

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILE 8672

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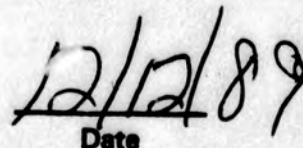


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Alaska State Legislature

House of Representatives

SPECIAL COMMITTEE ON FISHERIES

Pouch V
State Capitol
Juneau, Alaska 99811
(907) 465-4833

HEARING DATE:

March 11, 1986

Mariculture

NAME (Please Print)	ADDRESS	REPRESENTING	TESTIFY (Yes or No)	PHONE NUMBER
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Peter's
List



UNITED FISHERMEN OF ALASKA

Jack Cadigan
Executive Director
907-586-2820
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AQUACULTURE PERTAINING TO PEN-REARED SALMON

Where does UFA stand on the subject of pen-reared salmon? This was subject of extensive discussions at our Board Meetings in December and February. The position of the board was laid out in a resolution which essentially did three things:

- o Recognized that salmon farming as already here, whether we like it or not.
- o Cited the need to have an un-biased assessment of socio-economic impact
- o Cited the need for careful and cautious development

The Board also cited a number of "pros and cons". The "pros" which were listed were as follows:

- o Guaranteed high quality
- o Available in off-season
- o More jobs in industry
- o Keeps industry competitive
- o Possible decrease in overall processing/transport costs
- o Development of highly renewable resource
- o Capability to integrate into existing commercial fisheries
- o Technology is currently in place

The "cons" were listed as follows:

- o Competition with high-quality fresh frozen
- o Highly capital intensive at start-up
- o Habitat and biological concerns
- o Impact of egg supply requirements on wild harvest
- o Difficult to compete with foreign farmed salmon
- o Potential physical displacement of commercial fishing

The policy of UFA, interestingly, has caused concern as being too liberal in the view of some, while too conservative in the views of other fishermen. I think, on balance, that it is a pretty sensible one. It says we can't stick our heads in the sand, as farmed fish are in the marketplace right now. It says that there may be some advantages to commercial fishing in general, as well as to fishermen who individually (or in groups) get into that business. It says there is a big lack of anyone having looked hard at the pros and cons as they affect the existing commercial fishing industry, and that we need to get some unbiased assessments in this regard. It also says let's get on with the effort of developing a state policy before we get overtaken by big business interests and lose control of our destiny in this regard.

Delay accomplishes nothing if it is delay for the sake of delay. If it is delay for the sake of taking a hard and close look at fishermen's concerns, then it makes a lot of sense. If it is delay to see how we can integrate a new fishing system into the current one so we can see more productive processing plants operating in Alaska on a year-round basis, it makes sense because lower operating costs mean lower operating costs in the summertime too - and that helps the salmon market in general. If it is delay to see if a better and cheaper transportation system can be devised, that will also help the sales of wild fish in the summer. If it is delay to see if there is a need to prohibit or severely limit sales of farmed-fish in the summer, then it makes sense. So the position of the UFA is not to delay for the sake of delay, but to be sure that the course we take as a State is carefully charted before sailing full-speed into unknown waters.

How might fish-farming be of advantage to you as a fisherman? In addition to those fishermen who are scared blue of the whole issue (and not necessarily without good reason), there are those who can't wait to open up their own farm! In addition, there are those fishermen who recognize that the farmed-fish have prodigious appetites, and that feed accounts for nearly half the cost of raising the fish. So they figure there will be a good market for groundfish and other cheap fish to be processed as feed. Those tied into processing see that a 100 metric ton farm will produce 7,000 lbs a week of salmon for thirty-one weeks from October to May. There are fishermen who realize this is potentially a stable-income industry which can employ family and friends year-round. Further, because it is not labor intensive in the summer (no sales are made), the fishermen can be out fishing then.

Where is the economic concern? Clearly, there isn't any competition with pinks. The ex-vessel equivalent price of a farmed fish in Alaska is going to have to be around \$2.80 a pound. In the west coast and southern markets it will have to bring about \$3.50 rock-bottom to break even. So we are obviously talking a high-priced fish. Indeed, the economics is such that it can't (at least as yet) compete in the summer market. (My caution is the "as yet", because it may require legislation to insure that doesn't happen). There is the impact which might occur, irrespective of price, with the frozen market for high grade salmon. This is so because the public, rightly or wrongly, sees "fresh" fish as vastly superior to "frozen". This is something which needs evaluation before proceeding merrily along.

In summary, UFA is neither "for" nor "against" salmon-farming and will not have a definitive stand in that regard until the necessary data is achieved to make such a judgement. That data should be apparent on conclusion of an un-biased socio-economic study or evaluation, and coupled with the inputs from legislative hearings such as this, should provide the base from which to formulate a fully knowledgeable and non-reactive policy.

MEMORANDUM

State of Alaska

TO: Honorable Bill Sheffield
Governor

DATE: March 6, 1986

FILE NO.:

THRU:

TELEPHONE NO.:

SUBJECT: Aquaculture
Policy Proposal

FROM: Fisheries Mini-Cabinet

Please find attached the final recommendation of the Ad Hoc Aquaculture Advisory Committee to your Fisheries Mini-Cabinet. We have reviewed the recommendations of the advisors and are in concurrence with their suggested approach. Prior to forwarding our recommendations to you we requested the Departments of Commerce and Economic Development, Fish and Game, Natural Resources and Environmental Conservation to review the fiscal impacts associated with full and complete implementation of the recommendations. Although the total cost of full implementation would be substantial, the current revenue situation and the need to maintain existing fisheries management and development programs lead us to recommend the funding of only two portions of the recommendation. We suggest providing \$39,000 for public forums/education and \$50,000 for the proposed socioeconomic impact study. We would recommend that a total of \$95,000 be appropriated in the FY 87 budget, in the form of a C.I.P., to the Department of Commerce and Economic Development.

We collectively recommend acceptance of the basic policy regarding all forms of aquaculture with the exception of pen rearing of fin-fish. After the suggested study and public awareness process have been funded and completed and the public has had a chance to react, we will recommend further action regarding the pen rearing of fin-fish. In our view, a critical component of this policy development and implementation is the need to form and maintain a close partnership between your office and the Legislature as suggested by the Committee. We perceive there is presently a strong difference of opinion among members of the fishing community regarding whether or not fin-fish farming should be allowed. The communication link suggested above would maximize our chances for obtaining an accurate picture of the public desire to allow development of this industry to proceed in Alaska.

WP/sa0348g
30686b

Attachments: A Philosophy For Aquaculture Development in Alaska
Proposed Aquaculture Policy for Alaska

MEMORANDUM

State of Alaska

TO: Governor's Fisheries Mini-Cabinet

DATE: January 20, 1986

FILE NO.:

THRU:

TELEPHONE NO.:

SUBJECT: A Philosophy for Aquaculture
Development in Alaska

FROM: Aquaculture Advisory Committee

On July 15, 1985, Governor Sheffield appointed a Mariculture Advisory Committee, consisting of fishermen organizations, fish processors, a Native corporation, governmental agencies, the universities, and individuals in the private sector interested in mariculture development in Alaska. The committee was charged with the responsibility of formulating a workable and effective mariculture policy to guide the State in development of the mariculture industry in Alaska. The committee modified its original charge to include culture of all aquatic plants and animals in both the fresh and saltwater environments. Hence, this consensus document outlining an aquaculture policy is submitted.

The issues confronting the further development of aquaculture have been examined by the committee. These developments include fish, crustaceans, mollusks and aquatic plants. It is important, in light of world aquacultural developments and growing interest in aquaculture potential in Alaska to generate a policy that should enable the orderly development of an Alaskan aquaculture industry. However, many biological, technical and social questions must be resolved before allowing full implementation of any plan. The committee strongly recommends that every effort be made to assure that the developing aquaculture industry:

1. be complementary to, and not in conflict with, the existing fishing industry.
2. be economically viable and self-sustaining.
3. provide opportunities for family and other small scale businesses.
4. provide an overall enhancement to the marketing image of all Alaskan seafood products.
5. give due consideration to wild stocks.

Some shellfish aquaculture projects are currently underway. While we have found a need to tailor the existing permit and lease process in order to promote aquaculture development, and have identified a need to improve dissemination of technological data, it appears that the early success of these projects holds the promise of another positive use of Alaska's resources and should be supported.

January 20, 1986

The culture of aquatic plants may also offer new opportunities. There is a need to further assess opportunities and develop appropriate technology.

The farming of finfish (other than nonprofit ocean-ranching of salmon) has not been introduced, although experimental work has shown promise. We need to continue and expand grant research efforts between the State of Alaska and the National Marine Fisheries Service to gather data on the biological and technical aspects of pen-rearing. The possibility of social and economic conflicts with existing fisheries warrants a more cautious approach than for shellfish and aquatic plants.

The committee recommends that aquaculture be a self-sustaining industry with the exception of public investment in plant and animal health diagnostics, public health and initial biological research. In the meantime, there is a need to develop public policy regarding such issues as a regulation of the aquaculture industry (either as a farm or fishery), size and location of sites, federal land issues, organization of the permitting process, ownership questions, taxation, disease, and so forth.

Attached is our proposed policy document consisting of a generic policy statement followed by a number of comments regarding specific issues. This committee would be available for further deliberations on specific issues stemming from public review and comments to this policy.

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Attachments

GOVERNOR SHEFFIELD'S
AQUACULTURE ADVISORY COMMITTEE

PUBLIC MEMBERS

Brian Allee, PWSAC
Jack Cadigan, (Cass Parsons), UFA
Bill Clapp, Pelican Seafood
Nancy Gross, Unalaska
Richard Harris, Sealaska
Jim Hemming, Mussel Grower
Earl Krygier, A.T.A.
Robin Larsson, A.S.G.A.
Rick Lauber, P.S.P.

LEGISLATIVE MEMBERS

Senator Richard Eliason
Representative Peter Goll
Representative Adelheid Herrmann
Senator Fred Zharoff

UNIVERSITY & GOVERNMENT
AGENCY REPRESENTATIVES

Greg, Baker, ADC&ED
Ron Dearborn, U of A, Sea Grant
Bill Heard, NMFS
Ole Mathisen, U of A
Stan Moberly, ADF&G
Dick Neve, Office of the Governor
George Snyder, NMFS

SPECIAL ASSISTANT

Gerald Bowden, UCSC

Proposed Aquaculture Policy

It is the policy of the State to promote the development of a successful aquaculture industry in a manner that will contribute to the economic well-being of the citizens of the State, the commercial fishing and seafood industry, and all communities of the State, particularly the coastal areas.

GENERAL FINDINGS

1. There is an urgent need to inform the public of the potential socio-economic impacts, benefits and opportunities surrounding aquaculture, especially salmon farming, and to solicit public comments through a series of hearings. These efforts will provide necessary information to enable both the public and government to determine the future course of aquaculture and to provide for its orderly development. The process will:
 - A. address the concerns of fishermen, the fishing industry, coastal residents, and the citizens of the State for the development of aquaculture in Alaska;
 - B. serve to educate the public and the State about aquaculture;
 - C. serve as a mechanism to collect ideas and recommendations for the further development of Alaska's aquaculture policy;
 - D. include a review of the aquaculture development options envisioned; and
 - E. enable all concerned individuals to review and comment on any draft laws and proposed regulations prepared in response to public participation and comment.
2. The State, in considering the uses of public lands, water and other resources, should develop procedures to ensure an orderly and controlled use of the State's resources for aquaculture. The procedures instituted by the State should:
 - A. provide maximum opportunity for family and other small scale businesses;
 - B. require that leases be active, thereby avoiding speculation; and
 - C. avoid creating artificial wealth through possession of leases or permits.

State and other land planning programs should include inventories of potential aquaculture sites. These inventories should be responsive to existing State and federal regulatory requirements and establish uses.

3. In light of the growing competition caused by the growth of world aquaculture, the State should increase efforts to enhance the image and value of Alaskan seafood products. We specifically suggest instituting a program that promotes more stringent quality controls in grading and labeling, and further improves the general public perception of Alaskan seafood. Such action encourages promotion of a more competitive product.

SPECIFIC RECOMMENDATIONS

1. Shellfish and Seaweed

The State should review all existing statutes and regulations governing culture of shellfish and aquatic plants, and should, if necessary, institute programs to actively further promote and facilitate the culture of these organisms. There is a clear need to:

- A. tailor the State's permitting and leasing procedures to better accommodate the needs of the industry and to provide broader technological support;
- B. improve programs for testing of paralytic shellfish poisoning (PSP) including inspection and certification time frame;
- C. establish or certify diagnostic labs near shellfish culture areas; and
- D. encourage private oyster spat and other shellfish hatcheries.

2. Ocean Ranching

The success of the existing State and nonprofit salmon ocean-ranching programs is recognized, and efforts in this area should be expanded. Recent developments regarding product form and expanding markets indicate there will be a greater demand for additional salmon in the future.

3. Salmon and Other Finfish Farming

The form of aquaculture that poses the most controversy is the farming of large-sized salmon and trout, because these product forms may compete with the salmon fishing industry for markets.

Salmon farming is currently not allowed in Alaska, however, there is a growing interest to develop the industry. Prior to contemplating salmon farming, the State should initiate an unbiased study to identify and evaluate social and economic impacts and consider various implementation options to determine the greatest benefits for Alaskans.

Some finfish species and product forms such as pan-sized salmon and trout may not be in direct competition with the Alaska commercial fishing industry and, therefore, may not be as controversial as other forms of salmon farming. The State should commence a review to determine if the culture of pan-sized salmon, trout and other finfish are permissible under current statutes. Public comments should be solicited to determine if there is an interest or concern regarding these product forms.

FINAL

To accomplish the public education and research necessary for the orderly development of aquaculture in Alaska, a strong partnership commitment from the executive and legislative branches of State Government, federal agencies, Alaskan universities, industry and interested individuals will be required.

TESTIMONY OF RICHARD P. HARRIS
ENVIRONMENTAL MANAGER
SEALASKA CORPORATION
BEFORE THE
HOUSE SPECIAL COMMITTEE ON FISHERIES
ON STATE AQUACULTURE POLICY
MARCH 11, 1986

INTRODUCTION

SEALASKA CORPORATION HAS BEEN ASKED TO SPEAK TO THE HOUSE SPECIAL COMMITTEE ON FISHERIES DUE TO OUR INTEREST IN AQUACULTURE DEVELOPMENT IN ALASKA. FOR THE PURPOSE OF THIS TESTIMONY AQUACULTURE MEANS THE PROPAGATION AND REARING OF AQUATIC SPECIES IN CONTROLLED OR SELECTED ENVIRONMENTS. ALTHOUGH OCEAN RANCHING IS A FORM OF AQUACULTURE, THE STATE ALREADY HAS A COMPREHENSIVE PRIVATE NON-PROFIT OCEAN RANCHING PROGRAM, THUS, MY TESTIMONY WILL EXCLUDE DISCUSSION OF SALMON OCEAN RANCHING.

IN ALASKA, OPPORTUNITIES AND INTEREST IN AQUACULTURE DEVELOPMENT CONCENTRATE PRIMARILY ON OYSTERS, MUSSELS AND SALMON. OTHER POTENTIAL OPPORTUNITIES ALSO EXIST FOR SEAWEED, OTHER SHELLFISH, MOLLUSCS AND FINFISH SPECIES.

MY TESTIMONY TODAY WILL FOCUS ON:

- o SOCIAL AND ECONOMIC OPPORTUNITIES THAT EXIST FOR ONE FORM OF AQUACULTURE, SALMON FARMING; AND
- o A DISCUSSION OF THE BASIC ELEMENTS OF LEGISLATIVE AND ADMINISTRATIVE POLICY NEEDED TO AUTHORIZE AND PROMOTE AQUACULTURE DEVELOPMENT IN THE STATE.

