projects. Several return on investment methods commonly in use are:

   (a) $\frac{\text{Total Estimated Revenue}}{\text{Total Investment}} = \text{ROI}$

   (b) $\frac{\text{Total Discounted Estimated Revenue}}{\text{Discounted Amount of Investment}} = \text{Effective Yield}$

In (a) the estimated revenue is that which remains after all operating costs have been paid. In the case of a salmon enhancement project, the operating costs would include principal and debt service payments on borrowed money as well as the cost of personnel and supplies to operate the facility. This economic evaluation technique can be expressed in constant dollars or in terms which reflect price changes.

Computation (b) which is called the discounted rate of return, provides the true interest rate earned on an investment over the course of its economic life. This evaluation technique, while highly accurate, is very complex and does not lend itself to manual computation.

VI Micro-Economic Analysis Examples

Provide an economic evaluation in which alternative propagation methods are evaluated from two points of view: An investment banker concerned with return on investment and a fisherman concerned with the increased supply of harvestable numbers of fish.

Alternatives To Be Examined:

(1) Natural propagation - natural runs which do not incur direct operating or capital expense.

(2) Natural propagation - rehabilitation project. In this case the project would involve gravel cleaning or placement, stream bed stabilization and similar work.

(3) Hatchery propagation. This would entail construction of a hatchery and related facilities similar to that recently constructed by the Southern Southeast Acquaculture Association.

(4) Spawning Channel Propagation. This would entail excavation of a channel similar in design to those used on the Fraser and Columbia Rivers, the placement of gravel suitable for spawning purposes and the use of ripwrap to aid in channel stabilization.

5. Incubation Box - Simple 4'x 8' design with upwelling flow. Gravity feed water supply to the box from the stream with pipe outlet returning to the stream. Estimates include facilites for eyeing eggs before placing them in the incubation boxes.

Relevant Factors to be Considered in the Analysis:

1. Estimated returns by propagation method.

2. Annual operating cash.

3. Annual principal and debt service.

4. Estimated average ex-vessel price per fish.

Example Problem:

For each alternative, based upon the propagation of 25 million eggs:

1. How many fish will return?

2. How many can be harvested?

3. What proportion of the harvest may be needed to pay operating and capital costs?

4. Is the project a sound investment?

5. Of what value is the project to fishermen?

EXAMPLE ANALYSIS # 1

PINK SALMON

:TORS	NATURAL	NATURAL REHABILITATION	HATCHERY	S. CHANNEL	INCUBATION BOX
N PLAN:					
;gs Prop.	25 million	Same	Same	Same	Same
.eturn %	.003	.003	.041	.012	.0225
Total Returns	75,000	75,000	1,025,000	300,000	562,500
Spawners %	.333	.333	.015	.083	.044
Number Spawners	25,000	25,000	15,625	25,000	25,000
Hatchery Surplus	0	0	9,375	0	0
Harvestable Nos.	50,000	50,000	1,000,000	275,000	537,500
Hatchery Surplus + Harvest Nos.	50,000	50,000	1,009,375	275,000	537,500
Value/Fish (1)	$1.25	Same	Same	Same	Same
Total value of Harvest + Surplus	$62,000	62,500	$1,261,719	$343,750	$671,875
COSTS:					
Capital Invest (2)	0	$100,000	$2,500,000	$500,000	$300,000
Useful Life	-	5 Years	25 Years	10 Years	5 Years
Cost of Capital	-	8%	8%	8%	8%
Annual Capital Cost	-	$24,360	$231,600	$72,804	$73,000
Annual O & M (3)	-	-	$400,000	$25,000	$200,000
O & M Startup (4)	-	-	74,100	7,280	97,000
TOTAL ANNUAL COST	-	$24,360	$705,700	105,084	370,000
ALYSIS:					
Net Income	$62,500	$38,140	$556,019	$238,666	$301,875
Return on Invest.	-	38%	22%	48%	101%
RUN BREAKDOWN:					
Spawners	25,000	25,000	15,625	25,000	25,000
Fishermen	50,000	24,000	258,375	163,200	143,800
Annual Costs (5)	-	26,000	751,000	111,800	393,700
TOTALS	75,000	75,000	1,025,000	300,000	562,500

EXAMPLE ANALYSIS #2

CHUM SALMON

FACTORS	NATURAL	NATURAL REHABILITATION	HATCHERY	S. CHANNEL	INCUBATION BOX
RUN PLAN:					
Eggs Prop.	25 million	Same	Same	Same	Same
Return %	.0015	.0015	.017	.006	.0077
Total Returns	37,500	37,500	425,000	150,000	192,500
Spawners %	44%	44%	.025	.111	.087
Number Spawners	16,500	16,500	10,312	16,500	16,500
Hatchery Surplus	θ	θ	6,188	θ	θ
Harvestable Nos.	21,000	21,000	408,500	133,500	176,000
Hatchery Surplus + Harvestable Nos	21,000	21,000	414,688	133,500	176,000
Value/Fish (1)	$4.98	Same	Same	Same	Same
Total Value of Harvest + Surplus	$104,580	$104,580	$2,065,000	$665,000	$877,000
COSTS:					
Capital Invest (2)	θ	$100,000	$2,500,000	$500,000	$300,000
Useful Life	-	5 Years	25 Years	10 Years	5 Years
Cost of Capital	-	8%	8%	8%	8%
Annual Capital Cost	-	24,360	231,600	72,804	73,000
Annual O & M (3)	-	-	400,000	25,000	200,000
O & M Startup (4)	-	-	148,200	14,600	195,000
TOTAL ANNUAL COST	-	$24,360	$779,800	$112,404	$468,000
ANALYSIS:					
Net Income	$137,550	$80,220	$1,285,200	$552,596	$409,000
Return on Invest.	-	80%	51%	111%	136%
RUN BREAK DOWN:					
Spawners	16,500	16,500	10,312	16,500	16,500
Fishermen	21,000	14,495	206,688	103,500	51,000
Annual Costs (5)	-	6,505	208,000	30,000	125,000
TOTALS	37,500	37,500	425,000	175,000	192,500

EXAMPLE ANALYSIS #3

SOCKEYE SALMON

FACTORS	NATURAL	NATURAL REHABILITATION	S. CHANNEL	INCUBATION BOX
RUN PLAN:				
Eggs Prop:	25 million	Same	Same	Same
Return %	.0016	.0016	.0049	.006
Total Returns	40,000	40,000	122,500	150,000
Spawners %	.357	.357	.117	.095
Number Spawners	14,280	14,280	14,280	14,280
Hatchery Surplus	θ	θ	θ	θ
Harvestable Nos.	25,720	25,720	108,220	135,720
Hatchery Surplus + Harvestable Nos.	25,720	25,720	108,220	135,720
Value/Fish (1)	$5.68	Same	Same	Same
Total Value of Harvest + Surplus	$146,090	$146,090	$614,690	$770,890
COSTS:				
Capital Invest (2)	-	$100,000	$500,000	$300,000
Useful Life	-	5 Years	10 Years	5 Years
Cost of Capital	-	8%	8%	8%
Annual Capital Cost	-	24,360	72,804	73,000
Annual O & M (3)	-	-	25,000	200,000
O & M Startup (4)	-	-	14,600	195,000
TOTAL ANNUAL COST	-	$24,360	$112,404	$468,000
ANALYSIS:				
Net Income	$146,090	$121,720	$502,286	$302,890
Return on Invest.	-	122%	100%	101%
Run Breakdown:				
Spawners	14,280	14,280	14,280	14,280
Fishermen	15,720	20,020	81,920	26,120
Annual Costs	-	5,700	26,300	109,600
TOTALS	40,000	40,000	122,500	150,000

FOOTNOTES

(1) Value of Fish - Based upon 1978 Alaska State-wide weights and prices.

(2) Capital Investment - Basis of Estimates are as follows:

(a) Natural Rehabilitation - Cost is estimated at $15.00 per square yard of stream bed rehabilitated (approximately 7,000 yards rehabitated.

(b) Hatchery - Generally based upon Southern Southeast Acquaculture Association experience.

(c) Spawning Channel - Estimated in part upon Frazer River and Columbia River experience.

(d) Incubation boxes - based upon Washington State experience escalated to reflect higher Alaska costs.

(3) Annual O & M - Estimated based upon a combination of Washington and Alaska experiences. Higher Coho O & M reflects additional holding time and costs.

(4) O & M startup is estimated to be 2 years O & M costs for pinks and 4 years O & M costs for other species amortized at 8% interest for the useful life of the project.

(5) Annual costs include an allowance to pay for the costs of harvesting that portion of the harvest allocated to cover annual costs.

AN ANALYSIS OF ARTIFICIAL & NATURAL SALMON PROPAGATION METHODS

	FECUNDITY (1)	Survival-Egg Take to Emerge Stage by Propagation Method				Survival Emerge to Migrant Stage by Propagation Method				Marine Survival by Propagation Method			
		Natural	Hatchery	S. Channel	Incu. Box	Natural	Hatchery	S. Channel	Incu. Box	Natural	Hatchery	S. Channel	Incu. Box
PINK	1400-2300									6	82	36	45
	Ave. 2000	200	1700	1200	1500	-	1615	-	-				
SOCKEYE	2800-4200									5.6	-	17	21
	Ave. 3500	700	-	2100	2625	70	-	210	263				
CHUM	2100-3500									4.5	51	18	23
	Ave. 3000	450	2700	1800	2250	-	2565	-	-				
COHO	2500-3500									10	128	-	-
	Ave. 3000	600	2850	-	-	120	2565	-	-				
CHINOOK	3000-5500									8	36	24	30
	Ave. 4000	800	3800	2400	3000	400	3600	1200	1500				

(1) Salmon Ranchers Manual
NMFS Report, July, 1975
Average is estimated for demonstration purposes.