SALMON FARMING

SALMON FARMING IS THE REARING OF SALMON OR TROUT IN FRESHWATER OR MARINE ENCLOSURES SUCH AS HATCHERIES, RACEWAYS, NET PENS OR OTHER ENCLOSURES. THERE ARE TWO GENERAL MARKET SIZES OF FARMED SALMON OR TROUT, PAN-SIZED AND GROW-OUT. PAN-SIZED FISH ARE SOLD WHEN THEY REACH APPROXIMATELY ONE POUND IN SIZE. GROW-OUT FISH ARE GENERALLY SOLD WHEN THEY REACH TWO POUNDS OR MORE. THE BEST PRICES FOR GROW-OUT FISH ARE FOR SIZES BETWEEN SEVEN TO TWELVE POUNDS. CURRENTLY ALL FORMS OF SALMON AND TROUT FARMING ARE BELIEVED TO BE PROHIBITED IN ALASKA.

THERE HAS BEEN A RAPID GROWTH AND MARKET ACCEPTANCE OF FARMED SALMON BECAUSE IT IS A "NEW PRODUCT FORM" THAT MEETS THE BUYER AND CONSUMER NEEDS. THE ATTRIBUTES OF FARMED SALMON ARE:

1. THEY ARE AVAILABLE IN THE SIZE PREFERRED BY THE CONSUMER.
2. THEY OFFER CONSISTENTLY EXCELLENT QUALITY WITH FIRM FLESH, GOOD COLOR AND SILVER SIDES.
3. THEY ARE AVAILABLE FRESH TO ALMOST ANY MARKET WITHIN THREE DAYS.
4. AND, THEY DO NOT ENCOUNTER THE SEASONAL AVAILABILITY AND HIGH STORAGE COSTS THAT OCCUR WITH COMMERCIALLY CAUGHT FISH.

SEALASKA CORPORATION CONCLUDED THAT SALMON FARMING, IF ECONOMICALLY FEASIBLE, WOULD PROVIDE SIGNIFICANT ECONOMIC AND SOCIAL BENEFITS IN ALASKA. IN LATE 1984 AND 1985, SEALASKA COMMISSIONED AN AQUACULTURE FEASIBILITY STUDY WITH SWEDISH AND ALASKAN CONSULTING FIRMS TO EVALUATE SALMON FARMING POTENTIAL.

THE STUDY OBJECTIVES WERE TO:

1. DETERMINE IF SALMON FARMING IS ECONOMICALLY FEASIBLE IN

ALASKA; AND

3. EVALUATE POTENTIAL SOCIAL AND ECONOMIC BENEFITS TO ALASKA AND ITS RESIDENTS.

THIS STUDY FOUND THAT:

SALMON FARMING IS ECONOMICALLY FEASIBLE IN ALASKA UNDER CURRENT CONDITIONS, HOWEVER, COST CONTROL, FARM EFFICIENCY AND A FAVORABLE REGULATORY STRUCTURE ARE ESSENTIAL TO MAINTAIN PROFITABILITY.

- o THE CURRENT MARKET PRICE FOR FARMED SALMON IN HOUSTON OR LOS ANGELES IS IN EXCESS OF \$4.00 PER POUND.
- o THE DELIVERED COST TO PRODUCE FARMED SALMON FROM URBAN OR RURAL/REMOTE LOCATIONS IN SOUTHEAST ALASKA RANGES BETWEEN \$2.78 AND \$2.98 PER POUND.
- THE STUDY CONCLUDED THAT ASSUMING A CONSERVATIVE PURCHASE PRICE OF \$3.50 PER POUND THE GROSS ANNUAL PROFIT FOR A 200 METRIC TONNE SALMON FARM IN SOUTHEAST ALASKA WOULD BE BETWEEN \$217,000 AND \$268,000 OR 17% TO 21% PROFIT MARGIN.

THE STUDY ALSO FOUND THAT A SALMON FARMING INDUSTRY IN ALASKA WILL CREATE A SIGNIFICANT NUMBER OF NEW JOBS AND PROVIDE SMALL BUSINESS OPPORTUNITIES FOR ALASKANS.

- AN ALASKA SALMON FARMING INDUSTRY OF 200 TO 300 FARMS, PRODUCING 20,000 METRIC TONNES ANNUALLY, AT A SALES PRICE OF \$3.00 TO 4.00/POUND, WOULD HAVE A PRODUCT SALES VALUE OF \$132 TO \$176 MILLION DOLLARS AND WOULD CREATE 2,800 JOBS. THIS IS 20% OF THE 1982 FISH AND SEAFOOD HARVESTING INDUSTRY ANNUAL AVERAGE EMPLOYMENT.
- IN AN ALASKA COMMUNITY, FIVE TO TEN FARMS PRODUCING A TOTAL

OF 500 METRIC TONNES WOULD CREATE APPROXIMATELY 33 NEW JOBS AND HAVE A SALES PRODUCT VALUE OF \$3.3 TO \$4.4 MILLION DOLLARS.

- A 500 METRIC TONNE SALMON INDUSTRY IN A TYPICAL SMALL SOUTHEAST ALASKA VILLAGE WOULD EMPLOY 25% OR MORE OF THE AVAILABLE UNEMPLOYED LABOR FORCE AND CONTRIBUTE UP TO 50% IN ADDITIONAL WAGE EARNINGS TO THE COMMUNITY.

THIS BRIEF PRESENTATION HAS SHOWN THE POTENTIAL SOCIAL AND ECONOMIC BENEFITS TO ALASKA FROM SALMON FARMING. SEALASKA BELIEVES THAT OTHER FORMS OF AQUACULTURE WOULD ALSO OFFER SIGNIFICANT SOCIAL AND ECONOMIC OPPORTUNITIES, ALTHOUGH PROBABLY LESS THAN SALMON FARMING.

ALASKA IS ON THE THRESHOLD OF OPPORTUNITY TO PROMOTE A NEW INDUSTRY IN THE STATE. THIS INDUSTRY WILL CREATE OPPORTUNITIES TO:

1. DIVERSIFY STATE AND LOCAL ECONOMIES.
2. ADD SIGNIFICANT NEW CAPITAL TO THE COMMUNITIES, PROVIDE NEW YEAR-ROUND EMPLOYMENT OPPORTUNITIES AND ALLEVIATE SOME OF THE SEASONALLY HIGH UNEMPLOYMENT LEVELS.
3. PROVIDE SIGNIFICANT NEW SMALL BUSINESS OPPORTUNITIES TO OUTLYING COMMUNITIES; AND
4. INCREASE OFF-SEASON OPPORTUNITIES FOR THE COMMERCIAL FISHING AND SEAFOOD PROCESSING INDUSTRIES.

FOR THESE REASONS, SEALASKA BELIEVES THAT AQUACULTURE WILL BE BENEFICIAL TO ALASKA AND THAT EXPEDIENT DEVELOPMENT OF PUBLIC POLICY AUTHORIZING AND PROMOTING ALL FORMS OF AQUACULTURE IS NECESSARY.

THE SHEFFIELD ADMINISTRATION HAS RECOGNIZED THE OPPORTUNITIES AQUACULTURE OFFERS TO THE STATE AND HAS TAKEN INITIAL STEPS TO PROMOTE ITS DEVELOPMENT. RECENTLY, THE GOVERNOR'S AQUACULTURE ADVISORY COMMITTEE PROPOSED AN AQUACULTURE POLICY FOR THE STATE AND A PLAN OF ACTION TOWARD IMPLEMENTING THAT POLICY. SEALASKA CORPORATION WAS A PARTICIPANT IN THE DEVELOPMENT OF THAT POLICY AND BELIEVES THAT IT REPRESENTS A PRACTICAL AND ACHIEVABLE PROCESS FOR THE PUBLIC TO CONSIDER THE BENEFITS AND IMPACTS OF AQUACULTURE. THIS POLICY, HOWEVER, IS ONLY THE FIRST STEP IN PROMOTING AN AQUACULTURE INDUSTRY IN ALASKA.

FOR ALASKA TO REALIZE THE POTENTIAL OPPORTUNITIES THAT MAY EXIST FOR AQUACULTURE, THE STATE MUST CREATE A LEGISLATIVE, REGULATORY AND INSTITUTIONAL FRAMEWORK THAT, WHERE NECESSARY, AUTHORIZES VARIOUS FORMS OF AQUACULTURE AND ENCOURAGES DEVELOPMENT OF ALL FORMS OF AQUACULTURE.

IN SEALASKA'S OPINION, THE PROMOTION OF AQUACULTURE WILL REQUIRE THE LEGISLATURE AND ADMINISTRATION TO:

- o UNDERTAKE EFFORTS TO INFORM THE PUBLIC OF AQUACULTURE OPPORTUNITIES AND ISSUES.
- o CONDUCT STUDIES RECOMMENDED BY THE AQUACULTURE ADVISORY COMMITTEE TO ASSESS THE EFFECTS OF SALMON FARMING AQUACULTURE ON THE COMMERCIAL FISHING INDUSTRY; AND
- o DEVELOP A COMPREHENSIVE ENABLING STATUTE BILL FOR ALL POTENTIAL FORMS OF AQUACULTURE.

SEALASKA IN A MARCH 5 LETTER TO GOVERNOR SHEFFIELD ENCOURAGED THE GOVERNOR TO REVIEW THE AQUACULTURE POLICY AND PLAN OF ACTION PROPOSED BY THE AQUACULTURE COMMITTEE AND DEVELOP A CLEAR POLICY STATEMENT INDICATING THAT THE ADMINISTRATION ADOPTS THE PROPOSED POLICY AND PLAN OF ACTION. SEALASKA RECOMMENDED THE GOVERNOR'S STATEMENT SHOULD ALSO DESCRIBE STEPS THAT THE ADMINISTRATION WILL

BE TAKING TO IMPLEMENT THE POLICY AND PLAN.

IN ADDITION TO THESE EFFORTS THERE IS A NEED TO BEGIN PUBLIC POLICY CONSIDERATION OF AQUACULTURE BY DEVELOPING MODEL ENABLING LEGISLATION. THIS LEGISLATION SHOULD INCLUDE AND INCORPORATE ALL FORMS OF AQUACULTURE UNDER A SINGLE BILL. THE MODEL LEGISLATION WOULD BE USED TO FOCUS PUBLIC POLICY DEBATE ON THE ROLE OF GOVERNMENT AND INDUSTRY; AND WOULD ADDRESS PUBLIC POLICY ISSUES RAISED DURING PUBLIC HEARINGS.

AN AQUACULTURE BILL SHOULD INCLUDE THE FOLLOWING FINDINGS:

- o AQUACULTURE CREATES NEW PRODUCT FORMS AND SUPPLIES TO MEET GROWING CONSUMER DEMAND FOR HIGH QUALITY AQUATIC FOOD PRODUCTS, INDUSTRIAL MATERIALS, PHARMACEUTICALS AND ENERGY.
- o AQUACULTURE OFFERS ONE OF THE SINGLE GREATEST NEW OPPORTUNITIES TO DEVELOP AND DIVERSIFY STATE AND LOCAL ECONOMIES AND CREATE NEW JOBS.
- o THE RESPONSIBILITY FOR COMMERCIAL AQUACULTURE FARMING WILL REST PRIMARILY WITH THE PRIVATE SECTOR EXCEPT FOR ENHANCEMENT OF AQUATIC PRODUCTS FOR COMMON PROPERTY HARVEST.
- o AQUACULTURE IS OCCURRING ON A WORLDWIDE SCALE AND IS SUPPLYING WORLD AND DOMESTIC MARKETS WITH EVER INCREASING QUANTITIES OF AQUACULTURAL PRODUCTS. ALASKA MUST PARTICIPATE IN THE EFFORT TO PRODUCE AQUACULTURAL PRODUCTS OTHERWISE THESE PRODUCTS WILL BE PRODUCED BY OTHER DOMESTIC AND INTERNATIONAL GROWERS. FAILURE OF ALASKA TO CAPITALIZE ON THESE OPPORTUNITIES WOULD RESULT IN ALASKA LOSING THE SOCIAL AND ECONOMIC BENEFITS THAT CAN BE REALIZED FROM AN AQUACULTURE INDUSTRY.
- o AQUACULTURE GROWTH IS INHIBITED BY ECONOMIC, LEGAL AND PRODUCTION FACTORS SUCH AS SOURCES OF FINANCING, INSURANCE,

INADEQUATE MANAGEMENT INFORMATION, APPLIED TECHNOLOGY AND LACK OF RELIABLE SUPPLIES OF SEED STOCK.

- o MANY AREAS OF ALASKA ARE HIGHLY SUITED FOR AQUACULTURE, HOWEVER, GOVERNMENTAL POLICY AND PUBLIC PERCEPTIONS DO NOT ADEQUATELY CONSIDER AQUACULTURE POTENTIAL, SOCIO-ECONOMIC OPPORTUNITIES TO ALASKANS AND CORRESPONDINGLY INHIBIT AQUACULTURE DEVELOPMENT.

AN AQUACULTURE BILL SHOULD SEEK TO ACCOMPLISH THE FOLLOWING PURPOSES:

- ESTABLISH PROCEDURES TO PROMOTE AQUACULTURE IN THE STATE AND DEVELOP AN AQUACULTURE DEVELOPMENT PLAN.
- ENCOURAGE DEVELOPMENT OF ALL FORMS OF AQUACULTURE AND TO PROMOTE AQUACULTURE TO INCREASE THE VARIETY OF AQUATIC PRODUCTS SUPPLIED BY ALASKA.
- COORDINATE STATE AQUACULTURE DEVELOPMENT EFFORTS.
- ESTABLISH COORDINATION PROCEDURES AND DESIGNATE RESPONSIBILITIES WITHIN THE STATE TO PROMOTE A STATE AQUACULTURE INDUSTRY.
- COORDINATE STATE AND FEDERAL REGULATORY AND ASSISTANCE PROGRAMS IN ORDER TO FOSTER SUCCESSFUL AQUACULTURE DEVELOPMENT IN ALASKA.

AN AQUACULTURE BILL SHOULD INCLUDE THE FOLLOWING ELEMENTS TO PROMOTE AND REGULATE THE INDUSTRY:

- ESTABLISH THE DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT AS THE LEAD AGENCY FOR LICENSING, PROMOTING AND COORDINATING AQUACULTURE ACTIVITIES. THE DEPARTMENT WOULD BE RESPONSIBLE FOR COMPILING AND ANNUALLY REPORTING ON AQUACULTURAL FARM

PRODUCTION, PRODUCT VALUE, EMPLOYMENT STATISTICS AND ADVISE THE FEDERAL JOINT SUBCOMMITTEE ON AQUACULTURE OF THE STATUS OF THE STATE'S AQUACULTURE PRODUCTION.

- ESTABLISH THE DEPARTMENT OF FISH AND GAME AS THE AGENCY RESPONSIBLE FOR:
 - . DISEASE INSPECTION AND MANAGEMENT
 - . REVIEW OF NOTIFICATIONS FOR TRANSPORT OF LIVE AQUACULTURAL PRODUCTS
 - . PROVIDE SOURCES FOR INDIGENOUS SEED STOCK, AND
 - . PROVIDE TECHNICAL ASSISTANCE ON CULTURE AND DISEASE MANAGEMENT.
- DESIGNATE AQUACULTURE AS A PRIORITY USE OF ANY SURPLUS SEED STOCK FROM PUBLIC OR PRIVATE NON-PROFIT SOURCES. ALLOW ACQUISITION OF PURCHASE OF SEED STOCK FROM STATE AND FEDERAL HATCHERIES, COLLECTION FROM WILD SOURCES, OR IMPORTATION WHEN INDIGENOUS STOCKS ARE NOT AVAILABLE.
- ESTABLISH THAT ONCE SEED STOCK, ACQUIRED FROM COMMON PROPERTY SOURCES, COMES UNDER CONTROL OF THE AQUACULTURAL FARM, THE SEED STOCK, PROGENY OR PARTS THEREOF ARE THE PRIVATE PROPERTY OF THE AQUACULTURIST AND CAN BE SOLD, TRADED OR BARTERED CONSISTENT WITH REASONABLE STATE REGULATIONS TO CONTROL DISEASE AND PROTECT WILD STOCKS.
- DESIGNATE AQUACULTURE AS A SEGMENT OF THE STATE'S AGRICULTURAL INDUSTRY EXCLUDED FROM REGULATION BY THE BOARDS OF FISH AND GAME.
- ESTABLISH DISEASE CONTROL AND INSPECTION PROGRAM TO PROTECT WILD STOCKS, OTHER AQUACULTURE FARMERS, AND DEVELOP

PROCEDURES TO MONITOR AND APPROVE TRANSPORT OF LIVE PRODUCTS FOR FURTHER FARMING WITHIN THE STATE.