(2) Survival - Egg Take to Emerge Stage
Percentile Estimates

	Natural	Hatchery	S. Channel	Incu. Box
PINK	10%	85%	60%	75%
SOCKEYE	20%	-	60%	75%
CHUM	15%	90%	60%	75%
COHO	20%	95%	-	-
CHINOOK	20%	95%	60%	75%

(3) Survival - Emerge to Migrant Stage
Percentile Estimates

	Natural	Hatchery	S. Channel	Incu. Box
PINK	-	95%	-	-
SOCKEYE	10%	-	10%	10%
CHUM	-	95%	-	-
COHO	20%	90%	-	-
CHINOOK	50%	95%	50%	50%

(4) Marine Survival Estimates

	Natural	Hatchery	S. Channel	Incu. Box
PINK	3%	5%	3%	3%
SOCKEYE	8%	-	8%	8%
CHUM	1%	2%	1%	1%
COHO	8%	5%	-	-
CHINOOK	2%	1%	2%	2%

ATTACHMENT #2

AN ANALYSIS OF ARTIFICIAL & NATURAL SALMON PROPAGATION METHODS

	Marine Survival Percentage of Egg Deposition				Percentage of Total Run Required for Constant Harvest Rate				% Temporary Reduction in Harvest To Increase Run Size by 50%			
	Natural	Hatchery	S. Channel	Incub. Box	Natural	Hatchery	S. Channel	Incub Box	Natural	Hatchery	S. Channel	Incub. Box
PINK	.3%	4.1%	1.2%	2.25%	33.3%	1.5%*	8.3%	4.4%	25%	.8%*	4.5%	2.3%
SOCKEYE	.16%	-	.49%	.6%	35.7%	-	11.7%	9.5%	28%	-	6.6%	5.3%
CHUM	.15%	1.7%	.6%	.77%	44%	2.5%	11.1%	8.7%	40%	1.3%	6.3%	4.7%
COHO	.3%	4.3%	-	-	22%	1%	-	-	14%	.5%	-	-
CHINOOK	.2%	.9%	.6%	.75%	25%	3.5%	8.3%	6.7%	17%	1.8%	4.5%	3.6%

*Includes 1/4 Male Spawners for propagation with 3/4 used as hatchery surplus

*Harvest reduction would be on each run until the higher level run size is established. For Pinks, because of the two year cycle the harvest reduction would be for a two year period. For Chums the reduction would be for four years.

JULY 1979

NOTICE OF MEETING

AQUACULTURE POLICY STUDY GROUP

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON MONDAY JULY 9, 1979, 9:00 A.M. IN ROOM 423 OF THE STATE CAPITOL BUILDING, JUNEAU, ALASKA. A PRESENTATION WILL BE MADE BY THE FIRM OF MILLER & ASSOCIATES.

Terry Gardiner, Chairman
Pouch V
Juneau, Alaska 99811
Ph: 465-3720

MINUTES
AQUACULTURE POLICY STUDY GROUP
JULY 9, 1979

MONDAY - JULY 9, 1979

Call to Order

Chairman Terry Gardiner called the meeting to order at 9:30 a.m. in Room 423 of the State Capitol Building.

Roll Call

See attached attendance list.

Agenda

Meeting with Miller and Associates to discuss their draft findings and various options available for the salmon fisheries plan.

Introduction

Wally Miller of Miller and Associates started the presentation.

Discussion on Draft Recommendations and Options

Wally Miller advised that he was going to cover the economics review and the various investment techniques and would appreciate the input from the Committee. See Contract Task #3 "Economics" attached hereto. Mr. Miller discussed the cost benefit ratio analysis versus return on investment techniques. He advised that he personally favors the return on investment measure inasmuch as he felt it was the sterner of the two alternatives. Discussion ensued with various members of the Committee stating their views. It was the opinion of John Sandor that both areas are gray and thus it is possible to fudge on both. It was the opinion of the majority of the Committee that it would be necessary to utilize both techniques in order to get a complete picture and they questioned if it was economically feasible to utilize both.

Mr. Miller inquired of Barbara Sorensen as to the Department of Revenue's progress with the SIC code. Ms. Sorensen advised that certain conditions within the department had caused this to come to a standstill and at this point she is uncertain as to whether or not they would be continuing with it. Mr. Miller advised that he would discuss the Department of Revenue statistics in his final report.

Ms. Sorensen advised that the National Council on Water Resources has developed a complete system for a cost benefit ratio.

It was the consensus of opinion that the cost benefit ratio method is more a program than a project and that this function should be performed by another agency. Mr. Miller advised that he will, in his report, summarize how data could be obtained.

Contract Task 3.2

Mr. Miller advised that they were considering disregarding predation and subsistence as far as the quantifiable and non-quantifiable economic parameters. Chairman Gardiner expressed his feeling that it was important to consider subsistence and that possibly this should fall under the sport fish category. Mr. Miller expressed his desire to meet with the FRED division to discuss how his data coincides with financial accounting. It was suggested that risk analysis be included as a possible parameter.

Other areas of discussion included inexpensive versus expensive hatcheries; a ten-year as opposed to a six-year plan; and yield or return in comparison with cost of facility.

It was recommended that a seventh category be included under "cost factors" No. 7 "evaluation". Mr. Sandor inquired as to how the final report would deal with rehabilitation of streams and fishways. He again reiterated that he felt that it was a mistake to use return on investment in those particular cases. Mr. Sandor also presented to the Committee a sheet outlining the various projects that the Forest Service had been involved in since 1962. See attachment. He advised that he had been successful in obtaining money for the Forest Service efforts from Congress for 300 projects. However, their main problem is in the area of prioritization.

Mr. Wendte of SSRA felt that it was important to break the projects down by revenue versus non-revenue, which allowed different sources for funds.

Contract Task 4 - Financial Planning

Discussion ensued on the Department of Commerce's position regarding loans for fisheries projects; the fact that Weyerhauser will probably be looking at Alaska in the future as an additional investment; Mr. Miller would like to see something like the port authority in Washington set up in Alaska; and the possibility of Alaska floating its own bonds.

Mr. Sandor discussed the adverse impact on streams due to timber harvest. He advised that rehabilitation funds are collected out of timber receipts. A percentage of the timber receipts from each individual logging effort is assigned to rehabilitation of any streams within the boundaries of that particular logging show. It was Mr. Sandor's goal to have the State team up with the Forest Service on projects for joint financing in order to make the best use of the available dollars. It was his feeling

that the teamwork concept would be more effective. It was his opinion that the time is right now for formalization of the concepts due to the money available.

Break

The meeting recessed at 12:15 p.m., scheduled to reconvene at 1:30 p.m.

Called to Order

Terry Gardiner called the meeting back to order at 1:30 p.m.

Discussion on Task 4 (Continued)

Discussion ensued on the problem of getting brood stocks; transplanted brood stock versus Alaska brood stock; competition for eggs between the Fish and Game and fishermen's associations; the effect between loan policies and brood stock. It was suggested that the consultants obtain data from Washington state regarding the number of years for a return on brood stock and the resulting costs thereto. They then might be able to better determine whether their six-year plan was realistic or unrealistic.

Task 2

Mr. Bill Wilkerson of Eisenhower, Carlson, et al, spoke to Contract Task 2. It was Mr. Wilkerson's opinion that the present aquaculture program lacks organization. He feels that realism should be built in; so far only experimentation has taken place and that there is essentially no program at this time. Mr. Wilkerson advised that the final report was ready from Leonard Lane Associates on Task 1 and would soon be distributed. He further felt that organization and changes are needed to meet their goals. According to Mr. Wilkerson, coordination is necessary between the hatcheries and harvest management. The opinion was expressed by one of the Committee members that there should be a member of the Governor's administration present at the meeting to observe, direct and coordinate in order to ensure that all agencies were working for a common goal.

Mr. Wilkerson also pointed out the need for uniform reporting and accounting and for information-sharing among the hatcheries, Alaska Department of Fish and Game, the federal government and the Department of Commerce.

Goals

Mr. Wilkerson set forth the following tentative time frames for the goals:

PHASE I

1. Research and development phase. Two or three years in order to improve planning.

2. Development of fair share pay scheme.

3. Institutional relationships involving coordination of research.

He reiterated that informational development is absolutely essential.

PHASE II

Initial implementation as a result of the research stage.

PHASE III

Complete implementation.

PHASE IV

Final evaluation of the program. Is the program working?

Discussion

It was the opinion of many of the Committee members that the states of Washington and Oregon should be explored, as well as Canada, to determine whether they already had a program which the State might look to as opposed to individual activities. It was agreed that often too much planning is gone into with no concrete results.

Chairman Gardiner advised that due to an oversight, no money was appropriated this fiscal year for Committee meetings. He advised that members must pay their own travel and per diem for any future meetings but that their travel and per diem would be taken care of for this particular meeting. He advised that there was $29,000 in contract money left over and that with the permission of the Committee, a contract extension would be granted to Miller and Associates for continuation of the program development. There being no opposition expressed, Chairman Gardiner advised that this would be done.

Next Meeting

A meeting will be set within a month or six weeks from now in order to review the final report and decide what to do and whether additional work needs to be done.

The Committee asked that the final report be distributed prior to this meeting in order that they might review it prior to

providing input.

Break

The meeting adjourned at 4:30 p.m.

AQUACULTURE POLICY STUDY GROUP

Bob Burkett	ADF&G, F.R.E.D.
Terry Gardiner	Alaska Legislature
Floyd E. Heimbuch	Cook Inlet A.A.
Joe Davis	ADF&G, F.R.E.D.
Curt Kerns	Sea Grant
Armin E. Koernig	PWSAC
Bill Marsh	NSRAA
Derek Poon	NSRAA
John Sandor	U.S. Forest Service
Bill Sheridan	ADF&G
Barbara Sorensen	Department of Revenue
John Sund	SSRAA
Ron Wendte	SSRAA
Jack McBride	IMARPIK Aquaculture
Margaret Branson	Alaska Legislature

GUESTS IN ATTENDANCE

Bill Wilkerson	Eisenhower, Carlson, et al
Wally Miller	Miller & Associates
Paul A. McCollum	AUCP Fisheries Development Corp.

Irish Keku Creeks	Kupreanof Island
Red Creek	Prince Willian Sound
Hobo Creek	Prince William Sound
Logging Camp Creek	Prince William Sound
Solf Lake	Prince William Sound

In addition to the more costly fishway projects, the fish habitat enhancement program has included numerous stream clearance projects, stream channel improvements, installation of trickle dams and gabions, construction of incubation boxes, and fish planting activities. These are done with the close cooperation and coordination of the Alaska Department of Fish and Game.

To date, over 300 additional fish habitat enhancement projects and/or opportunities have been identified on the Tongass and Chugach National Forests. Those projects shown to be feasible will be incorporated into the Resources Planning Act (RPA), Sikes Act, and budget proposals. An example is the Sixmile Creek Project on the Kenai now in the planning stages. It should be noted here that the Cook Inlet Aquaculture Association has contributed $50,000 toward the initial stages of the Six Mile Creek Project.

The Forest Service is currently working with the State in updating the Sikes Act cooperative fish and wildlife comprehensive plan developed first in 1976. The State and Aquaculture Association have submitted comments on the Resources Planning Act Program. The Forest Service will identify specific projects for planning and construction during the 1980-85 period. We will explore, with the Alaska Department of Fish and Game, and the various aquaculture groups, opportunities for cooperation in the planning and accomplishment of these projects.

There are further opportunities for fisheries habitat enhancement under the

authority of the Knudsen-Vandenburg Act as amended by the National Forest Management Act of 1976. K-V funding may now be used to accomplish habitat improvements and restoration on sale areas on National Forest lands. We are still in the planning stages, however, significant projects such as the fishway on Log Jam Creek on Prince of Wales Island can be funded with these monies.

It is possible that on privately owned land similar arrangements could be made to reinvest a portion of the stumpage receipts in such things as fisheries and wildlife habitat improvement projects.

Although not discussed in any detail here, it should be noted that the Forest Service Fisheries Habitat Management Program includes the enhancement and protection of the sport fish resource which often is closely associated with the salmon fisheries.