- ESTABLISH AQUACULTURE PRODUCTS QUALITY CONTROL AND PUBLIC HEALTH PROGRAM TO ENSURE HIGHEST STANDARDS OF AQUATIC PRODUCTS ARE PRODUCED AND PUBLIC HEALTH IS PROTECTED.
- ESTABLISH THE NUMBER AND SIZES OF FARMS HELD BY ANY INDIVIDUAL, CORPORATION AND COOPERATIVE IN ORDER TO CREATE MAXIMUM OPPORTUNITY FOR PARTICIPATION IN THE INDUSTRY BY ALASKANS, TO PROMOTE COMPETITION, AND CREATE INCENTIVES TO ESTABLISH FARMS IN UNDEVELOPED AREAS.
- ESTABLISH PROCEDURES FOR LEASE OF STATE LANDS AND WATERS THAT PROVIDE GUARANTEES OF LONG-TERM USE AND TO PROMOTE TIMELY CONSTRUCTION AND OPERATION OF AQUACULTURAL FARMS TO AVOID SPECULATION.
- CREATION OF AN AQUACULTURE POLICY COUNCIL CONSISTING OF FIVE INDIVIDUALS INVOLVED IN FISH OR SHELLFISH AQUACULTURE AND EX-OFFICIO MEMBERS FROM STATE AND FEDERAL AGENCIES, UNIVERSITIES AND OTHER PARTIES WHO HAVE RESOURCES AND EXPERTISE NECESSARY TO PROMOTE AQUACULTURE IN ALASKA.

COUNCIL DUTIES WOULD INCLUDE:

- a. REPRESENT THE AQUACULTURE INDUSTRY IN ALL MATTERS OF INTEREST TO THE INDUSTRY SUCH AS PERFORMANCE, OPERATION, EXPANSION, DEVELOPMENT AND PROMOTION.
- b. INTERAGENCY AND DEPARTMENTAL COORDINATION OF AQUACULTURE PROGRAM EFFORTS.
- c. IDENTIFY CHANGES TO CONSOLIDATED PERMITTING AND REGULATORY PROGRAMS.

d. DEVELOP INDUSTRY PRODUCT STANDARDS.

e. IDENTIFY AND PROMOTE FINANCIAL, INSURANCE AND RESEARCH PROGRAMS.

SEALASKA BELIEVES THAT THE PROCEEDING FINDINGS, PURPOSE AND SUBSTANTIVE ELEMENTS SHOULD BE INCLUDED AS PART OF ANY AQUACULTURE ENABLING STATUTE.

SEALASKA WOULD LIKE TO THANK REPRESENTATIVE GOLL AND MEMBERS OF THE COMMITTEE FOR THIS OPPORTUNITY TO EXPRESS OUR VIEW REGARDING AQUACULTURE. THIS HEARING IS AN INITIAL STEP TOWARD THE EVOLUION OF AN AQUACULTURE PUBLIC POLICY, HOWEVER, THIS EFFORT CANNOT STOP AT THIS INITIAL HEARING. SEALASKA BELIEVES THAT AQUACULTURE REPRESENTS A MOST UNIQUE OPPORTUNITY TO THE STATE. FOR THIS REASON, SEALASKA RESPECTIVELY RECOMMENDS THAT THE LEGISLATURE AND ADMINISTRATION CREATE AN INTERIM COMMITTEE TO:

- ASSIST IN IMPLEMENTATION OF THE GOVERNOR'S AQUACULTURE ADVISORY COMMITTEE'S RECOMMENDED AQUACULTURE POLICY AND PLAN OF ACTION.
- AND DEVELOP A MODEL AQUACULTURE BILL FOR CONSIDERATION BY THE LEGISLATURE IN THE NEXT SESSION.

MEMORANDUM

State of Alaska

TO: Governor's Fisheries Mini-Cabinet

DATE: January 20, 1986

FILE NO.:

THRU:

TELEPHONE NO.:

SUBJECT: A Philosophy for Aquaculture
Development in Alaska

FROM: Aquaculture Advisory Committee

On July 15, 1985, Governor Sheffield appointed a Mariculture Advisory Committee, consisting of fishermen organizations, fish processors, a Native corporation, governmental agencies, the universities, and individuals in the private sector interested in mariculture development in Alaska. The committee was charged with the responsibility of formulating a workable and effective mariculture policy to guide the State in development of the mariculture industry in Alaska. The committee modified its original charge to include culture of all aquatic plants and animals in both the fresh and saltwater environments. Hence, this consensus document outlining an aquaculture policy is submitted.

The issues confronting the further development of aquaculture have been examined by the committee. These developments include fish, crustaceans, mollusks and aquatic plants. It is important, in light of world aquacultural developments and growing interest in aquaculture potential in Alaska to generate a policy that should enable the orderly development of an Alaskan aquaculture industry. However, many biological, technical and social questions must be resolved before allowing full implementation of any plan. The committee strongly recommends that every effort be made to assure that the developing aquaculture industry:

1. be complementary to, and not in conflict with, the existing fishing industry.
2. be economically viable and self-sustaining.
3. provide opportunities for family and other small scale businesses.
4. provide an overall enhancement to the marketing image of all Alaskan seafood products.
5. give due consideration to wild stocks.

Some shellfish aquaculture projects are currently underway. While we have found a need to tailor the existing permit and lease process in order to promote aquaculture development, and have identified a need to improve dissemination of technological data, it appears that the early success of these projects holds the promise of another positive use of Alaska's resources and should be supported.

January 20, 1986

The culture of aquatic plants may also offer new opportunities. There is a need to further assess opportunities and develop appropriate technology.

The farming of finfish (other than nonprofit ocean-ranching of salmon) has not been introduced, although experimental work has shown promise. We need to continue and expand grant research efforts between the State of Alaska and the National Marine Fisheries Service to gather data on the biological and technical aspects of pen-rearing. The possibility of social and economic conflicts with existing fisheries warrants a more cautious approach than for shellfish and aquatic plants.

The committee recommends that aquaculture be a self-sustaining industry with the exception of public investment in plant and animal health diagnostics, public health and initial biological research. In the meantime, there is a need to develop public policy regarding such issues as a regulation of the aquaculture industry (either as a farm or fishery), size and location of sites, federal land issues, organization of the permitting process, ownership questions, taxation, disease, and so forth.

Attached is our proposed policy document consisting of a generic policy statement followed by a number of comments regarding specific issues. This committee would be available for further deliberations on specific issues stemming from public review and comments to this policy.

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Attachments

GOVERNOR SHEFFIELD'S
AQUACULTURE ADVISORY COMMITTEE

PUBLIC MEMBERS

Brian Allee, PWSAC
Jack Cadigan, (Cass Parsons), UFA
Bill Clapp, Pelican Seafood
Nancy Gross, Unalaska
Richard Harris, Sealaska
Jim Hemming, Mussel Grower
Earl Krygier, A.T.A.
Robin Larsson, A.S.G.A.
Rick Lauber, P.S.P.

LEGISLATIVE MEMBERS

Senator Richard Eliason
Representative Peter Goll
Representative Adelheid Herrmann
Senator Fred Zharoff

UNIVERSITY & GOVERNMENT
AGENCY REPRESENTATIVES

Greg, Baker, ADC&ED
Ron Dearborn, U of A, Sea Grant
Bill Heard, NMFS
Ole Mathisen, U of A
Stan Moberly, ADF&G
Dick Neve, Office of the Governor
George Snyder, NMFS

SPECIAL ASSISTANT

Gerald Bowden, UCSC

Proposed Aquaculture Policy

It is the policy of the State to promote the development of a successful aquaculture industry in a manner that will contribute to the economic well-being of the citizens of the State, the commercial fishing and seafood industry, and all communities of the State, particularly the coastal areas.

GENERAL FINDINGS

1. There is an urgent need to inform the public of the potential socio-economic impacts, benefits and opportunities surrounding aquaculture, especially salmon farming, and to solicit public comments through a series of hearings. These efforts will provide necessary information to enable both the public and government to determine the future course of aquaculture and to provide for its orderly development. The process will:
 - A. address the concerns of fishermen, the fishing industry, coastal residents, and the citizens of the State for the development of aquaculture in Alaska;
 - B. serve to educate the public and the State about aquaculture;
 - C. serve as a mechanism to collect ideas and recommendations for the further development of Alaska's aquaculture policy;
 - D. include a review of the aquaculture development options envisioned; and
 - E. enable all concerned individuals to review and comment on any draft laws and proposed regulations prepared in response to public participation and comment.
2. The State, in considering the uses of public lands, water and other resources, should develop procedures to ensure an orderly and controlled use of the State's resources for aquaculture. The procedures instituted by the State should:
 - A. provide maximum opportunity for family and other small scale businesses;
 - B. require that leases be active, thereby avoiding speculation; and
 - C. avoid creating artificial wealth through possession of leases or permits.

State and other land planning programs should include inventories of potential aquaculture sites. These inventories should be responsive to existing State and federal regulatory requirements and establish uses.

3. In light of the growing competition caused by the growth of world aquaculture, the State should increase efforts to enhance the image and value of Alaskan seafood products. We specifically suggest instituting a program that promotes more stringent quality controls in grading and labeling, and further improves the general public perception of Alaskan seafood. Such action encourages promotion of a more competitive product.

SPECIFIC RECOMMENDATIONS

1. Shellfish and Seaweed

The State should review all existing statutes and regulations governing culture of shellfish and aquatic plants, and should, if necessary, institute programs to actively further promote and facilitate the culture of these organisms. There is a clear need to:

- A. tailor the State's permitting and leasing procedures to better accommodate the needs of the industry and to provide broader technological support;
- B. improve programs for testing of paralytic shellfish poisoning (PSP) including inspection and certification time frame;
- C. establish or certify diagnostic labs near shellfish culture areas; and
- D. encourage private oyster spat and other shellfish hatcheries.

2. Ocean Ranching

The success of the existing State and nonprofit salmon ocean-ranching programs is recognized, and efforts in this area should be expanded. Recent developments regarding product form and expanding markets indicate there will be a greater demand for additional salmon in the future.

3. Salmon and Other Finfish Farming

The form of aquaculture that poses the most controversy is the farming of large-sized salmon and trout, because these product forms may compete with the salmon fishing industry for markets.

Salmon farming is currently not allowed in Alaska, however, there is a growing interest to develop the industry. Prior to contemplating salmon farming, the State should initiate an unbiased study to identify and evaluate social and economic impacts and consider various implementation options to determine the greatest benefits for Alaskans.

Some finfish species and product forms such as pan-sized salmon and trout may not be in direct competition with the Alaska commercial fishing industry and, therefore, may not be as controversial as other forms of salmon farming. The State should commence a review to determine if the culture of pan-sized salmon, trout and other finfish are permissible under current statutes. Public comments should be solicited to determine if there is an interest or concern regarding these product forms.

FINAL

To accomplish the public education and research necessary for the orderly development of aquaculture in Alaska, a strong partnership commitment from the executive and legislative branches of State Government, Alaskan universities, industry and interested individuals will be required.

MEMORANDUM

State of Alaska

TO: Fisheries Mini-Cabinet

DATE: March 11, 1985

FILE NO:

TELEPHONE NO:

FROM: Bill Sheffield
Governor

SUBJECT: Policy Development
Strategy for Mariculture/Aquaculture

Alaska's position in the world marketplace as a producer of seafood products has changed dramatically since statehood. There is every indication that an equally dramatic change will occur in the next decade. A number of world-wide developments, over which we in Alaska have little or no control, have had and will have an impact on our domestic and international seafood markets. The increasing use of aquaculture or sea farming techniques to supplement or complement traditional wild stock harvest strategies stands out among these trends. In my opinion, this trend requires our careful development of a public policy response by the State.

Alaska's abundant, high quality water resources, the close ties between many of our coastal communities and our marine environment suggest that some forms of sea farming may represent an opportunity for economic growth and diversity. However, it is critical that State policy insure that such development complements, rather than conflicts with, our valuable traditional seafood industry. To accomplish the timely formulation of public policy and any legislative or regulatory changes that might be required, I instruct the Fisheries Mini-Cabinet to take the following steps:

1. Appoint an ad hoc advisory group representative of harvesting, processing, mariculture, and community interests to review the mariculture/sea farming issues.
2. In those instances where little or no conflict appears to exist between sea farming and traditional fisheries (e.g. shellfish), develop the legislation or regulations necessary to encourage an orderly development that maximizes Alaskan participation.
3. In those cases where sea farming may be in conflict with our traditional fisheries (e.g. pen reared salmon), move ahead cautiously to examine all facets of the issue, including:
 - a) the effect of sea farming on the markets for our traditional seafood products;

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March 11, 1985

- b) the experiences of other nations with sea farming development;
 - c) how such developments might supplement or complement our existing industry, and how maximum Alaskan participation could be encouraged.
4. Report to me regularly on your progress in dealing with these issues.

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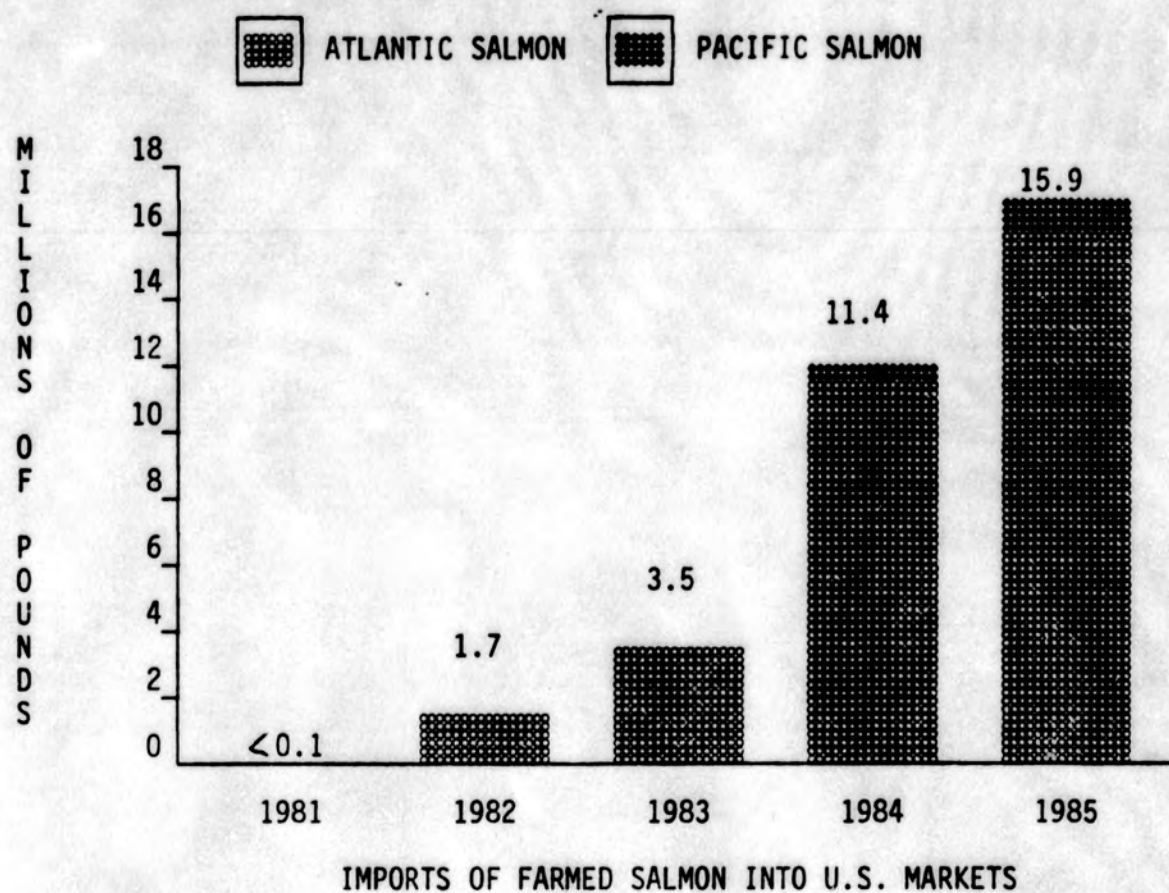
cc: Fisheries Mini-Cabinet Staff
Cass Parsons, United Fishermen of Alaska
Rick Lauber, Pacific Seafood Processors Association

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Table 1.--World production of pen-farmed salmon, 1981-85; 1990 and 2000 projections.