In summary, it can be seen that the Forest Service has been actively involved for the past 25 years in a substantial fisheries habitat management program in cooperation with the State. More recently, the aquaculture organizations have come into the picture as cooperators and have participated in funding in some instances. The Renewable Resource Corporation may also consider cooperative ventures to enhance the fisheries. With continual cooperation, our organization can play a significant role in the development of Alaska's fisheries resource.

FISH HABITAT ENHANCEMENT

ACCOMPLISHMENTS AND OPPORTUNITIES

ON THE NATIONAL FORESTS OF ALASKA[1/]

The Forest Service has a long involvement in fish habitat improvement in the Alaska Region. From 1952 to the present, some 250 projects have been completed on the Tongass and Chugach National Forests at a cost of approximately three million dollars. These costs have, in many instances, been equally shared with the Alaska Department of Fish and Game. Examples of the more important fisheries projects completed (or being worked on) are:

Stream	Location	Cost
Shrode Creek	Prince William Sound	$42,000
Seal Bay	Afognak Island	15,000
Control Creek	Prince William Sound	35,000
Parlor Creek	Chicagof Island	40,000
Anan Creek	Bradfield Canal	262,000
Italio River	Yakatat	2,800

In December 1976, under the authority of the Sikes Act, a comprehensive fish and wildlife plan was developed by Forest Service and ADF&G. In this plan, approved by Governor Hammond, Commissioner Brooks, and Regional Forester Sandor, 23 projects related to fish habitat were identified. In Fiscal Year 1978, the Forest Service received $600,000 under a special appropriation by the Congress for fishway projects. The planning done under the Sikes Act and the special funding in 1978 helped set the stage for the expansion of the Forest Service wildlife and fisheries programs.

As a result, additional fish habitat improvement projects have been either completed or are under contract. Examples of these are:

[1/] Summary prepared for the July 9, 1979 Aquaculture Study Group, Juneau, Alaska.

J & R

Miller & Associates, Inc. CONSULTANTS
PLANNING • MANAGEMENT • FINANCIAL ANALYSIS
EVERGREEN PLAZA BUILDING • 711 SO. CAPITOL WAY • OLYMPIA, WASHINGTON 98501 • (206) 943-3885

July 9, 1979

To: Members Acquaculture Policy Study Group

From: Wallace Miller WM

Subject: Agenda for July 9, 1979 Meeting

The Contractor proposes to provide a status report, discuss preliminary findings, identify additional areas for study or research by the Contractor and solicit comments regarding possible alternative courses of action or recommendations to be included in the final report.

The objective of this meeting is to stimulate discussions among the members of the committee on the issues presented so that the Contractors can fully consider these views in preparing a recommended course of action.

In order to facilitate the discussion, the Contractor proposes to conduct the meeting in the following sequence of discussion topics:

1. Economics
2. Financing
3. Institutional and Policy Arrangements
4. Goals

I look forward to a stimulating discussion and understanding your views and ideas about the issues to be presented.

AQUACULTURE POLICY STUDY GROUP

MEETING

July 9, 1979

Contract TASK #3 Economics

I. Contract Task #3.1 - Inventory both micro and macro economic systems in use in the state and elsewhere in fisheries as well as other resource areas.

II. Task I Status Report - Prior to the May 7, 1979 meeting of the Aquaculture Policy Study Group the Contractor evaluated a variety of micro and macro economic systems in use in the States of Alaska and (Kramer Chin and Mayo and others), the University of Washington and leading authors to determine the most appropriate means for conducting an economic analysis of the salmon fisheries.

While a listing of the alternative techniques will be included in the final report, the two basic techniques are:

Cost Benefit Ratio Analysis

Return on Investment

Because of the private sector orientation of Aquaculture development in Alaska, the need to attract increased amounts of investment (risk) capital to the Aquaculture program and given the traditional use of Return on Investment techniques by financial institutions, the Contractor prepared a series of Return on Investment comparisons for several alternative types of salmon propagation facilities. This information was reviewed with study group members on May 7 and a follow-up memorandum soliciting additional information and comments was sent to those members most directly involved with aquaculture operations.

The additional information requested has been received from a number of study group members and is currently being evaluated. The objective of this evaluation is to develop as realistic as possible estimates of returns and costs associated with alternative investment options.

With regard to the macro economic evaluation system, during the May 7 meeting of the study group the Contractor and a representative of the Alaska State Department of Revenue advised the sutdy group of the following general findings:

1. A key ingredient in evaluating the economic value of the salmon fishing to the State of Alaska is the ability to reasonably accurately estimate the total tax revenue which annually accrues to the State from this industry.

2. Currently, the only information available on State tax receipts from the fishery is the raw fish tax. Personal and corporate income tax information for residents and non-residents is not available in a readily useable form.

3. Input/output analyses which identify the secondary multiplier effect of direct employement in the fishing industry, have not been conducted. Because of the large percentage of non-residents in the direct and indirect labor force, Washington State input/output ratios are not applicable to Alaska.

4. Based upon this lack of reasonably accurate information, the State of Alaska is not is a position to evaluate its return on its investment in the fisheries. Moreover, the lack of this information effectively precludes the State from explicitly formulating a fisheries economic development policy.

5. Department of Revenue research personnel are well aware of the information problem and are equipped to deal with the problem if authorized to do so.

Since the May 7 study group meeting the Contractor has met with Alaska Department of Revenue personnel to further discuss the need to develop a macro economic evaluation system.

During this meeting it was decided to defer any further action on macro economic systems until such time as current internal departmental policy discussions on this subject are resolved. It is anticipated that this subject will be re-opened at an appropriate time and that a macro economic system will be defined for the State of Alaska to use in evaluating the salmon aquaculture program.

III. Micro-Economic Systems - Preliminary Findings

1. There are three economic evaluation perspectives which must be defined if the economic benefits of salmon enhancement are to be understood. One perspective is that of an "investment banker" who is concerned about the return on a specific proposed capital investment. The second view is that of a fisherman whose concern about the project is the net increases in allowable harvest for fishermen resulting from the project. The third economic evaluation perspective is that of the State of Alaska. The economic evaluation of the State for the most part is a macro-economic perspective which reflects the costs incurred in the form of grants, loss of interest income from providing low interest loans and other investments it makes in the fishery. Offsetting these costs, the State obtains, increases in personal and corporate income tax revenues (both direct and indirect) as well as other taxes and revenues. Reduced unemployment compensation taxes, welfare payments and other types of public aid are also factors which should be considered in the economic evaluation from the State perspective. Because the perspectives as well as their method of economic evaluation differ, investment bankers, the State and fishermen may judge the value of projects differently.

5. In addition to the substantial lack of information on expected returns of harvestable numbers of salmon for varying propagation methods, insufficient attention has been paid to the economic effects and esamining of alternative propagation methods.

V. Micro Economic Systems - Preliminary Findings

Deferred to later meeting.

VI. Macro Economic Systems - Discussion Items

Deferred to later meeting.

I. Contract Task #3.2 - Identify the economic parameters, both quantifiable and non-quantifiable and the various methods of analysis that can be applied to these parameters.

II. Task #3.2 - Status Report - During the May 7 meeting of the study group the Contractor identified the following parameters as being critically important to the economic evaluation of salmon aquaculture:

Salmon Propagation Factors

1. Number of eggs to be propagated
2. Survival rates - egg take to emerge stage
   - emerge to migrant stage
   - marine survival
3. Total returns - by project
4. Number of spawners required
5. Hatchery surplus (if any)
6. Harvestable numbers of fish
7. Value per fish
8. Total value of harvest plus surplus

Cost Factors

1. Amount of capital investment
2. Useful life of facility
3. Cost of capital
4. Annual capital cost
5. Annual O & M cost
6. O & M startup cost

Economic Analysis Factors

1. Net income
2. Return on Investment

Run Breakdown Analysis

1. Spawners
2. Harvest by fishermen
3. Portion of run used to offset operating costs

In addition to these preceding factors which must be quantified to conduct a complete economic analysis, the Contractor has considered the following factors but has not yet attempted to quantify them.

Run losses to natural predation.
Run losses to subsistence fisheries.

Since the May 7 meeting the Contractor has requested additional information from ADF & G and the Aquaculture Associations with regard to more realistic survival rates and costs. Based upon further analysis of available data the Contractor now believes it would be appropriate to change the earlier O & M cost factors to the following:

O & M Costs
Association Administration
Regional Technology Development & Application
Facilities in Start-up
Facilities in Operation

Additional analysis of responese provided to the Contractor have been analyzed and some difficulty has occurred in translating ADF & G, F.R.E.D. Division Standard Assumpiton on Salmon Survivals (attached) in a manner which allows alternative facilities (and investment levels) to be evaluated. Meetings will be held to clear up these difficulties.

III. Economic Parameters - Preliminary Findings

1. The suggested economic parameters are designed to answer the following questions for each acquaculture project:

   a. How many fish will return?
   b. How many fish can be harvested?
   c. is the project a sound investment?
   d. Of what value is the project to fishermen?
   e. What proportion of the harvest may be needed to pay facility O & M costs?

2. Based upon the results of the survival rate and cost information provided by the Associations and further based upon the outcome of discussions with with F.R.E.D. Division regarding salmon survival rates, the economic analyses presented during the May 7 meeting will be reworked to provide more realistic estimates of return on investments and run distributions.

3. Notwithstanding the changes which might occur as a result of more refined data substantially different rates of return are anticipated for differing species and depending upon the type cost of propagation method being used.

4. Because of the potentially greater sruvival rates for eggs artificially propagated (as opposed to those occuring in nature), and reduced percentage of the run required for spawning, artificially propagated runs have the potential of providing greatly increased numbers of harvestable fish, given the same number of eggs naturally deposited.

For example, based upon F.R.E.D. Division Standard Assumptions, of 1,000,000 green Coho eggs raised to smolt and planted at a stream mouth, 62,000 would return as adults approximately ±60,000 could be harvested.

Comparable data for natural coho runs indicate that approximately 8,500 adults would return providing for a harvest (less escapement) of about 6,000 fish.

Assuming this order of magnitude to be generally correct, the question to be answered through additional analysis is what proportion of the artificial run can be harvested by fishermen and what proportion is necessary to pay for the cost of its creation.

IV. Economic Parameters - Discussion Items

1. What other factors, either dealing with salmon survival or costs, by category, is it reasonable and necessary to include as an economic parameter?

I. Contract Tasks #3.3 and #3.4 - Select those parameters that would be effective in making an economic evaluation appropriate to the State of Alaska and in light of Tasks 1 and 2 furnish a recommendation of the most appropriate parameters and means to analyze them.

II. Tasks #3.3 and #3.4 - Status Report - Work on these tasks will be initiated pending review by the study group of the preliminary findings, receipt of additional information from regional associations and the classification of survival rates with F.R.E.D. Division.