Species/Country	Year						
	1981	1982	1983	1984	1985	1990	2000
	--metric tons--						
Atlantic							
Norway	8,907	10,266	17,016	25,000	30,000	80,000	200,000
United Kingdom	1,000	2,100	2,500	2,500	3,000	8,500	
Finland	500	700	700	700	750	2,500	
Ireland	80	103	256	256	300	2,000	
Canada	35	140	180	180	200	1,000	
Faroe Islands	100	130	160	160	190	2,000	
Sweden	60	80	100	100	100	500	
Iceland	20	30	50	50	50	300	
France	2	5	10	10	10	30	
Total	10,704	13,554	20,972	26,456	34,600	96,830	200,000
Pacific							
Japan	1,150	2,122	2,900	4,400	6,800	8,000	
United States	450	680	900	1,000	1,200	1,800	
Chile	60	80	100	150	200	3,000	
France	60	80	80	80	80	500	
Canada	3	5	10	100	100	50	
New Zealand	2	5	10	22	132	50	
Total	1,725	2,972	4,000	5,752	8,512	12,400	
Grand Total	12,429	16,526	24,972	32,208	43,112	109,230	200,000

Source: Branch of Foreign Fisheries Analysis and W. R. Heard, Auke Bay Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce.



MEMORANDUM
OF
AGREEMENT ON SEAFOOD INDUSTRY DEVELOPMENT AND TRADE

October 23, 1985

STATE OF ALASKA
OVERSEAS FISHERY COOPERATION FOUNDATION
JAPAN FISHERIES ASSOCIATION

MEMORANDUM OF AGREEMENT ON
SEAFOOD INDUSTRY DEVELOPMENT AND TRADE

Whereas the State of Alaska and the Japanese fishing industry represented by the Overseas Fishery Cooperation Foundation of Japan (hereinafter referred to as Foundation) and the Japan Fisheries Association (hereinafter referred to as JFA), have considered their mutual interest in the development of all the sectors of the Alaska seafood industry; and

Whereas the Foundation and the JFA recognize that the State of Alaska considers the further orderly and timely development of its seafood industry to be of great importance; and

Whereas the State of Alaska recognize it is the position of the Japanese fishing industry that economic disruption and dislocation should be minimized as U.S. participation develops in the fisheries off Alaska; and

Whereas the State of Alaska and the Japanese fishing industry wish to promote a cooperative and mutually beneficial relationship between the Japanese and Alaskan seafood industries in the areas of coastal fisheries development, marine products processing, marketing and related activities;

Therefore, the State of Alaska and the representatives of the Japanese fishing industry have agreed to cooperate in the following manner;

The State of Alaska, the Foundation and the JFA will organize a committee, consisting of appropriate representatives, to plan and monitor cooperative projects and facilitate the exchange of necessary information.

For the immediate future, the committee created under the terms of this agreement will consider and implement the following cooperative projects;

1. A feasibility study for the development of a Mariculture/ Sea farming industry in Alaska.
2. Assistance in the development of a curriculum for basic vocational training of Alaskans in marine products processing, including Surimi.

3. A discussion on the needs of the Japanese fishing industry that economic disruption and dislocation should be minimized as U.S. participation develops in the fisheries off Alaska.
4. A discussion on the needs of Alaska regarding the orderly and timely development of its seafood industry.

Recognizing the interest of the Foundation, the JFA and the State of Alaska, a meeting of the committee will be held in the near future to explore mutually beneficial fisheries development opportunities in all sectors of the seafood industry.

Signed at Tokyo, October 23, 1985

State of Alaska

By Bill Sheffield
Bill Sheffield
Governor

Overseas Fishery Cooperation Foundation

By Toshiniko Onba
Toshiniko Onba
President

Japan Fisheries Association

By Tomoyoshi Kamenaga
Tomoyoshi Kamenaga
President

ADDRESS BY ROBERT W. LOESCHER
VICE PRESIDENT FOR RESOURCE MANAGEMENT
SEALASKA CORPORATION
TO
UNITED FISHERMEN OF ALASKA
ANNUAL MEETING
FEBRUARY 5, 1986

AQUACULTURE DEVELOPMENT

INTRODUCTION

SEALASKA CORPORATION HAS BEEN ASKED TO SPEAK TO UNITED FISHERMEN OF ALASKA DUE TO OUR INTEREST IN AQUACULTURE DEVELOPMENT IN ALASKA. BRIEFLY, SEALASKA BELIEVES THAT AQUACULTURE REPRESENTS AN OPPORTUNITY FOR ALASKA TO:

1. DIVERSIFY STATE AND LOCAL ECONOMIES;
2. PROVIDE ECONOMIC GROWTH AND EMPLOYMENT FOR ALASKANS;
3. AND, TO DEVELOP AN INDUSTRY THAT UTILIZES ALASKA'S VAST NATURAL COASTLINE, ESTUARIES AND HABITAT RESOURCES IN A MANNER COMPATIBLE WITH EXISTING LIFESTYLES AND INDUSTRIES.

WORLD AQUACULTURE PRODUCTION

AQUACULTURE IS OF INTEREST BECAUSE THE WORLD PRODUCTION OF NATURAL STOCKS OF ALL SPECIES HAVE REMAINED STATIC AT 70-75 MILLION METRIC TONNES DURING THE LAST 15-20 YEARS. AT THE SAME TIME, THE WORLD DEMAND FOR QUALITY FISH AND OTHER AQUATIC PRODUCTS IS INCREASING. ONLY AQUACULTURE HAS THE POTENTIAL TO SIGNIFICANTLY INCREASE THE PRODUCTION OF FISH AND OTHER AQUATIC PRODUCTS TO MEET THESE NEEDS. THE WORLD PRODUCTION OF AQUACULTURE PRODUCTS IS INCREASING RAPIDLY. IN 1984, IT WAS

ESTIMATED THAT ABOUT 10 MILLION METRIC TONNES OF AQUACULTURE PRODUCTS WERE PRODUCED.

AQUACULTURE IN ALASKA

IN ALASKA, OPPORTUNITIES AND INTEREST IN AQUACULTURE DEVELOPMENT FOCUS ON OYSTERS, MUSSELS, SEAWEED AND SALMON. OTHER POTENTIAL OPPORTUNITIES ALSO EXIST FOR OTHER SHELLFISH, MOLLUSCS AND FINFISH SPECIES. THE PRESENTATION TODAY WILL FOCUS ON SALMON AQUACULTURE AND PARTICULARLY SALMON FARMING.

TYPES OF SALMON AQUACULTURE

SALMON AQUACULTURE OCCURS IN TWO FORMS -- SALMON OCEAN RANCHING AND SALMON FARMING. OCEAN RANCHING CONSISTS OF THE PRODUCTION OF AND RELEASE OF SALMON FRY OR SMOLTS INTO THE NATURAL WATERS OF THE STATE. THESE FISH MIGRATE THROUGH THE OPEN OCEANS AND LATER RETURN TO THEIR PLACE OF ORIGIN. DURING THIS MIGRATORY PHASE THE FISH ARE HARVESTED BY THE VARIOUS FISHERIES OF THE STATE. WITHIN ALASKA, THE OCEAN RANCHING PROGRAM IS WELL ESTABLISHED UNDER STATE LAW AS A STATE OR PRIVATE NON-PROFIT HATCHERY PROGRAMS.

SALMON FARMING IS THE REARING OF SALMON IN NET PEN OR OTHER ENCLOSURES. THE FISH ARE HARVESTED BY THE GROWER WHEN THEY REACH MARKETABLE SIZE. THERE ARE TWO GENERAL MARKET SIZES OF FARMED SALMON, PAN-SIZED AND GROW-OUT. PAN-SIZED SALMON ARE SOLD WHEN THEY REACH APPROXIMATELY ONE POUND IN SIZE. GROW-OUT SALMON ARE GENERALLY SOLD WHEN THEY REACH TWO POUNDS OR MORE. THE BEST PRICES FOR GROW-OUT SALMON ARE FOR SIZES BETWEEN SEVEN TO TWELVE POUNDS. CURRENTLY SALMON FARMING IS BELIEVED TO BE PROHIBITED IN ALASKA. THERE WILL BE A NEED TO ENACT ENABLING LEGISLATION IF THIS TYPE OF INDUSTRY IS TO PROCEED IN ALASKA.

WORLD SALMON FARMING INDUSTRY

SALMON FARMING AS IT CURRENTLY EXISTS EVOLVED IN NORWAY IN THE

1960S. THIS WAS LARGELY AN EXPERIMENTAL PROGRAM TO CREATE A BROAD BASED, GEOGRAPHICALLY DISPERSED INDUSTRY, THAT WOULD PROVIDE EMPLOYMENT OPPORTUNITIES IN REMOTE REGIONS AND FOR NATIONAL SECURITY PURPOSES. THE FIRST COMMERCIAL PRODUCTION OF NORWEGIAN FARMED SALMON OCCURRED IN 1971 WHEN 98 METRIC TONNES WERE PRODUCED. BY 1973, THE NORWEGIAN FARM PRODUCTION INCREASED TO 171 METRIC TONNES. IN 1981, NORWAY PRODUCED ALMOST 9,000 METRIC TONNES OF FARMED SALMON. IN 1981, TWELVE OTHER COUNTRIES PRODUCED AN ADDITIONAL 3,000 METRIC TONNES, FOR A TOTAL 1981 PRODUCTION OF 12,000 METRIC TONNES OF FARMED SALMON. BY 1984, THE WORLD FARMED SALMON PRODUCTION DOUBLED TO OVER 24,000 METRIC TONNES AND BY 1990 THE FORECAST FOR A WORLD PRODUCTION IS 126,000 METRIC TONNES.

THE IMPORTANCE OF SALMON FARMING BECAME READILY APPARENT IN 1980. BY THIS PERIOD SIGNIFICANT QUANTITIES OF FARMED SALMON WERE BEING EXPORTED FROM NORWAY TO 14 OTHER COUNTRIES. THE UNITED STATES AND JAPAN BEING THE LARGEST MARKETS FOR NORWEGIAN SALMON. FARMED SALMON WAS BEING WIDELY RECOGNIZED AND ACCEPTED AS A PREMIUM QUALITY SEAFOOD PRODUCT. SEALASKA HAS FOUND THESE PRODUCTS TO BE ENTERING EUROPEAN MARKETS TRADITIONALLY HELD BY FRESH FROZEN SALMON FROM ALASKA.

THE RAPID GROWTH AND MARKET ACCEPTANCE OF FARMED SALMON IS OCCURRING BECAUSE IT IS A "NEW PRODUCT FORM" THAT MEETS THE BUYER AND CONSUMER NEEDS. THE ATTRIBUTES OF FARMED SALMON IN THE MARKETPLACE ARE:

1. AVAILABLE IN THE SIZE PREFERRED BY THE CONSUMER.
2. OFFER CONSISTENTLY EXCELLENT QUALITY WITH FIRM FLESH, GOOD COLOR AND SILVER SIDES.
3. ARE AVAILABLE FRESH TO ALMOST ANY MARKET WITHIN THREE DAYS.
4. AND, DO NOT ENCOUNTER THE SEASONAL AVAILABILITY AND HIGH

STORAGE COSTS THAT OCCUR WITH COMMERCIALY CAUGHT FISH.

NORWAY, WHICH HAS 592 FARMS AND 649 HATCHERIES, SUPPLIES MOST OF THE CURRENT WORLD PRODUCTION. OTHER EUROPEAN COUNTRIES, JAPAN, CHILE, NEW ZEALAND, CANADA AND THE UNITED STATES, ARE PROMOTING SALMON FARMING IN THEIR REGIONS. THE OBJECTIVE IS TO DIVERSIFY LOCAL ECONOMIES AND TO CREATE NEW JOBS. IN 1984 BRITISH COLUMBIA HAD 10 FARMS PRODUCING APPROXIMATELY 100 METRIC TONS, IN 1985 THERE WERE 35 PRODUCING FARMS AND IN 1986 THERE WILL BE AN ESTIMATED 146 PRODUCING FARMS. BRITISH COLUMBIA OFFICIALS CONSERVATIVELY ESTIMATE THAT IN 1990 FARM SALMON PRODUCTION WILL BE BETWEEN 12,000-15,000 METRIC TONS, WORTH APPROXIMATELY \$122 MILLION DOLLARS. IN WASHINGTON STATE, THE GROWTH OF SALMON FARMING IS EQUALLY DRAMATIC. OFFICIALS IN WASHINGTON ESTIMATE THAT THERE WILL BE 100-140 FARMS BY 1990. IN BOTH WASHINGTON AND BRITISH COLUMBIA THE GOVERNMENTS RECOGNIZE THE SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS OF SALMON FARMING AND HAVE FORMULATED LAWS AND OTHER INSTITUTIONAL PROGRAMS TO PROMOTE SALMON FARMING IN THEIR RESPECTIVE REGIONS.

THE SUCCESS OF SALMON FARMING IN NORWAY AND OTHER COUNTRIES AND NOW CLOSER TO HOME IN BRITISH COLUMBIA AND THE PACIFIC NORTHWEST STATES IS PROOF THAT FARMED SALMON HAVE ESTABLISHED A PERMANENT PLACE IN THE WORLD FOOD MARKETS. THE PRODUCTION OF FARMED SALMON IS NOW MARKET-DRIVEN WITH PREVIOUSLY NON-PRODUCING REGIONS AGGRESSIVELY PROMOTING SALMON FARMING IN ORDER TO CAPTURE A SHARE OF THE NEW MARKETS AND REALIZE THE SOCIAL AND ECONOMIC BENEFITS FROM SALMON FARMING. CLEARLY, AS A RESULT OF THESE DEVELOPMENTS ALASKANS MUST NOW CONSIDER SALMON FARMING AS PART OF THE GROWING ALASKA SEAFOOD INDUSTRY.

SEALASKA CORPORATION, AS A MAJOR FISHERIES INDUSTRY PARTICIPANT, HAS CONCLUDED THAT SALMON FARMING MAY BE WELL SUITED FOR ALASKA CONDITIONS. IF ECONOMICALLY FEASIBLE, SALMON FARMING WOULD PROVIDE SIGNIFICANT ECONOMIC AND SOCIAL BENEFITS IN ALASKA. EQUALLY SIGNIFICANT IS THAT A FAILURE OF ALASKA TO ACT ON SALMON

FARMING WOULD MEAN A LOSS OF INCOME AND SOCIAL BENEFITS TO THE STATE AND ITS RESIDENTS. IN LATE 1984 AND 1985, SEALASKA COMMISSIONED AN AQUACULTURE FEASIBILITY STUDY WITH SWEDISH AND ALASKAN CONSULTING FIRMS TO EVALUATE SALMON FARMING POTENTIAL.

THE STUDY OBJECTIVES WERE TO:

1. EVALUATE COSTS OF FARMING SALMON IN ALASKA.
2. DETERMINE IF SALMON FARMING IS ECONOMICALLY FEASIBLE; AND
3. EVALUATE POTENTIAL SOCIAL AND ECONOMIC BENEFITS TO ALASKA AND ITS RESIDENTS.

THIS STUDY FOUND THAT:

SALMON FARMING IS ECONOMICALLY FEASIBLE IN ALASKA UNDER CURRENT CONDITIONS, HOWEVER, COST CONTROL FARM EFFICIENCY AND A FAVORABLE REGULATORY STRUCTURE ARE ESSENTIAL TO MAINTAIN PROFITABILITY.