DIRECTIVE

Attachment I

F.R.E.D. DIVISION

POLICY: STANDARD ASSUMPTIONS ON SALMON SURVIVALS (Unmarked fish)

PROCEDURE:

For your guidance in planning, budgeting and evaluating, these values are to be used.

In the hatchery

Green Egg	to	Eyed Egg	90%
Eyed Egg	to	Emergent Fry	95%
Emergent Fry	to	Fed Fry*	95%
Fed Fry	to	Fingerling**	95%
Fingerling	to	Smolt (10 gram)	80%
Smolt (10 gram)	to	Post Smolt	90%
Green Egg	to	Smolt	62%

In lake or stream

Hatchery Produced

Eyed Egg (Plant)	to	Emergent Fry	50%
Emergent Fry (King, Coho, Sockeye)	to	Smolt	7%
Fed Fry	to	Smolt	10%
Fingerling (King, Coho, Sockeye)	to	Smolt	20%
Smolt (Coho, Sockeye)	to	Adult	10%
Smolt (King)	to	Adult	3%

Lake or Stream Produced***

Emergent Fry (Pink, Chum)	to	Adult	1%
Emergent Fry (King, Coho, Sockeye)	to	Smolt	10%

Hatchery Produced Fish Planted Near or in Tidewater

Emergent Fry (Pink, Chum)	to	Adult	0.7%
Fed Fry (Pink, Chum)	to	Adult	1%
Fingerling (Pink, Chum)	to	Adult	2%
Smolt (Coho, Sockeye)	to	Adult	10%
Smolt (King)	to	Adult	3%

DIRECTIVE
F.R.E.D. DIVISION

To calculate the expected survival of a fish lot, multiply together all treatment values. For example: Coho salmon raised to smolt and planted at a stream mouth.

Green	to	Eyed	90
Eyed	to	Emergent	95
Emergent	to	Fed Fry	95
Feeding	to	Fingerling	95
Fingerling	to	Smolt	80
Smolt	to	Adult	10

.90 x .95 x .95 x .95 x .80 x .10 = .062 or 6.2% survival from Green Egg to Adult.

Sockeye salmon planted as fed fry in a lake

Green	to	Eyed	90
Eyed	to	Emergent Fry	95
Emergent Fry	to	Fed Fry	95
Fed Fry	to	Smolt in lake	10
Smolt	to	Adult	10

.90 x .95 x .95 x .10 x .10 = .0081 or .81% survival from Green Egg to Adult

Fecundities by Species (fecundity values may be changed where actual observations are available).

Chum	2,200
Pink	1,600
Coho	2,800
King	6,500
Sockeye	3,000

* Definition of Fed Fry -- 25% weight gain from emergent (swim-up) weight.
** Definition of Fingerling -- 100% weight gain from emergent (swim-up) weight.
*** Includes fry from egg plants, stream incubation boxes, incubation channels, etc.

COHO SALMON

FACTORS	NATURAL	NATURAL REHABILITATION	HATCHERY
RUN PLAN:			
Eggs Prop.	25 million	Same	Same
Return %	.003	.003	.043
Total Returns	75,000	75,000	1,075,000
Spawners %	22%	22%	1%
Number Spawners	16,500	16,500	10,312
Hatchery Surplus	θ	θ	6,188
Harvestable Numbers	58,500	58,500	1,058,500
Hatchery Surplus + Harvestable Nos.	58,500	58,500	1,064,688
Value/Fish (1)	$ 6.51	Same	Same
Total Value of Harvest + Surplus	$380,835	$380,835	$6,931,000
COSTS:			
Capital Invest. (2)	-	$100,000	$2,500,000
Useful Life	-	5 Years	25 Years
Cost of Capital	-	8%	8%
Annual Capital Cost	-	24,360	231,600
Annual O & M (3)	-	--	800,000
O & M Startup (4)	-	--	278,000
TOTAL ANNUAL COST		$24,360	$1,309,600
ANALYSIS:			
Net Income	$380,835	$356,475	$5,621,400
Return on Invest.	-	256%	225%
RUN BREAKDOWN:			
Spawners	16,500	16,500	10,312
Fishermen	58,500	53,500	797,088
Annual Costs (5)	-	5,000	267,600
TOTALS	75,000	75,000	1,075,000

Contract TASK #4 - Financial Planning

I. Contract Task #4 - Evaluate existing financial planning for the A.S.R.D.P. Define problems. Develop criteria for financial planning and recommend model financial planning framework.

II. Task 4 Status Report - The Contractor has examined the current financial planning mechanisms established in statute which provide funding for the Alaska Salmon Resource Development Program.

Through a series of legislative acts beginning in 1974, the Alaska State Legislature has established and refined several mechanisms for the development of private-non-profit hatcheries and more generally the renewable resources of the State.

More specifically the legislature has provided:

(1) For a royalty assessment of either 2 or 3 percent of the fair market value of salmon sold by persons holding entry permits, with the proceeds to be used by regional aquaculture associations for salmon enhancement projects.

(2) Provided for 25 year state loans to regional aquaculture associations of up to $3,000,000 per facility at a maximum interest rate of 8% with deferred payments for six years.

(3) Provided for organizational and planning grants to qualified associations of up to $100,000 initially with a second $100,000 to be matched on a 50/50 basis.

(4) Established the Renewable Resources Corporation of Alaska and Development Fund into which not less than 5% of the receipts from certain revenues will be deposited to be used to enhance and develop renewable resource programs.

(5) Provided additional revenue for salmon enhancement and related projects through the passage of H.B. 306. SB 232

(6) Provided for the establishment of the Commercial Fishing and Agriculture Bank which may receive 1/3 of the revenues as provided for in H.B. 306 which in turn can be loaned, or used as a guarantee for regional aquaculture association loans.

(7) Creation and state funding of the F.R.E.D. Division of ADF & G.

As a result of these actions, it appears that the Alaska Legislature has taken a number of positive steps toward the encouragement of salmon resource development.

The main financing problem is presently not the lack of investment capital (which could become a problem), but instead the problem is a lack of financial resources by the regional associations. Financial problems at the regional level are as follows:

1. The regional royalty assessment does not provide sufficient revenues to pay administrative costs, regional technical expertise and hatchery O & M start-up costs for more than one large facility at a time.

2. No agreed upon financing mechanism has been established for financing hatchery O & M costs, once the hatchery is in production.

3. The $3.0 million loan ceiling can be artificially restrictive on the choice and size of facilities.

4. The responsibility as to who is responsible for the "investment risk" is not defined nor understood. Local fishermen and association managers fear financial failure.

5. The use of non-profit organizations, while desirable from some perspectives, is simply not geared to take the financial risks that for profit organizations are willing to-take.

6. The lack of a unique system of budgeting, accounting and financial reporting among the associations mades it very difficult to develop comprehensive financial policies at the state level.

7. The regional associations lack the necessary mechanisms for stability. Assessment revenues remain uncertain and no reserves exist to cover a "bad year" or further expansion.

In addition to these financial problems at the regional level, there are several financial problems at the state level which are impacting the A.S.R.D.P. These are:

1. Notwithstanding the public's willingness to support bond issues for the construction of salmon propagation facilities, the state, because of scarce financial resources and a strong user pay orientation is not committed to paying the O & M costs for facilities once they are in production. As more state operated facilities become operational the controversy over who pays will increase, which in turn will effectively limit the amount of production, which will in turn control the achievement of any quantitative goal such as "100 million salmon by the year 2000".

2. The emergence of for-profit salmon resource development corporations in Oregon, California and sooner or later in Washington with their very persuasive "free" fish argument could become a highly devisive alternative in Alaska which can best be countered by a system which produced results at a minimum cost to the taxpayers.

3. The State of Alaska by choosing to constitutionally limit taxing authority has deprived itself of one of the primary methods for economic development found in other states. The states of Washington and Oregon, through their port authorities and such mechanisms as METRO have devised long term organizations which have comparatively stable and adequate financing so they can and do prepare long range plans and achieve them.

III. Task 4 - Preliminary Findings

1. Pending the outcome of the litigation, some additional actions such as a constitutional amendment (or state collection and re-distribution of the royalty assessment) may be necessary to ensure this source of financing can be counted upon by the regional associations.

SB232

2. Again, pending the outcome of the litigation it may be desirable to re-direct the proceeds from ~~H.B. 306~~ going to local government to the regional associations so as to ensure projects are properly priortized and to improve the revenue base of the associations.

3. A "source and applications" funding model needs to be developed and tested. Such a model might include the following elements.

APPLICATION	FUNDING SOURCE
1. Association Administrative Costs	Royalty Assessment
2. Regional technology development and application (Regional Fisheries Biologists and other technical personnel involved in facility planning, stream surveys, test fisheries etc.)	State Planning and Survey Grants Federal EDA Planning Grants
3. Facilities in Start-up operations and maintenance	Royalty Assessment or State Loan or Guarantee to be repaid from 4 below
4. Facilities in production operations and maintenance	Hatchery harvest (limited to not more than 50% of the run) surplus fish and eggs, royalty assessment subsidy, federal and state mitigation payments
5. Capital costs for facilities and rehabilitation projects	Initially state loan or guarantee, then same as 4 above

4. The hatchery loan programs needs to be substantially restructured. Based upon approved plans, the regional association should be able to receive a construction loan separate from a start-up loan and further be guaranteed that the start-up loan will be available and can be repaid from future production revenues or royalty assessments or combination thereof at the election of the regional association.

5. The state needs to consider its level of responsibility for the financial risk if an association were to default in its payments as a result of a "bad year" or other circumstances creating financial difficulties. The objective of such action is to more clearly define for the associations, a state position which acknowledges the financial risks involved in acquaculture development and the level of financial risk acceptable to the state. In addition, such action would relieve state lending officials from making arbitrary judgements about the financial policies of the regional associations.

6. A uniform system of budgeting, accounting and financial reporting needs to be established for the associations which will satisfy legislative and executive branch concerns over the finances of the regional associations. Such a system would in turn will help ensure that the assumed financial risk by the state can be appropriately monitored.

7. In terms of state financial policies it will become increasingly more difficult for ADF & G to secure state appropriations to operate production hatchery facilities are being operated on a user pay basis by the regional associations. For ADF & G research facilities which would not be duplicated by regional associations, on the other hand, it could be argued should be a state funding responsibility because of their state-wide benefits and importance to the total program.

Contract TASK #2 - Institutional and Policy Analysis

I. Contract Task #2 - Evaluate existing institutions and policies and the implications of present and possible alternatives for suitability to achieve goals. Evaluate ramifications of possible alternatives. Define existing problems.

II. Contract Task #2 - Status Report - Leonard Lane and Associates reported a detailed outline of state programs impacting on the salmon fishery. An outline format describing each program by type, size, structure, geographical location, funds and primary constituents was presented for each such program. A horizontal diagram depicting all such programs on a wall chart was presented to indicate the morass of state programs affecting the Alaska Salmon Fisheries Development Program (ASRDP).