- o THE CURRENT MARKET PRICE FOR FARMED SALMON IN HOUSTON OR LOS ANGELES IS IN EXCESS OF \$4.00 PER POUND.
- o THE DELIVERED COST OF FARMED SALMON FROM SOUTHEAST ALASKA FROM URBAN OR RURAL/REMOTE LOCATIONS RANGES BETWEEN \$2.78 AND \$2.98 PER POUND FOR AN ESTABLISHED METRIC TON FACILITY.
- o ASSUMING A CONSERVATIVE PRICE OF \$3.50 PER POUND THE GROSS PROFIT FOR A 200 METRIC TONNE SALMON FARM IN SOUTHEAST ALASKA WOULD BE BETWEEN \$217,000 AND \$268,000 OR 17% TO 21% PROFIT MARGIN.
- o THE PRODUCTION COSTS OF FARMED SALMON IN ALASKA ARE APPRECIABLY HIGHER THAN COSTS TO PROVIDE THE SAME FISH IN WASHINGTON OR BRITISH COLUMBIA. IF GOVERNMENTAL AND REGULATORY PROGRAMS DO NOT ENCOURAGE SALMON FARMING, ALASKA

WILL BE UNABLE TO COMPETE WITH THE LESS EXPENSIVE FISH FROM THESE REGIONS.

A SALMON FARMING INDUSTRY IN ALASKA WILL CREATE A SIGNIFICANT NUMBER OF NEW JOBS AND PROVIDE SMALL BUSINESS OPPORTUNITIES FOR ALASKANS.

- o AN ALASKA FARMED SALMON INDUSTRY PRODUCING 20,000 METRIC TONNES WOULD HAVE A PRODUCT SALES VALUE OF OVER \$132 MILLION DOLLARS AND WOULD CREATE 2,800 JOBS. THIS IS 20% OF THE 1982 FISH AND SEAFOOD HARVESTING INDUSTRY ANNUAL AVERAGE EMPLOYMENT.
- o IN AN ALASKA COMMUNITY FIVE TO TEN FARMS PRODUCING 500 METRIC TONNES WOULD CREATE APPROXIMATELY 33 NEW JOBS AND HAVE A SALES PRODUCT VALUE OF 3.3 MILLION DOLLARS.
- o A 500 METRIC TONNE SALMON INDUSTRY IN A TYPICAL SMALL ALASKA VILLAGE WOULD EMPLOY 25% OR MORE OF THE AVAILABLE UNEMPLOYED LABOR FORCE AND CONTRIBUTE UP TO 50% IN ADDITIONAL WAGE EARNINGS TO THE COMMUNITY.

SALMON FARMING WILL PROVIDE DIRECT AND INDIRECT JOBS AND BENEFITS TO THE COMMERCIAL FISHING INDUSTRY.

- o COMMERCIAL FISHERMEN MAY OWN AND OPERATE SALMON FARMS AS WELL AS CONTINUING TO FISH COMMERCIALLY. SALMON FARMING IS A YEAR-ROUND ACTIVITY, HOWEVER, DURING THE SPRING AND SUMMER MONTHS OPERATING A SALMON FARM IS AT A MAINTENANCE LEVEL REQUIRING REDUCED LABOR FORCE AND DIRECT MANAGEMENT THEREBY FREEING THE OWNER TO COMMERCIAL FISH. DURING THE WINTER HARVESTING AND PROCESSING PERIOD, THE COMMERCIAL FISHERMAN OWNER WILL BE AVAILABLE TO MANAGE THE OPERATION.
- o SALMON FARMING REQUIRES LARGE QUANTITIES OF RAW FISH FOR USE AS FISH FOOD OR FISH MEAL. THESE RAW PRODUCT DEMANDS WILL

CREATE NEW AND DIFFERENTLY COMMERCIAL FISHING OPPORTUNITIES.

- o CURRENTLY, SIGNIFICANT PORTIONS OF THE STATE AND PRIVATE NON-PROFIT OCEAN RANCHING FACILITIES BUDGET IS FOR PURCHASE OF EXPENSIVE FISH FOOD WHICH IS RECEIVED FROM WASHINGTON OR OREGON. THE FISH FOOD DEMANDS OF THESE FACILITIES IS INSUFFICIENT TO JUSTIFY A FISH FOOD PRODUCTION PLANT NEAR THESE FACILITIES. WITH THE GROWTH OF A SIGNIFICANT SALMON FARMING INDUSTRY SUFFICIENT FOOD REQUIREMENTS WOULD EXIST TO JUSTIFY REGIONAL FISH FOOD PRODUCTION PLANTS. THIS WOULD REDUCE COSTS TO THE OCEAN RANCHING FACILITIES.

SALMON FARMING IN ALASKA WILL NOT EFFECT THE ALASKA COMMERCIAL FISHING INDUSTRY DUE TO WORLD PRODUCTION AND MARKETS THAT ALASKA FARMED SALMON WILL ENTER

THE PRODUCTION OF FARMED SALMON IS VERY EXPENSIVE. IN ALASKA THE PROJECTED DELIVERED COSTS OF PRODUCING FARMED SALMON IS \$2.78 TO \$2.98 PER POUND. DUE TO THESE COSTS, FARMED SALMON FROM ALASKA WOULD ENTER ONLY VERY SPECIAL DOMESTIC MARKETS THAT WILL PAY PREMIUM PRICES.

AREAS OF POTENTIAL COMPETITION MAY BE FOR PREMIUM QUALITY COMMERCIALLY CAUGHT CHINOOK AND POSSIBLY COHO SALMON ENTERING FRESH AND FRESH FROZEN MARKETS. COMPETITION WILL NOT BE DIRECT BECAUSE FARMED SALMON CANNOT COMPETE WITH THE PRICES OF COMMERCIALLY CAUGHT FISH. FOR THIS REASON, FARMED SALMON GENERALLY ENTER THE MARKET DURING A 31-WEEK PERIOD (WINTER THROUGH LATE SPRING) WHEN FRESH COMMERCIALLY CAUGHT SALMON ARE NOT AVAILABLE. FARMED SALMON MAY ALSO IMPROVE MARKETING OF COMMERCIALLY CAUGHT FISH BY CREATING NEW MARKETS SUCH AS RESTAURANTS THAT PREVIOUSLY DID NOT CARRY SALMON. IN THESE MARKETS, PREMIUM QUALITY COMMERCIALLY CAUGHT FISH WOULD BE PURCHASED IN SEASON WHILE FARMED SALMON WOULD BE PURCHASED DURING THE OFF-SEASON.

SALMON FARMING IS OCCURRING THROUGHOUT THE TEMPERATE AND SUB-ARCTIC CLIMATES OF THE NORTHERN AND SOUTHERN HEMISPHERE. THERE IS PRESENTLY AN UNDECLARED RACE THROUGHOUT THESE REGIONS TO DEVELOP A SALMON FARMING INDUSTRY WHICH CAN SECURE A SHARE IN THE NEW MARKET. EACH COUNTRY IS POSITIONING ITSELF TO FIND THE GEOGRAPHIC MARKET AREA IN WHICH THEY WILL HAVE A COMPETITIVE ADVANTAGE OVER OTHER PRODUCING REGIONS. RECOGNIZING THE EXISTENCE OF THIS RACE, IT IS SAFE TO CONCLUDE THAT THE WORLD DEMAND FOR FARMED SALMON WILL BE FILLED. THUS, REGARDLESS OF ALASKA'S PARTICIPATION, IN SALMON FARMING THE MARKETS WILL BE FILLED. FAILURE OF ALASKA TO PARTICIPATE WILL ONLY MEAN A LOSS OF JOBS AND INCOME TO ALASKA.

EXPEDIENT DEVELOPMENT OF SALMON AQUACULTURE POLICY AND REGULATIONS IS NECESSARY IF ALASKA IS GOING TO COMPETE IN MARKETS FOR FARMED SALMON

- THE GROWTH OF A SALMON INDUSTRY INVOLVES CONSIDERABLE LEAD TIME. FOR EXAMPLE, IT TOOK NORWAY 20 YEARS BEFORE THE COUNTRY WAS ABLE TO PRODUCE 9,000 METRIC TONNES.
- IN ALASKA, THE LEAD TIME REQUIRED TO PRODUCE A MARKETABLE PRODUCT WILL BE AT LEAST FOUR YEARS.
- IT IS ESTIMATED THAT IT WILL TAKE A MINIMUM OF EIGHT TO 10 YEARS FOR ALASKA TO PRODUCE MORE THAN 5,000 METRIC TONNES. THIS ASSUMES THAT THE STATE WILL PROVIDE A MINIMUM OF 1.1 MILLION EGGS ANNUALLY AND THAT VERY FAVORABLE GOVERNMENTAL SUPPORT AND REGULATIONS ARE IN PLACE.
- A DELAY IN AUTHORIZING SALMON FARMING IN ALASKA WILL PREVENT ALASKA FROM ESTABLISHING ITS OWN FARMED SALMON MARKETS. THIS WILL ENABLE OTHER COUNTRIES SUCH AS CANADA AND FARMS IN THE UNITED STATES TO FILL THE DOMESTIC MARKETS BEFORE ALASKA PRODUCTION IS AVAILABLE.

SALMON FARMING WOULD BE BENEFICIAL TO ALASKA, HOWEVER, THE SUCCESS OR FAILURE OF THE INDUSTRY IS PREDICATED ON EXPEDIENT POLICY DECISIONS TO ALLOW THE INDUSTRY IN ALASKA

THE PROJECTED DEMAND FOR FARMED SALMON WILL CONTINUE TO EXCEED SUPPLY THROUGH THE EARLY 1990S. THIS DEMAND WILL MAINTAIN A HIGH PRODUCT PRICE AND EXCELLENT PROFIT MARGIN. IT IS ANTICIPATED, HOWEVER, THAT AS THE MARKET DEMAND IS MET THE PRICE MAY DECREASE. ESTABLISHED SALMON FARMS WILL STILL BE ABLE TO MAINTAIN GOOD TO EXCELLENT PROFIT MARGINS THROUGH IMPROVED EFFICIENCY OF THEIR OPERATIONS AS PRICE DECLINES OCCUR.

THE SUCCESSFUL EVOLUTION OF A NEW SALMON FARMING IN ALASKA IS PREDICATED ON DEVELOPING THE INDUSTRY WHILE THE PRODUCT REMAINS HIGH. IF THE PRICE DROPS BEFORE ALASKA'S INDUSTRY IS ESTABLISHED, ALASKA WILL NOT HAVE THE EXPERIENCE AND IMPROVED EFFICIENCY NECESSARY TO MAINTAIN PROFIT MARGINS. THIS WILL HAVE ADVERSE IMPACTS ON DEVELOPING SMALL SALMON FARMING BUSINESSES THAT DO NOT HAVE SUFFICIENT CAPITAL TO WITHSTAND THE DEVELOPMENT PHASE.

IN CONCLUSION

ALASKA IS ON THE THRESHOLD OF OPPORTUNITY TO PROMOTE A NEW INDUSTRY IN THE STATE. THIS INDUSTRY WILL AFFORD SIGNIFICANT OPPORTUNITIES TO:

1. DIVERSIFY LOCAL AND STATE ECONOMIES.
2. ADD SIGNIFICANT NEW CAPITAL TO THE COMMUNITIES, PROVIDE NEW YEAR-ROUND EMPLOYMENT OPPORTUNITIES ALLEVIATING THE EXTREME UNEMPLOYMENT LEVELS DURING THE FALL AND WINTER MONTHS.
3. PROVIDE SIGNIFICANT NEW SMALL BUSINESS OPPORTUNITIES TO OUTLYING COMMUNITIES; AND

4. INCREASE OFF-SEASON OPPORTUNITIES FOR THE COMMERCIAL FISHING AND SEAFOOD PROCESSING INDUSTRIES.

THESE BENEFITS AND MORE CAN BE REALIZED BY DEVELOPING A SALMON FARMING INDUSTRY. SALMON FARMING IS A NON-EXTRACTIVE INDUSTRY WHICH REQUIRES MAINTENANCE OF ENVIRONMENTAL AND WATER STANDARDS AND IS CONSISTENT WITH ALASKA LIFESTYLES.

THE SUCCESSFUL DEVELOPMENT OF SALMON FARMING CANNOT ENCOUNTER PROTRACTED DELAY. THERE IS A WINDOW OF OPPORTUNITY TO DEVELOP THE INDUSTRY BUT DUE TO RAPID GROWTH OF SALMON FARMING IN OTHER REGIONS OF THE WORLD, COMPETITION FOR MARKET WILL INCREASE. ONCE THIS HAPPENS THE WINDOW OF OPPORTUNITY FOR MANY ALASKANS, PARTICULARLY SMALL BUSINESSES, MAY BE CLOSED.

SEALASKA BELIEVES THAT AQUACULTURE AND SALMON FARMING WILL BE BENEFICIAL TO ALASKA AND THAT EXPEDIENT DEVELOPMENT OF PUBLIC POLICY TO PROMOTE SALMON FARMING IS NECESSARY. DEVELOPMENT OF THIS MUST OCCUR WITH THE CLOSE COOPERATION AND INVOLVEMENT OF THE ALASKA SEAFOOD FOOD INDUSTRY. RECENTLY, THE GOVERNOR'S AQUACULTURE ADVISORY COMMITTEE PROPOSED AN AQUACULTURE POLICY FOR THE STATE AND A PLAN OF ACTION TOWARD IMPLEMENTING THAT POLICY. SEALASKA CORPORATION IS A PARTICIPANT TO DEVELOPMENT OF THE POLICY AND BELIEVES THAT IT REPRESENTS A PRACTICAL AND ACHIEVABLE PROCESS FOR THE PUBLIC TO CONSIDER THE BENEFITS AND IMPACTS OF OCEAN FARMING AND TO MAKE INFORMED DECISIONS REGARDING THE FUTURE OF SALMON FARMING IN ALASKA.

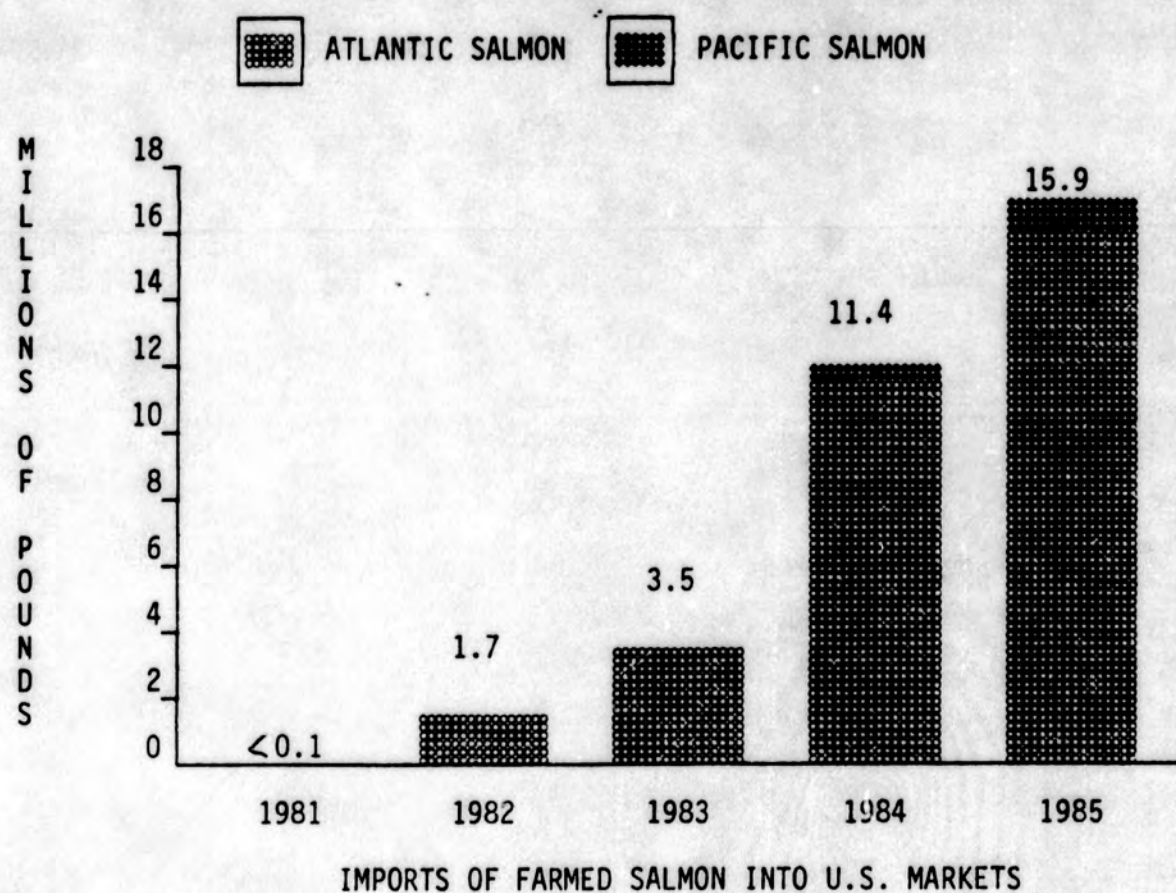


Table 1.--World production of pen-farmed salmon, 1981-85; 1990 and 2000 projections.

Species/Country	Year						
	1981	1982	1983	1984	1985	1990	2000
	--metric tons--						
Atlantic							
Norway	8,907	10,266	17,016	25,000	30,000	80,000	200,000
United Kingdom	1,000	2,100	2,500	2,500	3,000	8,500	
Finland	500	700	700	700	750	2,500	
Ireland	80	103	256	256	300	2,000	
Canada	35	140	180	180	200	1,000	
Faroe Islands	100	130	160	160	190	2,000	
Sweden	60	80	100	100	100	500	
Iceland	20	30	50	50	50	300	
France	2	5	10	10	10	30	
Total	10,704	13,554	20,972	26,456	34,600	96,830	200,000
Pacific							
Japan	1,150	2,122	2,900	4,400	6,800	8,000	
United States	450	680	900	1,000	1,200	1,800	
Chile	60	80	100	150	200	3,000	
France	60	80	80	80	80	500	
Canada	3	5	10	100	100	50	
New Zealand	2	5	10	22	132	50	
Total	1,725	2,972	4,000	5,752	8,512	12,400	
Grand Total	12,429	16,526	24,972	32,208	43,112	109,230	200,000

Source: Branch of Foreign Fisheries Analysis and W. R. Heard, Auke Bay Laboratory, National Marine Fisheries Service, NOAA, U.S. Department of Commerce.



The commercial fishing fleet has been concerned with and damaged by salmon aquaculture for more than a decade. Without boring anyone with a detailed history, I would like to outline these concerns, especially in light of Sea Farm of Norway's recent request to increase its pen-rearing operation here in Puget Sound.

Economic concerns. Jon Lindberg, consultant for Sea Farm of Norway, makes the absurdly naive contention that there is no economic impact on the salmon fishery, since Sea Farm fish go into the fresh market during the off-season. While this may seem plausible to anyone not familiar with the salmon fishery, Mr. Lindberg certainly realizes, as do all other commercial fishermen, that there is but one salmon market, that it is international in scope, and that it consists almost entirely of frozen fish and, further, that the grocery stores and other resellers neither know nor care whether the fish are fresh or frozen, or even what species they are.

For example, if Alaska has a good year in salmon, it depresses the dock price worldwide for the following winter and first half of the next season until the market absorbs the old inventory.

According to the Pacific Fishery Management Council, in a report dated March 1985, the dollar value of pen-reared Atlantic salmon imported from Norway was 2.7 times the value of the entire commercial catch from Washington, Oregon, and California in 1984. Currently, there is an effort to apply trade tariffs to these imported fish. If Sea Farm of Norway is able to monopolize Washington pen-rearing, they will have successfully side-stepped these protective tariffs.

Sea Farm of Norway is requesting a permit to rear native coho and chinook. Mr. Lindberg states that the basis of this request is to compete with Chilean imports. This is an ironic piece of opportunism, since it was Mr. Lindberg's previous employer, Dom Sea Farms, who was responsible for the original importation of Washington salmon eggs in Chile.

Political concerns. I very much object to Sea Farm's attempt at monopoly by requesting more pen permits when they are only using a fraction of the permits they already have. If pen-rearing is to become a fixture of the region, it should at least include some of the commercial fishermen whom it has helped displace. It should not be restricted to one foreign-based corporation which employs only a few local people at near minimum wage and removes any profits not only from the city and county but from the state and country as well.

In short, the economic benefits are virtually nil, while the adverse impact is potentially very damaging.

Environmental concerns. What is even more potentially damaging are the many unanswered environmental issues involved. There is the very real possibility of habitat damage to the area under and near the pens from rotting feed, fecal matter, dead fish, and oxygen depletion resulting from this underwater feed lot. This problem has already surfaced in Sea Farm's other Puget Sound facility in Griffin Bay.

The other environmental problem is disease. Sea Farm has already had this problem here in Port Angeles with mortality running reportedly between 20% and 30%. The Washington Department of Fisheries considers 10% mortality to be epidemic in a hatchery environment. The cause of the mortality is apparently unknown, but likely results from either an immune deficiency among the Atlantic salmon or an induced disease from the country of origin. It has never been established if the Sea Farm fish are diseased or if these diseases are transferable to the native population of coho and chinook.

I believe that Sea Farm of Norway should not be allowed any additional pens at its Port Angeles site until they have utilized their existing permits. We have to preclude any monopolization that would eliminate local participation in the pen-rearing of salmon.

I also think that any pen-rearing



Tom Pope is an 11-year resident of Port Angeles, Washington and a commercial fisherman with experience in Alaska, Washington, Oregon, and California. He is the ex-chairman of the executive committee of the West Coast Professional Fishermen's Union, AFL-CIO No. 367.

"If pen-rearing is to become a fixture in the region, it should at least include some of the commercial fishermen it has helped displace."

operation should be required to provide a full environmental impact statement, including a baseline survey, independent scheduled monitoring of underwater habitat conditions, and documentation by accredited, responsible agency biologists of existing mortality, transferability of disease to local salmon, and the projected effect on the local salmon population.

It is especially important that these requirements be met before Sea Farm of Norway or any other operation be allowed to raise native coho and chinook salmon.

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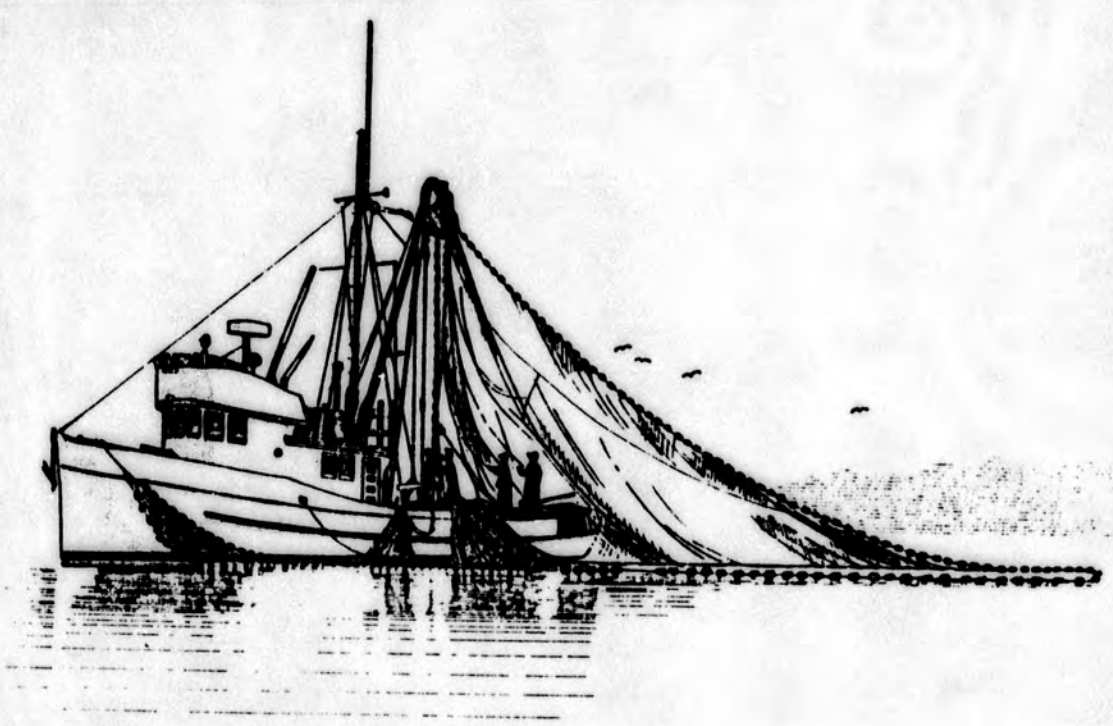
May, 1986

Copies of minutes listed below were originally included in this file. The minutes are available on the STAIRS date base CM 14. In order to save space copies of minutes have not been left in the files.

Jeanie Henry

House Special Committee on Fisheries, 3/11/86, 8:30am

North Pacific Fisheries Delphi Project Final Report



05052



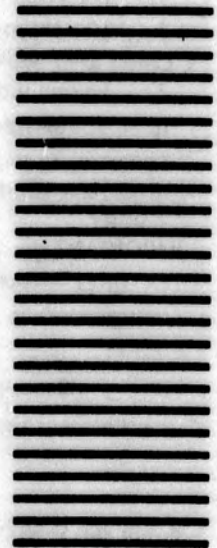
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FISHERIES DELPHI EVALUATION

We are interested in how the North Pacific Fisheries Delphi Study will be used and its value to users. Please answer the questions below, and return the form to the address stamped on the back. Please fold and staple or tape so the mailing address is shown.

1. In your own anticipated use of the study results, the report will be

☐ referenced often

☐ read

☐ scanned

☐ generally ignored

2. With respect to the identification of important problems, issues and policies, is the report

☐ generally reliable

☐ reliable in many cases

☐ reliable in a few cases

☐ generally unreliable

With respect to the panel's predicted outcomes (majority opinion) are the panel's predictions for the study as a whole

☐ generally reliable

☐ reliable in many cases

☐ reliable in a few cases

☐ generally unreliable

3. In what area(s) is the report most accurate? (Denote the Chapter and/or Table #) _____

In what area(s) is the report least accurate? _____

4. Check your own primary affiliation in the left most column below (please check no more than two). Then indicate the report's usefulness to each group/organization by putting one check per row at the right.

AFFILIATION	GROUP/ORGANIZATION	VERY USEFUL	USEFUL	SOME USE	LITTLE VALUE
☐	Harvester(s)	☐	☐	☐	☐
☐	Processor(s)	☐	☐	☐	☐
☐	Distributor(s)	☐	☐	☐	☐
☐	Legislator(s)	☐	☐	☐	☐
☐	State agency(ies)	☐	☐	☐	☐
☐	Federal agency(ies)	☐	☐	☐	☐
☐	Researcher(s)	☐	☐	☐	☐
☐	Other _____	☐	☐	☐	☐

5. Rate your own level of expertise in the following six seafood issue categories (Put H for high, M for medium, L for low):

Supply _____ Trade _____ Price _____
Demand _____ Marketing _____ Policy _____

6. Please rank (1 - highest, 2 - next highest, etc.) the effectiveness of the following methods for long-range forecasting of fisheries developments:

- [] econometric and mathematical models
- [] forecasting by individual experts
- [] Delphi method - forecasting by a group of experts augmented by individual rating of expert opinions in three rounds
- [] group judgement methods other than Delphi
- [] other (please specify) _____

7. If you are familiar with the Delphi method, please rate the importance of the following factors to the credibility of the Delphi study:

VERY IMPORTANT	MODERATELY IMPORTANT	OF LITTLE IMPORTANCE	
☐	☐	☐	High level of expertise of the panelists
☐	☐	☐	Large panels
☐	☐	☐	Anonymity during the process
☐	☐	☐	Multiple questionnaire rounds
☐	☐	☐	Feedback of previous round results for re-evaluation
☐	☐	☐	Appearance of a consensus among panelists

8. Are you willing to serve on a future Delphi panel? ☐ Yes ☐ No

Questionnaire _____: Your responses will be kept strictly confidential; this number is included here solely for control purposes.

PLEASE FEEL FREE TO USE THE BACK OF THIS FORM FOR COMMENTS

05052

THE NORTH PACIFIC FISHERIES DELPHI PROJECT

REPORT TO

OFFICE OF COMMERCIAL FISHERIES DEVELOPMENT

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

LOREN H. LOUNSBURY, COMMISSIONER

GREGORY BAKER, DIRECTOR

**Contractor: Economic Analysis
Section, Department of Commerce and
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Project Coordinator: Lynn Hutton
Principal Consultant: Brad Pierce
Research/Support Team:
Geoffrey Whistler
Robert Schiller
Jeanette Mitchell**

**Juneau, Alaska
September 1985**

ACKNOWLEDGEMENT

The members of the Delphi panel listed below contributed many hours of hard work toward providing the information that made this study possible. We sincerely thank them for their dedication and patience.

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Andrew Alley
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Jim Branson
Alec Brindle
Alvin Burch
Bud Burgner
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James A. Crutchfield
Don DeVoretz
Bill Dietrich
Lauren Donaldson
John Doyle
Oscar Dyson
Ralph Eluska
Thomas R. Eyestone
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Jay Gage
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Rick Ranta
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James A. Richardson
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Edward A. Ryan
Robert Ryan
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Keith Sandercock
Susan Shaw
David A. Stanchfield
Hans Stuercken
Ed Suska
Tom C. Swafford
Joe Terry
Clem Tillion
John Wedin
Jim Wilson
Carlos F. Wurmann

IN MEMORIAL

JACK O. HICE

Mr. Hice was a tireless and innovative leader in the field of fish processing. He invented the world's first fish sticks, and between him and his wife, Holly, had 57 patents in fish processing, including a flash freezing process and the molecular adhesion process for molding fish blocks. He also developed the concept and marketed the first boilable bags for cooking frozen foods.

His contributions to this study were innovative and thought-provoking. We are sorry to lose his valuable contribution to the study and to the industry.

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EXECUTIVE SUMMARY

This report presents the predicted impact of selected future developments and issues in the North Pacific seafood industry. The predictions were obtained from a panel of over 100 distinguished and expert members of the seafood industry. The study was performed under contract with the Office of Commercial Fisheries Development, Alaska Department of Commerce and Economic Development.

Methodology

Delphi is a method for combining expert opinions elicited from the members of a carefully selected panel. The method utilizes a series of structured questionnaires mailed to panelists, which was combined with feedback of interim results to panel members. Panelists are thus made aware of emerging panel positions, including areas of significant consensus or lack of consensus. The Delphi method has many of the advantages of a high level conference without the disagreements and logistical problems associated with putting together such a gathering.

Prospective Delphi panelists were selected based on their level of expertise in six seafood issue categories (supply, demand, trade, price, marketing, and policy) and the sector of the industry that the panelist represents (government, university, industry-harvester, industry-processor, industry-distributor). An original list of 249 prospective panelists was reduced to a balanced list of 187 highly qualified individuals. Of the 187 invited to participate, 101 persons participated in one or more questionnaire rounds.

Three questionnaires were constructed by the research team and disseminated to the panel members. The focus of the first questionnaire was an overview of the major issues and events that are expected to impact the North Pacific seafood industry in the next 20 years. The panel was asked to forecast the occurrence of significant events, identify major issues of concern to them, identify impediments to development and areas of comparative advantage for exploitation, and to respond to a number of more technical hatchery, market interaction, and supply issues.

Round 2 was primarily focused toward having the panel evaluate the collective panel responses from Round 1. A number of new "probe" questions were included which were generated by the panel's response in Round 1. Round 3 focused on refining the forecasts from Round 2 and evaluating the panel responses from new questions introduced in Round 2.

The panel responded to more than 500 variables and questions. The first questionnaire was sent to the panel in June 1984, the second was sent in November 1984, and the third in March 1985.