A less detailed presentation regarding federal programs was also offered at the May 7, 1979 meeting by William R. Wilkerson. A breakdown of federal programs to identify those directly involved in fisheries management, development research, enforcement and financing, non-fisheries regulatory activities, and other economic assistance programs was done for purposes of review. It was indicated at the meeting that it would be impossible and inappropriate pursuant to this contract to conduct the investigation necessary to compile information in the same manner as for the State of Alaska. Some initial analysis as to basic issues and needs to maximize effectiveness of federal program activities vis a ASRDP was madeavailable to the study group.

Since the May 7, 1979 meeting, the detailed outlines regarding state program activities have been completed and the first stages of analysis (below) have been performed by the Contractors. This includes a detailed listing of preliminary findings and conclusions regarding the status of ASRDP and some suggested courses of action. Additionally, some possible institutional arrangements consistent with project findings and existing and potential new goals are being offered for discussion at the second study group meeting. All are stated in general terms to trigger discussions and suggestions of alternative courses of action by the study group.

III. Contract Task #2 - Preliminary Findings

The following is a detailed listing of preliminary findings and conclusions regarding the present institutional arrangement for ASRDP. It is emphasized that these findings are largely the product of detailed review of available literature, studies and program outlines, comparative analysis with programs in other states, and limited discussions with members of the study group, among others. We have not conducted detailed discussions with all parties involved in ASRDP, as it has been our view that until the study group has had the opportunity to review and assess certain alternative

options regarding alternative and reform of the present institutional arrangement, and to provide specific guidance to the Contractors, discussions with key policymakers is inappropriate. We await guidance from the study group as to how best to proceed.

Statement of Findings and Needs

A. Need for Consolidation of ASRDP Policies and Goals

The wording of the Constitution of the State of Alaska and its statutes and policy statements clearly indicate that fisheries development is a top priority activity for the state. What is needed is not new goals, but consolidation of goals into a single ASRDP program statement consistent with proposed reforms and implementation, coordination, direction and accountability for results within the executive branch. (See discussion for Contract Task #1).

B. Need to Address Institutional Disarray Which is a Present Feature of ASRDP

The detailed program outlines developed be Leonard Lane and Associates indicate a need for greater horizontal coordination among a wide variety of programs and agencies in Alaska having impact on the successful operation of ASRDP. Clear direction as to the relative roles and responsibilities of each entity as it related to the overall goal of fisheries development, their interrelationships in achieving established goals, and means of assuring that such programs and activities not operate at cross purposes from one another, need to be established. The role of the Office of the Governor, agencies with major involvement and responsibility for ASRDP, regional associations and the private sector, as part of a consolidated approach to fisheries development must be addressed in terms of alternative institutional arrangements to be considered by the study group. The findings and needs addressed throughout this outline suggest certain reforms and approaches to program reform, consolidation and coordination. Among the specific issues which must be addressed relating to greater coordination among ASRDP programs are:

1. Need for improved harvest and hatchery management relations - A number of studies have identified the need for greater coordination among harvest management and hatchery programs within ADF & G, especially with regard to research conducted by both. As hatcheries come on line, the need for coordination and communication among such divisions within ADF & G will loom all the more important. Moreover, competition for limited research dollars among the two divisions can backfire for both. Over time, improved relationships between the F.R.E.D. Division and commercial and sport fisheries divisions will be required, as management to maximize harvest and protect viable runs loom all the more complex with the interjection of hatchery runs. Thus, the need for coordination among these divisions is not limited to the problem of competition for limited research dollars.

2. Need for improved relations between regional associations and ADF & G - The existing arrangement for development of regional associations and private nonprofit hatcheries presents a number of problems. First, the relationship between regional associations and ADF & G has been identified by a number of writers as hostile. Lack of cooperation and coordination among these entities has jeopardized the future successful operation of all. The legislature must consider imposition of requirements on both ADF & G and the regional association to jointly achieve results contemplated for ASRDP.

To data, both ADF & G and the regional associations have been dependent on state monies to support a variety of activities relevant to salmon resource development. Regional associations have built hatcheries, other artificial propagation projects, they have conducted research, they have created greater public awareness of the need for salmon resource development, and they have participated in some regional planning. Yet, cooperation with ADF & G has been limited and it differs from association to association.

On the other hand, it appears that the regional associations have had to fight ADF & G with regard to methods being undertaken to develop the resource, they have had problems obtaining brood stock and eggs for existing facilities from the state, and in many cases, the recommendations of regional associations through a legislatively established planning process have often been ignored. There is no apparent commitment by ADF & G to guarantee the successful evolution of the private non-profit hatchery program or vice versa.

While we do not suggest that either ADF & G or the regional associations are singly at fault for the relative adversary relationships which have evolved, we do suggest that the legislature itself can and should mandate improved relationships. Moreover, if regional associations are to be viable, program goals and missions for both the PNPs and ADF & G must be more clearly defined. In other words, comparative roles of both in regional planning and operation of activities related to the ADRDPmust be defined.

3. Salmon, shellfish, bottomfish development - need for improved relationships - Competition for research, management and investment dollars among program activities will be further heightened by the growing interest in development of off-shore fisheries in Alaska. The state will have only limited involvement in actual management control over such fisheries, although its interest in the activities of the North Pacific Fisheries Management Council, and assumption of a responsible advocacy roll before such council, will dictate the need to develop data and information regarding management problems which are likely to evolve now and in the future. With regard to bottomfish, the primary concern will be how to develop this fishery to the maximum benefit of the citizens in the State of Alaska. Initial development efforts will require substantial biological data and information for the private sector to be motivated towards utilization of such species, but it is suggested

that the bulk of activity from the state's perspective will be concentrated on the economics and social aspects of responsible development.

Thus, there will be a need to establish clearly defined relationships between any bottomfish and shellfish development programs, and the Alaska Salmon Resource Development Program. The commonality of objectives, i.e., to maximize benefits for the citizens of Alaska of all such fisheries, are not followed by commonality of needs and solutions. However, competition for dollars, the existence of programs which can be utilized for all fisheries development at both state and federal levels, ultimate relationships in the harvesting of many such species, and the clear need for Alaska to have its "act together" if it is to receive appropriate levels of benefits from all such fisheries, necessitate establishment of a coordinated fisheries resource development program, which takes into account the needs of each of the three above fisheries.

4. Need for improved federal-state relations - see discussion below.

C. Need for Improved Information, Data and Research Results for ASRDP

1. Budget implications and financial stability - We have identified a clear need for improved data regarding fisheries development activities, both by state agencies and regional corporations, if financing for expansion of the fisheries resources of the state is ever to be secure. Lack of information and proof of success of existing programs has affected budget reductions and instability which renders short-and long-range planning difficult.

At present, stability of financing for salmon resource development programs appears a problem for both the regional associations and ADF & G. Again, the legislature has significantly cut the budgets of both activities, with no obvious future commitment to continuation of an aggressive salmon development program. In other words, a signal has been sent for all such activities to improve on existing operations. Part of the reason for this has been the perceived competition among such entities and their lack of ability to prove results which justify public investment. The relationship between ADF & G and the private nonprofit program and the legislature must be improved (see below). A first step is a commitment to develop data and information necessary to successful planning for and operation of the ASRDP. This is an area in which regional associations and ADF & G can immediately work closely together.

2. Need for expanded research to accomplish ASRDP goals - While a primary need is improvement of data and information for budget purposes, increased biological information regarding the implications of existing and proposed projects of ASRDP. Again, the large number of biological questions raised about any and all hatchery programs throughout the United States affect program budget.

Federal, state and private sector research must be directed at resolution of questions involving disease egg transfers, the relationship of hatchery planning and harvest management, improved methods for hatchery operation, and the like. Certain research needs are suggested in the Economics section above. A system for establishing research priorities consistent with broad goals for resource development should be established. This will include coordination with the Federal government (see below). In any event, expanded research and development of data and information must concentrate on exploration of artificial propagation alternatives and establishment of clear biological guidelines for the establishment, location and operation of fish production facilities.

a. Exploration of artificial propagation techniques - As indicated in the discussion regarding economics of artificial propagation projects, there are a number of different means of producing salmon. Some such means are appropriate in certain regions while others are not. Moreover, certain means involve considerably greater front end costs, (hatcheries), while others (egg boxes) require relatively little in front end capital costs. Once economic and biological guidelines for various projects have been established in a particular region, regional associations and/or ADF & G must have sufficient capital available to them to conduct research to evaluate the best mix of alternatives. Moreover, if the goal of ASRDP is to get the "biggest bang for the buck", further research as to means of improving alternative means of propagation must occur. Some such research is now being done by regional associations, the federal government, colleges and universities and the state. Again, coordinated research is a must, and assignment of responsibility for such research to these entities must reflect regional needs, contribute to the accomplishment of state-wide production goals, and reflect an appropriate allocation of costs among citizens and users.

b. Establishment of biological guidelines for the construction and operation of fish production facilities - In the discussion above, we have indicated that prior to approving a particular artificial propagation project, certain economic factors must prove the worthiness of such project. The need for economic guidelines is only a part of the analysis necessary for more successful ASRDP operations. Biological guidelines for the construction and operation of hatcheries and other artificial propagation projects must be established. This will require analysis of the impact of such projects on existing natural runs, the viability of projects in the face of competing beneficial uses of watersheds, and analysis of wide variety of other critical biological issues outlined in the Economics discussion above.

Other states involved in fisheries resource development programs have established detailed guidelines for evaluation of hatcheries before they are built and established procedures and guidelines for operation of such hatcheries in a manner consistent with statewide goals. As long as federal and state agencies and regional associations are involved in the production of salmon,

a process to assure selection and operation of facilities in a manner consistent with goals, objectives and guidelines of ASRDP will be required. We are in the process of evaluating proposed and existing processes and guidelines for hatchery programs.

D. Some Additional Specific Problems and Needs for Regional Associations Affecting Institutional Arrangements

Detailed analysis of financial needs and policy implications are discussed in the financing section above. Suffice it to say that the present financial arrangements for the associations have major institutional implications. Again, relationships between regional associations and ADF & G have been less than cordial thus affecting not only the program accomplishments and credibility of both, but also the long-term stability of ASRDP.

Financial decisions relating to ASRDP suggest the need for clarification of the relative responsibilities and roles of regional associations and ADF & G. Decisions regarding who should pay or bear the risk for failures affect the types of operations to be undertaken by the state and the private sector. Biological information needs (research) and economic prospects in part should dictate whether it is appropriate for regional associations or ADF & G to undertake particular projects.

We think it is an open question whether voluntary private non-profit institution(s) as have been established by the Legislature can in fact provide the organizational stability and operational flexibility to undertake a major economic development activity as is contemplated for ASRDP, e.g., returning harvest levels for salmon to historic high levels. As discussed above, non-profit corporations by their nature are not major risk takers. Moreover, the level and quality of constituent interest (primarily fishermen) in an active fisheries development role is by no means assured. In this latter point, the threat of private acquaculture filling a regional association void may well stimulate continued interest in the program. Again, financial needs for ASRDP may dictate altered structures.