A complete description of the research methodology, including the measurement scales, procedure, method of analysis, and panel demographics is given in Chapter 8.

Principal Results

This section contains the most significant data obtained from the panel's response to the three Delphi questionnaires. The results reflect what a majority of the panel rated as valid and reliable conclusions about the impact of selected issues facing the industry in the next 20 years. Refer to the relevant chapters for the specific frequency distributions of the panel's ratings.

- o The quality of fish delivered to the final consumer should be improved, both in the average and best practiced technologies.
- o "Fishing to the Market." We need to recognize that fishing is a competitive business which requires a broad managerial outlook. Define and develop the demand potential for seafoods, understand the seafood consumer, and long-term trends in consumption.

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EXECUTIVE SUMMARY

This report presents the predicted impact of selected future developments and issues in the North Pacific seafood industry. The predictions were obtained from a panel of over 100 distinguished and expert members of the seafood industry. The study was performed under contract with the Office of Commercial Fisheries Development, Alaska Department of Commerce and Economic Development.

Methodology

Delphi is a method for combining expert opinions elicited from the members of a carefully selected panel. The method utilizes a series of structured questionnaires mailed to panelists, which was combined with feedback of interim results to panel members. Panelists are thus made aware of emerging panel positions, including areas of significant consensus or lack of consensus. The Delphi method has many of the advantages of a high level conference without the disagreements and logistical problems associated with putting together such a gathering.

Prospective Delphi panelists were selected based on their level of expertise in six seafood issue categories (supply, demand, trade, price, marketing, and policy) and the sector of the industry that the panelist represents (government, university, industry-harvester, industry-processor, industry-distributor). An original list of 249 prospective panelists was reduced to a balanced list of 187 highly qualified individuals. Of the 187 invited to participate, 101 persons participated in one or more questionnaire rounds.

Three questionnaires were constructed by the research team and disseminated to the panel members. The focus of the first questionnaire was an overview of the major issues and events that are expected to impact the North Pacific seafood industry in the next 20 years. The panel was asked to forecast the occurrence of significant events, identify major issues of concern to them, identify impediments to development and areas of comparative advantage for exploitation, and to respond to a number of more technical hatchery, market interaction, and supply issues.

Round 2 was primarily focused toward having the panel evaluate the collective panel responses from Round 1. A number of new "probe" questions were included which were generated by the panel's response in Round 1. Round 3 focused on refining the forecasts from Round 2 and evaluating the panel responses from new questions introduced in Round 2.

The panel responded to more than 500 variables and questions. The first questionnaire was sent to the panel in June 1984, the second was sent in November 1984, and the third in March 1985.

A complete description of the research methodology, including the measurement scales, procedure, method of analysis, and panel demographics is given in Chapter 8.

Principal Results

This section contains the most significant data obtained from the panel's response to the three Delphi questionnaires. The results reflect what a majority of the panel rated as valid and reliable conclusions about the impact of selected issues facing the industry in the next 20 years. Refer to the relevant chapters for the specific frequency distributions of the panel's ratings.

- o The quality of fish delivered to the final consumer should be improved, both in the average and best practiced technologies.
- o "Fishing to the Market." We need to recognize that fishing is a competitive business which requires a broad managerial outlook. Define and develop the demand potential for seafoods, understand the seafood consumer, and long-term trends in consumption.

- o Over half of the panel expects pen-reared (farmed) salmon to largely displace "caught-at-sea" salmon in the white tablecloth restaurant and European markets.
- o The majority of the panel expects the maximum sustainable production and yield of ocean-reared (wild stocks and hatchery releases) salmon to be reached in the North Pacific by the year 2000.
- o Major impediments to the development of Alaska's fishing potential are: the high cost of domestic processing, fierce competition from foreign groundfish products in the domestic market, and the U.S. technology of catching, processing, and storage needs to be upgraded to be competitive with the world market.
- o Some areas of comparative advantage in world seafood markets for exploitation by U.S. producers are: in groundfish (individually frozen cod fillets for fast food restaurants), surimi products (low price should encourage domestic consumption), and in pink and chum salmon (market large volumes at a low price).
- o There is insufficient factual data available to accurately predict the biological implications of the release of 11 billion salmon fry into the North Pacific by the year 2000.
- o The major political implication of the release of 11 billion salmon fry is that existing regimes will predominate within the FCZ and greater competition will occur outside the FCZ and in nonterminal interception areas.
- o The major economic implication of the release of 11 billion salmon fry is that there will be a long term increase in the supply of pink and chum salmon which will probably result in a more stable supply, lower price, and greater consumer demand.
- o The significant implications of the increasing Japanese coastal salmon catch and declining high seas catch upon the U.S. salmon industry are that the Japanese import demand for red salmon will increase (thus U.S. exports should increase), and that the U.S. salmon market must be further expanded to compensate for the loss of Japanese import of the low valued salmon species (i.e., chum).
- o Alaska needs salmon farming to open up year-round markets for high quality fish, assuming that pen-rearing is technically and economically feasible.
- o Most panelists indicate that there is no reason why hunting and farming cannot be integrated into a single industry. Salmon farming will dominate the high priced fresh market in the off-season while hunting and ranching interests will hold the lower priced, high volume end of the market.
- o Salmon pen-rearing should be profit motivated to attract investors, but the fishing lobby who view pen-rearing as competition may exert political pressure on the Legislature to prevent private for profit pen-rearing.
- o The cost of hatchery programs should be carefully evaluated to insure they contribute more than they remove from the fishery economy. We should consider whether dollars spent on hatcheries might be better spent on research, stock assessment, and hatchery enhancement.
- o Pen culture should be encouraged. The State should allow a pen farming network of size, scope, and marketing operations similar to Norway.

- o "Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons.
- o Since salmon are most often fished in mixed stock fisheries and predicting run strength is an art even for hatchery fish, great care should be exercised not to close down valuable mixed stock fisheries in order to generate more hatchery returns. In other words, the expected costs and benefits of alternative methods of managing fisheries which intercept hatchery fish should be weighed.
- o Two-thirds of the panel indicated that the preferred method used to finance nonprofit, private hatcheries would be a balance between an enhancement assessment and partial cost recovery.
- o About half of the panel forecast that net profits will increase for both fishers and processors if there is a long-term increase in the supply of salmon stocks. Although price will decrease, the overall increase in harvest volume will increase unit efficiently (CPUE) as long as limited entry is in place.
- o More than half of the panel expects that domestic groundfish production will generally displace imports in the next 20 years, but it will occur slowly. However, about one-third of the panel expects that the domestic industry will not completely displace imports because domestic producers will not be able to supply the total domestic demand, especially at a competitive price with foreign imports.
- o According to the panel, the primary reasons why the U.S. seafood industry is not in the forefront of the development of the domestic surimi market are: that the Japanese have much historical experience in the processing of pollock and the technology of surimi product development due to their traditional markets in Japan and Korea.
- o A majority of the panel indicated that domestic producers were surprised at the U.S. market's acceptance of analog products. In order to successfully compete with imports, either joint ventures will be necessary or a major domestic company which is capable for financing a fully integrated operation will be necessary.
- o The major factors that affect the competitiveness of the domestic processing industry are: foreign labor costs, exchange rates, trade barriers and foreign government subsidies.
- o According to the panel, strategies for encouraging the development of a "value-added" industry around Alaska's abundant groundfish resources are: to encourage steady improvement in infrastructure, to encourage development around factory trawlers (Alaska can benefit by providing support facilities and support services), and to pursue no development policy other than providing a stable regulatory environment.
- o Over half of the panel indicated that a viable option for capturing some of the "value-added" from groundfish production would be a fleet of locally-based vessels, of smaller size than factory trawlers, which could harvest and process their catch at sea and ship their frozen finished product from Alaskan ports in freezer containers.
- o The current relative share of production by domestic groundfish processors (floaters, 65%, shore-based, 35%) is forecasted to remain about the same for the next 20 years.
- o Domestic processors are forecasted to increase by 20% their relative share in Alaska's groundfish harvest compared to joint ventures and foreign catch levels by the year 2000.

- o The greatest growth in seafood markets will occur in fast food restaurants and in convenience type foods (e.g., frozen fillets, fish sticks) in the next 20 years.
- o U.S. demand for seafood products will increase for fresh and frozen salmon and for groundfish products. Per capita demand for regular canned salmon will decrease or remain about the same, while demand for skinless and boneless canned salmon is expected to increase. Demand for canned crab and shrimp is projected to decrease.
- o According to the panel's ranking of factors that affect foreign and domestic demand, product price, consistency of supply, and perceived quality appear to be more important in foreign demand for seafood products, while change in dietary habits, price of substitutes, and ease of preparation appear to be relatively more important factors for domestic consumer demand.
- o The most important factors necessary to insure consistent quality of seafood products are: product standards, education, product inspection, bonus payments to fishers for quality, and product grading.
- o Ninety-two percent of the panel indicated that the role of exchange rates was a critical factor in the development of the domestic groundfish industry.

INTRODUCTION

This final report is the culmination of the North Pacific Fisheries Delphi Study for the Alaska Governor's Fisheries Mini-Cabinet Task Force which began in March, 1984, and involved a panel of over 100 seafood industry experts. Panelists completed a series of three questionnaires which explored many issues concerning North Pacific fisheries products and markets. Special attention was given to groundfish and salmon fisheries development within Alaska's Fisheries Conservation Zone (FCZ). The panelists themselves chose many of the issues which are explored in this document and spent many hours filling out questionnaires.

For panelists, the Delphi process is a structured communication exercise where disparate points of view within the industry can be focused on particular issues and individual assumptions about the future can be weighed against the opinions of one's peers. The reader of this final report should gain a broader understanding of the diversity of viewpoints and interrelatedness of issues affecting the future of the domestic seafood industry in the North Pacific.

The Governor's Fisheries Task Force is charged with making recommendations to the Governor on future groundfish and salmon development. Other studies done for the Task Force concentrated on empirical or "hard data" approaches, e.g., benefit/cost ratios for the State's hatchery programs. The Delphi method is a much "softer," less quantifiable means of assessing future trends and attitudes and their political and economic consequences. The Delphi is defined "as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."* Decisionmakers can look at the Delphi as a modified version of a public hearing in which testimony from 100 experts on a particular issue is gathered, condensed, and presented back for evaluation by the experts.

At its best, the Delphi process causes an individual panelist to articulate his or her opinion about a particular subject. Then through successive rounds of questionnaires, individual opinion is brought into sharp focus against the background of the rest of the group's responses. As each question is reintroduced or refined, individual views tend to merge toward consensus or disperse into definite areas of disagreement. At its worst, the Delphi process can be a rehash of old arguments by the same experts who reinforce one another's prejudices. By insuring that the panel composition contains a broad cross section of representatives in the North Pacific seafood industry, this dynamic is held to a minimum.

Seafood industry "insiders" will discover in this report a full range or representative sample of opinion on most of the issues concerning the future development of Alaska's groundfish and salmon resources. The less informed reader will become aware of the major issues facing the industry and what the industry can do in the next 20 years to mitigate the negative impacts and enhance the positive impacts.

The research team was directed by the Office of Commercial Fisheries Development to:

- Forecast market demand for Alaska salmon and groundfish categorized by region, market segment, and product form.
- Identify market interactions such as the impact of exchange rate fluctuations, future international trade patterns, and the impact of promoting seafood products.
- Forecast future supply trends for salmon for the production methodologies of harvesting, ocean ranching, and farming.

* Limestone, H.A., and M. Turoff, (eds.), The Delphi Method Techniques and Applications (Reading, MA: Addison-Wesley, 1975), p.3.

After consulting with the project sponsor and seven fisheries consultants, the above objectives were translated into a series of questions. Due to the complexity of the fisheries issues and due to the preceived lack of sufficient factual information, the general format of the Delphi questions was exploratory rather than simply predictive. According to the consultants, too much factual data is unknown by anyone in these fisheries areas, thus numerical forecasts by the panel would produce insufficient accuracy to yield valid results. As a result, the general format of the questions was focused toward collecting the expert information that the respondents do possess in reference to an issue area. By using this format, we were able to maximize the use of the expert information without forcing the respondents to rely on their various knowledge levels to predict specific supply levels or forecast years.

Round 1 questionnaire was focused at obtaining an overview of the major issues and events that are expected to impact the North Pacific seafood industry in the next 20 years. The panel was asked to forecast the occurrence of significant events, identify major issues of concern to them, identify impediments to development and areas of comparative advantage for exploitation, and to respond to a number of more technical hatchery, market interactions, and supply issues.

Round 2 was primarily focused toward having the panel evaluate the collective panel responses from Round 1. A number of new "probe" questions were included which were generated by the panel's response in Round 1. Round 3 focused on refining the forecasts from Round 2 and evaluating the panel responses from new questions introduced in Round 2.

An advisory group of eight fisheries consultants was used by the research team to: identify significant issues for inquiry, pretest the questionnaires, and to provide clarification on the many technical issues raised by the panel. The members of this consulting work group were:

Dr. Richard Johnston
Department of Agriculture and Resource Economics
Oregon State University

Ron Jensen, President
Sea-Alaska Products, Inc.

Sara Hemphill
Alaska Contact, Ltd.

Chris Mitchell, Director
Alaska Fisheries Development Foundation, Inc.

Daryl Pedersen, President
Seawest Industries, Inc.

Eric Eckholm
Pacific International Marketing, Ltd.

Dr. William McNeil
Weyerhaeuser/Oregon Aquafoods

Greg Baker, Director
Office of Commercial Fisheries Development
State of Alaska

Chapter Eight discusses the methodology employed in this study in greater detail. Chapter Two through Seven present the principal results classified into the following categories: fundamental issues and events facing the industry, international development of salmon aquaculture, Alaska hatchery issues, international groundfish issues, and market economics.

In interpreting the results presented here, the reader should keep in mind the objectives of the research and the limitations of the Delphi method. The Delphi is not a method for obtaining statistical accuracy, but instead focuses on broad areas of agreement and disagreement about future developments. The Delphi should be judged as a method for allowing a group of experts to deal with a complex problem via a structured communication process. Refer to Chapter Eight for a more complete description of the Delphi procedure.

CHAPTER 2

FUNDAMENTAL ISSUES

- o Important Issues Facing the North Pacific Seafood Industry in the Next 20 Years.
- o Selected Potential Developments in the Seafood Industry in the Next 20 Years.
- o Impediments to the Development of Alaska's Fishing Potential.
- o Areas of Comparative Advantage in World Seafood Markets for Exploitation by U.S. Producers.

PRINCIPAL RESULTS

The quality of fish delivered to the final consumer should be improved, both in the average and best practiced technologies.

"Fishing to the Market." We need to recognize that fishing is a competitive business which requires a broad managerial out look. Define and develop the demand potential for seafoods, understand the seafood consumer, and long-term trends in consumption.

Over half of the panel expects pen-reared (farmed) salmon to largely displace "caught-at-sea" salmon in the white tablecloth restaurant and European markets.

The majority of the panel expects the maximum sustainable production and yield of ocean-reared (wild stocks and hatchery releases) salmon to be reached in the North Pacific by the year 2000.

Major impediments to the development of Alaska's fishing potential are: the high cost of domestic processing, fierce competition from foreign groundfish products in the domestic market, and the U.S. technology of catching, processing, and storage needs to be upgraded to be competitive with the world market.

Some areas of comparative advantage in world seafood markets for exploitation by U.S. producers are: in groundfish (individually frozen cod fillets for fast food restaurants), surimi products (low price should encourage domestic consumption), and in pink and chum salmon (market large volumes at a low price).

In developing a forecast of the future based on expert respondents, we chose to first formulate a general context of information about the future. This chapter summarizes the panel's views about the important issues the industry must deal with in the next 20 years, impediments to industry development, and areas of comparative advantage for industry growth. This chapter also includes the panel's predictions of the likelihood of occurrence of a number of national and international developments in the industry.

In this section are the data obtained from four questions given in the first questionnaire. The results for two questions which concern important issues facing the industry and impediments to the development of Alaska's fishing potential were subsequently fed back to the panel to be rated in Round 2. The question which deals with the probability of future developments was rated by the panel in Round 1. The last subsection in this chapter summarizes the results of the panel's one-time open-ended response. The data from this question was not submitted for rating by the panel.