Other needs and factors relating to the organization and structure of regional associations not suggested above include the following:

1. Need for uniform reporting and accounting system for regional associations - One of the problems during the early years of the regional association program has been the lack of a systematic reporting system which will allow state policymakers, fishermen, and others to review the progress of the various associations. Moreover, in the analysis of economic and biological projections, as well as program results over the long term, it will be necessary to work from a common set of data.

Comparing the effectiveness and efficiency of different programs and approaches undertaken by the associations, not to mention ultimate comparison of successes with federal and state projects, will be impossible without establishment of a uniform data and reporting system.

State agencies have been relatively critical of the level and quality of information available to them regarding internal activities of the associations. Moreover, legislators have apparently been frustrated by the lack of a common reporting system. Such a system must be simple and yet report out information necessary not only to evaluate the programs, but also to reduce and minimize administrative burdens and cost to the associations. Obviously, the regional associations must participate in any program effort at system development.

Establishment of a uniform reporting and accounting system for regional associations cannot be totally apart from those systems established for state agencies. Ultimately, the information from each ASRDP activity must be in a form which can be diegested to evaluate successes and failures of its operations. Moreover, information sharing is facilitated by common systems. This is and to suggest a single information system for all ASRDP programs, as the varying needs and requirements of state and private activities will vary.

2. Need to assure equity in participation and sharing of regional association program results - A problem for the regional associations has been to treat fairly all interested user groups, not only through participation in regional association management and planning, but through receipt of benefits from programs undertaken by the associations. To improve the viability and quality of operation of the regional associations, means to better and more fairly involve sports fishermen, subsistence fisheries, less than dominant fisheries in particular regions, and interested citizens in the operations of such associations appear necessary.

   Clearly, all user groups are interested in maximizing benefits from both the state development and management programs and regional association activities to their own members. Whether fisheries managers like to admit it or not, a critical issue in both management and enhancement decisions is who gets what? The ASRDP and its specific programs must be operated in a manner which better assures all parties equity in both participation in and benefits from such programs. This is not to mention the need to, maximize benefits for all citizens of the state at least to the extent of public investment in these programs.

3. Need to evaluate actual resource development needs for each region - There is little doubt that the resource development objectives of the many regions of Alaska will differ. For example, in the Aleutian Islands resource development priorities might not include any projects for salmon fisheries development. Their activities may more appropriately be

centered on bottomfish development. Regional associations could be authorized to become involved in projects related to bottomfish development in order to become a more effective tool for the rational economic development of a region.

Another example would be the differing types of salmon fisheries which may exist in regions where salmon is an important resource. Prevalance of gear in such regions will in part dictate the species which should be developed. In Cook Inlet, consideration of sport fisheries interests is looming all the more important, yet regional associations may not now be properly organized to deal with such interest. Over time, one must consider whether the existing regional association structure will appropriately meet true regional needs. We will suggest format changes which will accomodate more flexible utilization of regional associations in Alaska fisheries development activities.

Additionally, the research, management, and resource development staffs of regional associations and ADF & G are not presently directed or located to best address and meet regional fisheries development needs. Establishment of regional planning activities, with regional association participation, is but a small step towards achieving this goal. However, the mission and capabilities of regional fisheries planners must be clarified, expanded and improved.

4. Need to idenfify appropriate level of activity for regional associations - The need to identify the level of program activities to be undertaken by both ADF & G and the regional associations has surfaced. At present, certain regional associations are moving aggressively while others are going slow. At the same time, the commitment of ADF & G to expansion and establishment of new projects to achieve increased salmon runs is limited by virtue of significant budget cuts.

   It is suggested that the goals established by the legislature, framers of Alaska's constitution, and individual program managers to return runs to their historic high levels, and to perhaps expand such runs beyond such levels, will not be achieved if regional associations are to operate on budgets which justify but a few projects. Moreover, ADF & G does not have a sufficient budget to undertake the kinds of projects necessary to begin to achieve the above goals.

   ASRDP can be shaped to accomplish established goals. Stability of financing for such programs, coordination with harvest managers, improved and coordinated research, and the sharing and development of information to prove viability of all programs will be required if any aspect of the ASRDP is to be justified and continued. Again, the legislature must assure development of information early on to identify an appropriate level of program activities for both ADF & G and the regional associations.

5. Need to identify regional development and research priorities and assure adequate staffing to achieve regional goals and policies - The legislature has taken an important first step toward assessment of regional needs in establishment of regional planning activities as part of authorizing legislation for the private non-profit hatchery program. However, it is suggested that regional planning activities, as presently constituted, are not adequate to assure implementation of ASRDP in a manner consistent with established regional needs. As indiciated above, needs of Alaska's regions differ and ADF & G and regional association activities shouldreflect these differences. This suggests to us consideration of alternative organizational structures for both ADF & G and regional associations, with greater concentration of resources by areas and according to established needs.

   As noted in the financing and economics sections, regional associations are budgeted for regional planning. Yet, relative roles and responsibilities of ADF & G and the associations by no means assures that fisheries development policies approved by the state reflect their input. Resultant hostile or adversary relationships noted above are quite contrary to the goals for association involvement in planning established by the legislature. We are in the process of idnetifying means of improving relationships through planning process as well as exploring institutional alternatives which will better assure accomplishment of region specific ASRDP needs.

6. Need for cooperative agreements among federal and state agencies, regional associations and others - ADF & G has in effect a cooperative agreement with the U.S. Forest Service at this time. We have not evaluated the results that have evolved from this agreement. However, we suggest that improved federal-state relations, as well as relations between regional associations and the federal government, must occur if the ASRDP is to be improved. Model cooperative agreements, including sharing of information, research results and data, utilization of labor and skills, and the like, can go a long ways towards improvement of the existing resource development program. The legislature can mandate that regional associations and the state negotiate cooperative agreements with each other and with all appropriate federal agencies. This is not to limit such agreements merely to fisheries agencies. In fact, cooperative arrangements with regulatory activities, industrial development agencies, among others, will be as important over time as those among fisheries agencies themselves.

E. Activities to Improve Federal-State Relationships and Expand Federal Contribution to ASRDP

1. Need to build case for equitable federal expenditures into ASRDP - Although it was impossible to obtain detailed budget statements regarding commitment of federal dollars to research relating to Alaska Salmon Resource Development (nor would the time involved for such a task be justified at this time or as part of this

project), we would suggest that a number of factors indicate that Alaska may not be obtaining a share of federal research monies commensurate both with its resource availability and potential when compared with other states. While the federal presence in Alaska is perhaps greater than any other state, competition for limited dollars is again a fact of life when it comes to federal research monies. A first reality when exploring possible reasons for lesser federal expenditures relating to Alaska salmon fisheries than may be justified include comparative lack of political clout of Alaska's Congressional delegation (a very small delegation), the location of federal regional offices in Seattle and fisheries policy offices in either the region or in Washington, D.C., the location of most major regional research facilities outside the State of Alaska, the relatively small population of the state, comparative inaccessibility to the state, and the difficulty in getting highly qualified and skilled researchers to locate in Alaska.

We suggest that all is not lost however. A major reason for some comparative lack of attention to Alaska research, management, development, and other needs which are often filled by the federal government, is at least in part the lack of effective advocacy before appropriate policymakers by Alaskans themselves. We have noted above considerable lack of data and much information is necessary to presenting the state's case to federal agencies. However, without federal and state financial commitment to the development of such information, presentation of Alaska's case is difficult. Research regarding unique problems to Alaska, e.g., weather methods of stream classification to be applied to the large number of Alaska streams, migration patterns, etc., dictates development of research priorities, to achieve the goals of the ASRDP, but also to help Alaska justify future federal and state expenditures for this program.

An expanded federal contribution to ASRDP is clearly justified. First, the federal presence in Alaska is greater than in any other state in the union. Second, degradation of fisheries resources in Alaska occured in large part during years in which the federal government was responsible for management of the resource (before statehood). Third, so much of the nation's fisheries resources are off the shores of Alaska. Fourth, with enactment of legislation affecting native claims to fisheries, and the trust responsibility of the United States over such claims, expansion of fisheries resources to meet the subsistance and other needs of Alaska natives will be heightened in coming years. If the Alaska D-2 legislation is enacted, preservation and expansion of Native fisheries will be essential, and soon, if the problems regarding fisheries resources and native claims in other states are not to be repeated. Federal responsibility in this area is paramount. Finally the State of Alaska is among the most economically dependent of the states on its fisheries.

2. Federal-state formulating and regulatory coordination for ASRDP - We have identified a number of federal requirements and regulations which can (and have) affect significantly increased costs for ASRDP. The regional associations have experienced the need to obtain countless permits from the federal government merely to begin their operations, and these requirements are also imposed on ADF & G. While many and perhaps all of the requirements are justified, the process for moving the program forward can be simplified. The first step is a concerted effort by the state to consolidate permit requirements, eliminate duplication, and provide services which may include a one stop license licensing process. Once the state program, which is already in place, has been applied specifically to salmon resource development projects, a necessary next step is expansion of the program to include federal regulatory activities. It is possible to utilize fisheries development program activities as a model project to test the validity of coordinated and consolidated regulatory review by both federal and state agencies through simplified processes.

   Because Alaska has not yet developed its coastal zone management program to the point of full implementation, and because coastal zone management is viewed by the Carter Administration as a vehicle to achieve rational development through simplified processes, monies can and should be available to incorporate into ASRDP policies, processes and initiatives which will insure improved coordination by federal and state regulatory activities. It is noteworthy that most existing fisheries authorities, not to mention upland regulatory activities, specifically authorize coordinated activities, and in some cases, the federal government has appropriated funds for establishment of such process. Yet, implementation of model programs for specific interest areas (e.g. fisheries development) are not truly in effect.

   It is proposed that Alaska initiate on its own efforts to develop simplified processes for consideration, evaluation and approval of projects relating to fisheries development. Again, impetus towards development of offshore fisheries can be utilized as a further rationale for incorporating model projects such as the above to relate to all fisheries development projects in Alaska.

3. Need for federal-state research coordination - Again, federalofficials have expressed interest in coordinating research and data sharing. Establishment of research priorities with federal, state and native representatives, as well as representatives of regional associations, will insure more effective expenditure of limited funds, and perhaps will contribute to Alaska's case for greater expenditure of external funds. A proposed program model for such an effort is in the review stage.

4. Need to identify federal programs which may contribute to ASRDP - A problem states have had in the past with regard to federal relationships has been difficulty in identifying on a continuing basis the countless programs which may be utilized to contribute to accomplishment of broad state policies. Thus, it is suggested that the State of Alaska in improving its fisheries development

program should make special efforts to identify those programs and funding sources available at federal levels, as well as in the private sector, which can be utilized to contribute to accomplishment of the goals for the state program.

5. Need to maximize level and quality of state control over fishery resources - A major argument against seeking federal financing for fisheries development program is legitimate concern by the states over the "strings attached" to such funds. Given the level of federal presence in Alaska, this concern is all the more legitimate. However, there are fisheries related programs and activities, not to mention economic development programs, which can and should be utilized to the fullest degree possible, which programs do not dictate absolutely an ominous federal presence. Alaska, like other states, will expect to receive their fair share of federal"benefits" , many of these being directed specifically at resource needs and opportunities. Fisheries clearly fits within this niche.

   Thus, in the framing of an overall Alaska fisheries resource development program, attention must be paid to the true cost of federal funding. It is suggested that loss of resource management authority or local government planning control over development activities is hardly worth sacrificing for additional federal dollars. It is submitted that the more effective the ASRDP, the less likely the concern over such federal preemption of legitimate state activities is justified.

6. Need to evaluate ASRDP in relation to the President's national policy on fisheries - In May, President Carter announced a national fisheries development policy aimed essentially at increased utilization by Americans of fisheries resources off the shores of the United States. The attractiveness of the development of off-shore fisheries has led to what can be termed a complete reversal of existing federal policy relating to fisheries activities. As indicated in prior study group meetings, the Office of Management and Budget has indicated in the past no special treatment of fisheries related programs is justified and all such projects must be considered as in competition with other resource development projects. While the policy reversal would indicate greater interest by this Administration in fisheries development, the impetus is hardly salmon fisheries development.

   Thus we suggest again consideration of establishment of a state fisheries development program which considers the needs and potential benefits of all species. The attractiveness of new opportunities off-shore could in fact erode significantly dollars available at federal and state levels for salmon fisheries development. This is not a necessary result, as maintenance and enhancement of high value stocks is important off-shore. However, salmon planners cannot operate in a vaccum and ignore off-shore opportunities. It makes for greater sense to develelopin Alaska a

program which takes into account the interest and potential of all species with the ultimate presentation of a coordinated package to the federal government which includes justification for positive federal contributions to the maintenance, enhancement and development of its fisheries. Again, effective advocates before federal agencies is a necessary goal and result of such an effort.

IV. TASK #2 - Alternative Institutional Arrangements for Preliminary Consideration by the Study Group - Brief Description

Preliminary analysis of financing, economics and institutional arrangements for ASRDP has led us to some general conclusions regarding potential reforms to the fisheries development program. A restatement of ASRDP goals is suggested in our discussion relating to TASK #1.

It is the purpose of this section at this time merely to focus the attention of the study group to some of the alternative approaches to reform of Alaska's fisheries development program which may be necessary if long-term goals are to be achieved. Focus on institutional arrangements includes:

(1) Options to assure greater central management control and horizontal coordination among programs directly and indirectly involved in the development of Alaska's fisheries;

(2) Options which reflect the need for planning and program implementation on the basis of identified regional needs; and,

(3) Options responsive to the particular organizational needs and problems extant within the present regional association program.

A. Options Relating to Centralized Management of Alaska's Fisheries Development Program

Again, we have identified a number of institutions at the state level directly involved in or impacting on the ASRDP. Additional to those are certain specific programs relating to bottomfish development and shellfish development. The needs and missions of at least the following programs or offices must be specially considered in the development of any proposed alternative organizational structures for ASRDP. These are:

(1) Alaska Department of Fish and Game

- Fisheries Rehabilitation and Enhancement Division
- Commercial Fisheries Division
- Sport Fisheries Division
- Shellfish Program

(2) Office of the Governor/Bottomfish Coordinator

(3) Regional Associations

(4) Department of Commerce and Economic Development (loan program and economic development)

(5) Department of Transportation (construction of facilities)

(6) Others

Option One - Maintain present structure, with strong legislative mandate for interagency cooperation and coordination of activities, with some reforms responsive to above findings and conclusions.

This approach would contemplate no alteration of the organizational structure, but initiation at legislative and executive levels of certain reforms necessary to insure greater communication and consolidation of policy and program activities among key programs with ASRDP. This option would also contemplate greater coordination among salmon, bottomfish and shellfish programs. Executive and legislative reforms to accomplish the goals described in the above sections, affecting each of the individual programs critical to ASRDP would be necessary.

Option Two - Present structure, but define through executive or legislative action, lead agency responsibility for certain program activities within Alaska's Fisheries Resource Development Program.

This organizational alternative contemplates establishment of a lead agency which would be responsible for implementation and coordination of all activities related to the Alaska Fisheries Resource Development Program (AFRDP). While the basic authority of each individual program, division or other activity would not be altered, their responsibility to respond and work cooperatively with the lead agency in establishment and implementation of AFRDP would be clearly established either by legislative or executive order. Again, reforms to each individual program responsive to the above findings would be defined for each program.

This organizational option will help elevate the priority of fisheries development within Alaska's government, provide greater visibility to fisheries development goals and programs, and should assure greater horizontal coordination and efficiency and improved management. While there will be debate as to which program or activity most appropriately would serve as lead agency, it is suggested here that there is no real obvious choice. Fisheries development involves more than just an understanding of salmon and other species. The lead agency must be able to draw expertise on such issues as the economics of fisheries, infrastructure development, construction of capital facilities, administration of projects, and the like. No single agency presently has this capability. Thus, as when one discusses who should have the lead in terms of implementing the state's policy on fisheries development, provision of such lead to fisheries management agencies is not a necessary result. However, we suggest that the most likely candidate within the state structure at this time may well be the Alaska Department of Fish and Game.

Option Three - Maintain present structure, but establish within the Office of the Governor an Alaska Fisheries Resource Development Coordinator.

This organizational alternative contemplates top level oversight and policy management of the wide variety of AFRDP programs from the Office of the Governor. This process has already been established for Alaska's Bottomfish Development Program. It is suggested that with the wide variety of agencies

involved in fisheries development, the exercise of special top level management to ensure coordination and effective prioritization of the use of limited funds would be most helpful. Moreover, a coordinator's office within the Office of the Governor will elevate the level of public visibility for the fisheries development program, it will offer the opportunity for greater policy direction and control, and it will provide an office responsible for ensuring that agencies do not operate at cross purposes.

If such an office were established in the Office of the Governor, the coordinator would need sufficient staff and direction either from the Governor by executive order or the state legislature to clearly define functions, powers over existing agencies, program goals and priorities. We are not suggesting in this option the establishment of a massive new bureaucracy, but merely a coordinating office with sufficient staff to perform identified tasks consistent with established goals.

Option Four - Establish a separate fisheries development agency or office through executive reorganization authorized and approved by the state legislature.

Establishment of a fisheries development agency or office under the Governor, with assignment of existing programs from a wide variety of agencies to such new agency or office is a possibility. For example, assignment of all salmon, shellfish, and bottomfish development activities, loan programs, and facilities construction programs within a single agency would be a possibility. Moreover, this agency would have the specific responsibility to work directly with regional associations. The benefit of this type of effort would be a clear separation in terms of budget and responsibility of fisheries management and fisheries development functions. This would be useful not only to agencies themselves, but also to the regional associations, whose role in fisheries management is sometimes difficult to define.

Negative aspects include further competition for dollars between fisheries development and fisheries management activities, perhaps greater difficulties in coordinating fisheries development and management activities which is necessary to the success of both programs, and the prospect for expanded bureaucracy. Good points include clear delineation of assignments and possibly greater coordination, greater public visibility for the total fisheries development program, and management authority over the total program which will help the agency fix financial and budget requirements according to need. Again, regional association relationships may be enhanced if a separate fisheries development agency is established.

B. Organizational Alternatives Affecting Greater Regional Coordination Between the State and Regional Associations

As indicated above, it is our view that peculiar needs of the many diverse regions of Alaska must be addressed by the study group. It is suggested that institutional arrangements affecting greater regional assessment and program implementation merit special consideration by the study group. There are a variety of options available, but certain key issues must be addressed. These include:

(1) Relative powers and authority of regional associations and regional staff (ADF&G for example) in the development of policies and implementation of programs;

(2) Assignment of technical support on basis of need to the regions;

(3) Resolution of disputes and conflicting policies among the regions;

(4) Methodology for implementation of statewide policies;

(5) Methodology for making responsible and equitable budget decisions as they affect the regions;

(6) Means of assuring coordination between regional officials and all programs directly or indirectly involved with AFRDP;

(7) Identification of means to establish relationships between regional officials and external activities (e.g. federal, private) affecting fisheries development in the region.

Options relating to regionalization of Alaska's Boards of Fish and Game were embodied in House Bill 193, introduced during the 1979 legislative session. While we have reviewed this proposed bill, and would expect the study group to focus on this approach, there are persons in the group better fixed to lead discussion as to its merits. At present, it is our intent to focus our attention on alternatives relating to the operations of regional associations and ADF&G to determine whether certain institutional arrangements might facilitate greater responsiveness of AFRDP to regional development needs. At present, options would appear to include:

(1) No alteration in ADF&G or regional associations

(2) Expansion of ADF&G regional staffs to address regional development needs and implement coordinated program with regional associations

(3) Legislative establishment of regional offices and empower a regional administrator to fix certain policies and implement certain programs - this would include clear definition of relative roles and responsibilities of ADF&G regional offices and regional associations

(4) If an AFRDP office is established in the Office of the Governor, regional coordinating offices might also be established

(5) If development activities are in any way separated out from fisheries management activities, regional relationships between these functions would have to be established.

We have spent some time in assessing alternative institutional arrangements because of the problems related to fisheries development budgets and stability of program financing. Others have reviewed such options from the standpoint

of institutional or program efficiency. We will be looking for guidance and insights from the study group regarding the many alternatives suggested by detailed findings and conclusions of the study to date.

C. Organizational Alternatives Affecting Regional Associations

Obviously, any organizational decisions affecting AFRDP will impact on the operations of regional associations. We have discussed in some detail above our concerns that regional associations, as presently organized, may not offer the organizational stability and flexibility necessary to assure salmon development consistent with stated goals. We will not restate the financial, organizational and other findings which affect ultimate decisions relating to the organizational structure of the regional associations here. Suffice it to say, that a number of factors must again be considered in the consideration of alternatives. These include:

(1) responsibilities and functions properly assigned to regional associations;

(2) methods of financing their operations;

(3) relationships with fisheries development agencies;

(4) role in policy development and planning;

(5) organization to include equitable balance of regional needs;

(6) budget limitations;

(7) ultimate project results.

We have suggested consideration of expanding the functions of regional associations to include fisheries development activities for species other than salmon. We have also addressed many of the problems and limitations related to financing (e.g. problems with assessments, etc.) and the economics of alternative propogation methods. Finally, we have indicated that the state and regional associations both may have legitimate yet difficult responsibilities as they relate to undertaking certain economically high, medium and low risk (yet legitimate) projects. These and the many other factors outlined above again suggest many organizational options. A few are:

(1) Establish regional associations as an arm of local government.

(2) Establish regional associations as a for profit activity.

(3) Authorize regional associations to assume qualities of quasi-public economic development agency (e.g. METRO, Puget Sound Economic Development Council) with authority to become involved in infrastructure development, artificial production facilities, etc.

(4) Maintain present PNP status, but provide financial flexibility through bonding authority and other like mechanisms.

(5) Separate facility operation and regional planning functions.

(6) Others.

Contract TASK #1 - Search for Goals

I. Contract Task #1 - Assignment

Research evidence in existing Alaska Salmon Resource Development Program of goal statements. Examine existing statements of goals and objectives of the Alaska Salmon Resource Development Program (ASRDP) as they are expressed or implied by the State of Alaska constitution, statutes, administrative policies, legislative intent and testimony as to clarity definition within biological, social and economic parameters. Define existing problems. Present to committee possible alternative sets of goals for ASRDP.

II. Task #1 - Status Report

As indicated in our discussion of Task #2, Leonard Lane and Associates has conducted an expansive program search and defined in outline form the goals of Alaska programs affecting ASRDP. This has included development of outlines expressing such policies as evidenced in the Constitution, statutes, administrative guidelines, etc. As is suggested above, the problem for ASRDP is hardly one of lack of goals. Rather, it is one of lack of a consolidation of those goals and implementing activities into a workable "program".

To arrive at a series of consolidated goals for consideration by the study group we have sought first to identify problems and findings related to the existing fisheries development program, then to begin to identify some alternative approaches to resolving those problems, and now, to suggest a series of goals or policies which will contribute to an improved "program".

III. Task #1 - Preliminary Findings

The only necessary goal of the study group and ultimately the executive and legislative branches, is to develop a series of policies and initiatives which will contribute to an improved Alaska fisheries development program. To achieve that objective we suggest the following general policies for consideration by the study group:

1. Improved coordination among state agencies impacting on ASRDP;
2. Improved relations among organizations direclty participating in ASRDP;
3. Improved data and information and expanded research for ASRDP;
4. Expansion of ASRDP to include all fisheries development activities;
5. Clarification and better definition of roles for local, state and federal agencies and organizations presently involved in Alaska Fisheries development;
6. Development of biological and economic guidelines for program implementation and operation;

7. Establishment of a ten-year, phased-in development plan, with further organizational evaluation to find the "best mix" of public and private commitment and involvement in fisheries development;

8. Establishment of processes and programs which assure an equitable distribution of program benefits among Alaska citizens and interest groups;

9. Establishment of programs and processes which assure an equitable distribution of program costs among Alaska citizens, the fishing industry and benefactors outside the State of Alaska;

10. Provision of stability of financing for all fisheries development activities.

Our findings and options suggested by those findings contained herein necessarily reflect these goals or policies. It is suggested that an improved Alaska fisheries development program can be achieved by implementation of actions which focus on achievement of these policies.

7/9/79 minutes

OCTOBER 1979

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

AUDIT DIVISION
POUCH W—ALASKA OFFICE BUILDING

FINANCE DIVISION
POUCH WF—STATE CAPITOL

JUNEAU, ALASKA 99811

9/14/79

NOTICE OF MEETING

THE AQUACULTURE POLICY STUDY GROUP WILL MEET ON TUESDAY, OCTOBER 9, 1979, 9:00 A.M. IN ROOM 423 OF THE STATE CAPITOL BUILDING, JUNEAU, ALASKA.

MINUTES
AQUACULTURE POLICY STUDY GROUP
October 10, 1979

Call to Order

Chairman Terry Gardiner called the meeting to order at 9:30 a.m., in Room 423 of the State Capitol Building.

Roll Call

See attached attendance list.

Agenda

Meeting with Miller and Associates to review final report for salmon fisheries plan.

Introduction

Wally Miller of Miller and Associates advised that the final report had been mailed out on October 1, 1979. He expressed his regrets that Bill Wilkerson of Eisenhower, Carlson, et al, could not be present due to a family emergency. Further, he would attempt to outline and answer questions concerning the Institutional section, although he was not quite as familiar with it as Mr. Wilkerson.

Chapter I - Salmon Aquaculture Economic Evaluation Techniques

Mr. Miller advised that their report recommended utilization of both the return on investment and cost benefit techniques, with the greater weight on return on investment in order to satisfy financial assessment needs of lending institutions.

Cost factors are set out on page 33 of their report.

A great deal of emphasis has been placed on breaking down the operating costs in such a manner as to get a clear picture as to the actual expense of raising salmon from egg to maturity and setting out separate categories for administration and technical services. An example, remote egg take has been separated from general hatchery operations. There was much discussion concerning the use of constant dollars and current dollars and discounting. It was the concensus of opinion that the cost benefit analysis should use the first wholesale price as a reasonable value for the project.

The Alaska Department of Fish and Game is currently using ex-vessel pricing rather than first wholesale pricing. It was the recommendation of the group that the Alaska Department of Fish and Game publish an annual report setting out the first wholesale prices in three regions of the State.

It was also the opinion of some members of the group that the matter of interim benefits, such as the value during construction, had not been addressed, only end stream benefits. It was suggested that possibly this should be set up in a separate category. This, in turn, spurred discussion concerning resident hire. The building of fish hatcheries results in 100% resident hire as opposed to pipelines which employ many nonresidents.

Macro-Economic Evaluation Techniques

Mr. Miller advised that two procedures needed to be implemented in order to perform macro-economic analyses; i.e., State Tax Revenue Collection Reports coded by the Standard Industrial Code and Geographic Region and that the State develop an Input/Output Economic Model. In this manner, they may accurately estimate the total tax revenue accruing to the State from this industry as well as the effect of employment and income from the fishing industry. It was Mr. Miller's recommendation that the State Departments of Revenue, Commerce and Economic Development and Labor be authorized to develop the information systems.

Chapter II - Sources and Methods for Financing Salmon Aquaculture Programs

Mr. Miller had outlined five alternatives for financing salmon aquaculture programs in light of the Wayne Alex, et al, vs. Southern Southeast Aquaculture Association, et al, court case. Mr. Miller personally felt that alternative 4 was the most attractive which, in essence, established service areas in the fishing regions of the State. This is like the Seattle Port Authority's system.

Much discussion ensued concerning the complications and mechanics of all of the various alternatives, including the fact that there are so many different types and forms of governments, with varying powers, making alternative 4 extremely complicated. A sixth category was suggested and that being a user pay tax.

Break

The meeting recessed at 11:45 a.m., reconvening at 1:15 p.m.

State Loans to Regional Aquaculture Associations

Concern was expressed over long-range monetary support for programs which take many years, such as lake fertilization.

Mr. Miller advised that he would look at FRED Division's cost categories for hatcheries as there are no comparisons between the various hatcheries.

Chapter III - Institutional Problems and Potential Reforms

There was some discussion concerning moving the fisheries loan program out of the Department of Commerce into the Department of Fish and Game. It was the opinion of some that the Department of Fish and Game is better qualified to determine the viability of a particular hatchery program than a conventional lending agency.

It was Mr. Miller's opinion that there should be one lead agency established statutorily with a published intent statement and established reporting functions.

A straw vote was taken and the majority of the group approved the research center concept. Inasmuch as 90% of the fish in the United States are harvested in Alaska, it was brought out that possibly the State would be eligible for some federal funding for the research institution. Sitka was recommended as a good location for the research center since there are a variety of species and it is a rather sheltered area.

Organization

The following points were brought up during the discussion on organization:

1. FRED should be researchers instead of managers.

2. Technical planning is important.

3. It should be determined what the viable species are.

4. Planning should not be done piecemeal.

5. Regional associations should meet regularly in order to improve relationships.

6. Concerning page 105 of the Miller and Associates report, finance officer should be changed to loan committee.

7. It was pointed out that the last 30 pages of the Miller and

Associates report was missing on the subject of goals.

Summary of Recommendations

It was agreed that salmon enhancement looked attractive, but that they needed a stable organization and financing. Various areas that should be explored are the service district proposition, State appropriations and a tax of the user groups. First, it was imperative that they resolve any organizational problems.

It was pointed out that the report had not addressed the small individual hatcheries of which there were quite a few. It was determined that the report would acknowledge the existence of such "ma and pa operations" and they would be dealt with at some future time.

Chairman Gardiner appointed two subcommittees in the areas of proposed legislation and the establishment of the research center.

Proposal and Legislative Committee

Duties:

a. Draft statute changes.
b. Draft policy changes or new policies.
c. Prepare a list of subcommittee questions.

Members Appointed:

Legislature - Terry Gardiner and Margaret Branson
Administration - Joe Davis
Aquaculture Associations - Ron Wendte

Research Center

Duties:

Among other things, the Research Center Subcommittee should compare the amount of money spent in this State for research, the number of fish and dollar volume of fish versus the same figures in the other fishing states.

Members Appointed:

Bob Burkett, Chairman
Derek Poon
Curt Kearns
Floyd Heimbuch

Miller and Associates will work with the two subcommittees and an attorney from the Legislative Affairs Agency will do the drafting of the recommended pieces of legislation. Chairman Gardiner was appointed to renegotiate the Miller and Associates contract so that they might work with the subcommittees. It was pointed out by Chairman Gardiner that there is still $25,000 left in the budget for use by the Aquaculture Study Group. This money had been tentatively set aside for an extended Miller and Associates contract at an earlier meeting.

Mr. Miller went through the following mental checklist to ascertain that he had written down the salient points brought out by the group by chapter:

Chapter I

1. That he recomend to the Alaska Department of Fish and Game that they publish annually the first wholesale prices of fish, and;

2. That the Department of Revenue develop an input/output economic model.

Chapter II

1. That a cost estimate is needed as an interim measure for next year.

2. That the committee must determine which is the most viable of the five proposals set out on pages 55 and 56 of the Miller report, with the addition of a user tax.

3. That they explore other financing avenues.

4. That the hatcheries loan program be moved from the Department of Commerce and Economic Development to the Alaska Department of Fish and Game.

5. That an accounting program be developed.

6. That a lead agency be appointed to essentially deal with the Aquaculture program.

U. S. Forest Service Projects

Bill Sheridan of the U. S. Forest Service presented a handout showing the fisheries enhancement projects that the Forest Service was currently working on.

Break

The meeting adjourned at 5:00 p.m.

AQUACULTURE POLICY STUDY GROUP

Bob Burkett	ADF&G, F.R.E.D. Division
James E. Fisher	USDA - Representative
Terry Gardiner, Chairman	Legislature
Floyd E. Heimbuch	Cook Inlet A.A.
Joe Davis	ADF&G, F.R.E.D. Division
Curt Kerns	Sea Grant
Bill Marsh	NSRAA
Derek Poon	NSRAA
Jev Shelton	NSRAA
Bill Sheridan	U. S. Forest Service
Barbara Sorensen	Department of Revenue
John Sund	Legislative Employee
Margaret Branson	Legislature
Ron Wendte	SSRAA
Jack McBride	IMARPIK

GUESTS IN ATTENDANCE

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Karl Ohles	Alaska Fishermen's Association
Wally Miller	Miller & Associates
Paul A. McCollum	AVCP Fisheries Corp.
Dan Malick	Leonard Lane & Associates

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