The format of this and the remaining chapters is to present the informational context of the subject area and report the question used to elicit the panel's response. Then an analysis of the data is given which is followed by tables of data that formed the basis of the analysis. In a number of cases, however, data from another section of the report is referenced. Analytical statements are referenced to the table data. The notation used is this: T7.6,#1,2. T7.6 means Table 7.6 and #1,2 means item numbers 1 and 2 on Table 7.6. Citations at the bottom of each table refer to the questionnaire round and question number from which the data was obtained. Since most tables are composed of a number of variables, the number of panelists responding to each varies. To avoid over complicating the tables, the average number of panel members responding is given in a footnote to the table.

Important Issues Facing the North Pacific Seafood Industry in the Next 20 Years.

In Round 1, the panelists were requested to list three of the most important questions or issues relevant to the development of the North Pacific seafood industry in the next 20 years. In Round 2, the panelists' responses from Round 1 were listed and the panelists were requested to rate the importance of each issue (or question) using the four-point importance scale described in the last chapter.

Several general themes run through panelists' responses which are exemplified by the issues listed on Table 2.1. In the very broadest of terms, panelists feel that marketing and product development are the weakest aspects of the domestic seafood industry. Along with this is the need to upgrade quality standards at all levels to enhance the consumer's perception of domestically produced seafood products. To fully utilize Alaska's vast groundfish resources and derive maximum local economic benefits, large investments in infrastructure and support facilities are needed (T2.1,#7,22). Long-term solutions to overcapitalization problems must be sought for all North Pacific fisheries which will lead to orderly development and improved resource management (T2.1,#6,8,14,16). An overall concern of the panelists is that the domestic industry continues to lag behind foreigners in technological innovation and market development even as our salmon supplies have risen dramatically and foreign fleets have been regulated away from groundfish resources in the FCZ during the past several years (T2.1,#4,10,15,18,19,24). Financial incentives are needed to reverse this trend.

TABLE 2.1

Important Issues or Questions Facing the Industry in the Next 20 Years.

PERCENTAGE OF PANEL SELECTING EACH ISSUE AS VERY IMPORTANT	
<u>ISSUES SELECTED BY THE PANEL</u>	
1. The quality of fish delivered to the final consumer should be improved, both in the average and best practiced technologies.	78%
2. Quality, product development, marketing, and advertising should be encouraged in concert with each other.	61%
3. "Fishing to the market." We need to recognize that fishing is a competitive business which requires a broad managerial outlook. Define and develop the demand potential for seafoods, understand the seafood consumer, and long-term trends in consumption. Develop appropriate strategies.	60%
4. Can U.S. harvesters/processors be cost competitive with foreign producers and hold their own vis-a-vis expanded markets in the U.S. and foreign products in export markets?	57%
5. The Alaskan salmon market is being challenged by the Norwegian Atlantic salmon and this will increase. Also, the public perception of the quality of Alaskan salmon is still low. The best method of addressing these problems is to increase the quality of our products which will make marketing easier.	56%
6. Work at long-term planning rather than quick fixes.	53%
7. Develop transportation/storage/labor infrastructure to reduce the cost of U.S. processing and access to U.S. market.	53%
8. Management of fishery resources with combined elements of biology and economics. The relationship of biological management and economic utilization of fishery resources must be brought into accord in policy making.	52%
9. Will U.S. producers exhibit adequate entrepreneurship and foresight to develop products and marketing strategies which will lead to expanded sales? Growth is essential to ensure full exploitation of our resources by U.S. firms.	51%
10. Will Alaska with the major share of salmon, groundfish, and shellfish production habitat, i.e., supply, take its equitable market share on the world seafood markets?	49%
11. Quality standards similar to the meat industry should be adopted. Products should be graded and the grading should be enforced both on fish delivery and finished products to develop a reliably high standard for U.S. products.	47%
12. What will be the impact of worldwide salmon farming and ranching on the Alaskan salmon industry?	46%
13. To raise the per capita consumption of fish by influencing children and adults on the merits of eating seafood. Develop seafood eating habits.	45%

TABLE 2.1
(Continued)

Important Issues or Questions Facing the Industry in the Next 20 Years.

PERCENTAGE OF PANEL SELECTING EACH ISSUE AS VERY IMPORTANT	
14. Fleet management. Without developing and implementing some form of property rights system in the fishing industry, economic profits will continue to be dissipated in capital investments. Fleet management strategies can also be used to improve the marketability of fish.	44%
15. We need to establish positive incentives to the processing industry to improve technology allowing market expansion and innovation.	42%
16. Better and more general solutions to the common property problem particularly in groundfish and shellfish operations.	42%
17. We should give serious thought to profit oriented ranching and farming in Alaska.	41%
18. Development of marketing oriented rather than production oriented attitudes by domestic seafood companies.	41%
19. How can products from shore-based processors be cost competitive on the world market?	40%
20. Supporting and maintaining university and federal educational and research facilities and staffs.	40%
21. Long-term financing available at an interest rate that would allow the U.S. fishing industry to compete with imports.	39%
22. Upgrading of major seafood ports to provide adequate ice and cold storage facilities; fish waste handling, shipping, and air freight facilities; and boat repair and dock facilities.	39%
23. Management needs to insure that stock exploitation confers economic benefits to society at large.	38%
24. To what degree will foreign countries be permitted to catch in U.S. waters? Will the U.S. Government use foreign quotas as a bargaining tool in U.S.-foreign relations?	37%
25. There is an increasing need for adequate information systems (particularly as international trade increases) so that entrepreneurial abilities can exploit market opportunities.	36%
26. The exchange rate of the dollar must be dealt with.	36%
27. Agreement between fishing nations on the sharing of trans-boundary stocks and effective enforcement of such agreements.	36%
28. An aggressive, fully funded marketing and promotion program for Alaska seafood products must be adopted for the next ten years.	34%

Selected Potential Developments in the Seafood Industry in the Next 20 Years.

The future of the U.S. seafood industry is affected by developments outside its borders and, thus, outside its direct control. By having the panelists indicate the probability of occurrence of selected global and national developments, an overall context for guiding our future inquiries was produced. Sixteen potential developments were given and the panelists used a six-point scale to rate the likelihood of occurrence of the development by the year 2000. The panel also rated their level of expertise for answering each of the 16 potential developments. The respondents that indicated a high level of expertise are separated out on Table 2.2 and labeled as "experts only." The "experts only" tend to confirm the general panel's responses.

Panelists confirm that trends which are apparent today will continue into the 20 year future (T2.2,#6,9,11). The fact that a majority of panelists feel the carrying capacity of the North Pacific for ocean reared salmon will be reached by the turn of the century has interesting biological, economic, and political implications which are explored further in Chapter 3 (T2.2,#4). Most of the potential developments rated by the panel as "probable" or "very probable" are positive for the U.S. seafood industry.

TABLE 2.2

Probability of the Occurrence of Selected Potential Developments in the Industry in the Next 20 Years.

POTENTIAL DEVELOPMENTS		Very Improb- able (0-20%)	Improb- able (20-40%)	Either Way (40-60%)	Probable (60-80%)	Very Probable (80-100%)	No. of Panelists
1. A Pacific Rim Common Market established.	ALL EXPERTS ONLY	29% 53%	45% 20%	13% 20%	11% 7%	2% 0%	84 15
2. There is a dramatic increase in "pro- tectionism" in world trade.	ALL EXPERTS ONLY	3 4	28 25	40 50	25 13	4 8	93 23
3. Pen-reared (farmed) salmon will largely displace "caught at sea" salmon in the white tablecloth restaurant and European smoker markets.	ALL EXPERTS ONLY	5 7	14 10	28 26	33 33	20 24	94 42
4. The maximum sustainable production and yield of ocean reared (wild stocks and hatchery releases) salmon is reached in the North Pacific.	ALL EXPERTS ONLY	12 18	23 28	11 5	40 31	14 18	92 39
5. Japan will dramatically reduce imports of U.S. salmon by meeting demand through domestic production.	ALL EXPERTS ONLY	12 12	40 39	24 21	16 14	12 14	95 41
6. Europe will dramatically reduce imports of U.S. salmon by meeting demand through domestic production.	ALL EXPERTS ONLY	11 11	11 6	39 25	22 33	17 25	94 36
7. Third world countries will become major markets for U.S. salmon.	ALL EXPERTS ONLY	26 33	45 46	16 6	11 9	2 6	96 33
8. Third world countries will become major markets for U.S. groundfish.	ALL EXPERTS ONLY	6 7	23 19	20 19	35 26	16 29	96 31
9. Alaska becomes the principal supplier of U.S. groundfish.	ALL EXPERTS ONLY	4 5	13 21	19 5	37 32	27 37	94 43
10. The Jones Act is repealed or modified to allow purchase of foreign vessels and/or use of foreign labor for fishing and processing in the U.S. Fisheries Con- servation Zone.	ALL EXPERTS ONLY	25 37	32 33	25 26	14 0	4 4	88 27
11. U.S. fishermen and processors completely displace foreign effort in the U.S. FCZ.	ALL EXPERTS ONLY	5 4	21 14	21 18	27 21	26 43	94 49
12. A futures market for U.S. seafoods is developed.	ALL EXPERTS ONLY	19 25	29 15	18 15	22 20	12 25	85 20
13. U.S. export trading companies begin trading substantial quantities of sea- food on world markets.	ALL EXPERTS ONLY	2 0	16 22	38 26	29 22	15 30	87 23
14. The world fisheries harvest, exclusive of aquaculture, reaches its maximum sustainable level.	ALL EXPERTS ONLY	9 13	20 10	17 16	28 19	26 42	96 31
15. Privately-owned salmon ranching operations largely displace publicly financed hatcheries in the U.S.	ALL EXPERTS ONLY	6 10	51 60	24 10	14 13	5 7	94 30
16. The domestic common property salmon fishery is largely replaced by privately-owned operations and automated harvesting facilities.	ALL EXPERTS ONLY	29 43	38 26	17 13	11 10	5 8	95 39

(R1-Q:1-16; average n = 95)

Impediments to the Development of Alaska's Fishing Potential.

A primary opportunity for developing Alaska's renewable natural resource base in the next 20 years lies in fisheries products. More specifically in those species where the resource base has not yet been fully exploited. For all practical purposes halibut, herring, and shellfish are now being harvested at their maximum sustainable levels. Given a 20-year time horizon, the greatest opportunities for growth in seafood production appear to be in salmon, groundfish, and latent species such as mollusks.

With this background information as a context for their response, the panelists were requested to state the major impediments to the development of Alaska's fisheries potential. In Round 2, the panelists were requested to rate the impediments they submitted in Round 1 using the 4-point importance scale. Table 2.3 gives a breakdown of the impediments that were ranked as "very important" by the panel.

Most of the impediments to development of Alaska's fisheries potential state the obverse of the important issues ranked in Table 2.1. Impediments which were not addressed in the Important Issues Section are:

- o Fierce competition from foreign groundfish products in the domestic market.
- o Attempt to structure industry to perceived social demands rather than sound economic strategies.
- o A stagnant industry structure which has not changed over time (i.e., fishermen vs. processors).
- o Finances: most processors are in financial trouble and don't have cash available to finance new ventures.
- o Lack of U.S. government response to infant industry status even though foreign firms are clearly subsidized.

TABLE 2.3

Panel Ranking of the Major Impediments to the
Development of Alaska's Fisheries Potential.

PERCENT OF PANELISTS SELECTING EACH ISSUE AS VERY IMPORTANT	
<u>IMPEDIMENTS SELECTED BY THE PANEL</u>	
1. High cost of domestic processing.	44%
2. Fierce competition from foreign groundfish products in the domestic market.	39%
3. Technology of catching, processing, and storage needs to be upgraded to be competitive with the world market.	39%
4. Inadequate domestic and foreign market development.	37%
5. Low level of quality control.	32%
6. Lack of product standards, grading, and pricing by quality grade and final product inspection.	32%
7. Lack of integration between market identification and promotion and production (harvesting and processing). Need to work backward from outlets, not forward from production.	30%
8. Lack of support services and infrastructure in Alaska.	30%
9. Attempt to structure industry to perceived social demands rather than sound economic strategies.	27%
10. A stagnant industry structure which has not changed over time (i.e., fishermen vs. processors).	27%
11. High dollar entry and conversion costs to enter the groundfish industry.	26%
12. Finances: most processors are in financial trouble and don't have cash available to finance new ventures.	25%
13. Lack of marketing expertise.	24%
14. Lack of the development of effective licensing regimes which would discourage excess investment in harvesting and encourage productive investment in stock enhancement.	23%
15. Lack of U.S. government response to infant industry status even though foreign firms are clearly subsidized.	21%
16. Lack of a system acceptable to the industry that allows some property rights to be acquired so that fishing can become a viable long-term investment opportunity.	21%
17. Lack of State investment in research and development.	21%

(R2-Q:5.1, average n = 70)

Areas of Comparative Advantage in World Seafood Markets for Exploitation by U.S. Producers.

In Round 1, the panelists were asked to describe what areas of comparative advantage U.S. producers could exploit in the competitive world seafood markets of the future. They were to take into consideration the recent introduction of pen-reared salmon into international markets and the planned North Pacific hatchery releases of 11 billion salmon fry referred to in Chapter 4 of this report. Several common themes emerged from an analysis of the panel responses. In general, the panelists referred to the abundance of U.S. fishery resources (groundfish, salmon, and shellfish stocks), access to markets (especially a relatively unexploited domestic market), and technological "know how" as three areas of comparative advantage for U.S. producers to exploit. A synopsis of panel responses is given in Table 2.4.

TABLE 2.4

Areas of Comparative Advantage in World Seafood
Markets for Exploration by U.S. Producers

Summarized Panel Comments

- o The greatest opportunities are in groundfish - individually frozen cod fillets for fast food restaurants.
 - o The low price of surimi products should encourage domestic consumption.
 - o Alaska can market large volumes of pink and chum salmon at a low price.
 - o U.S. producers haven't exploited the domestic market where there is greatest advantage and room for expansion.
 - o For all products, it isn't the product itself that is competitive, but price. To gain a comparative advantage, we need to sharpen our fishing and processing costs. If the price is right and quality consistent, we can sell most anything.
 - o Our comparative advantage in salmon markets is the relative abundance of the resource. Pen-reared salmon which are fairly small and used for fresh or fresh like products will not be a serious competitor to reds; the market for chums is increasing in Europe; pinks are best canned, but the domestic market for frozen is increasing; coho would be hardest hit by pen-rearing, but there is a strong recreational demand; and Kings enjoy a strong domestic demand.
 - o U.S. export of seafood products has been uniquely successful on species unavailable elsewhere in the world or produced at lower prices than elsewhere, i.e., salmon, King and tanner crab, bait squid, black cod. Control of these resources is the key.
 - o Develop the domestic market for pollock as a high quality substitute for cod in fast food outlets and supermarkets.
 - o Groundfish production by foreign fleets and joint ventures which are presently part of TALFF are being phased out. As foreign fleets become older they will probably not be replaced, so U.S. fishermen/processors will be able to fill their domestic and export markets.
 - o The U.S. industry has shown it can catch groundfish cheaper than the foreigners can. Development of processing technology would promote domestic processing to where it would become a comparative advantage.
 - o Alaska has a tremendous advantage of site availability for salmon ranching/farming.
-

(R1-Q:D3, n = 97)

CHAPTER 3

INTERNATIONAL DEVELOPMENT OF SALMON AQUACULTURE

- o Implications of the Potential Release of 11 Billion Salmon Fry into the North Pacific by the Year 2000.
- o Implications of the Increasing Japanese Coastal Salmon Catch and Declining High Seas Salmon Catch for the U.S. Salmon Industry.

PRINCIPAL RESULTS

There is insufficient factual data available to accurately predict the biological implications of the release of 11 billion salmon fry into the North Pacific by the year 2000.

The major political implication of the release of 11 billion salmon fry is that existing regimes will predominate within the FCZ and greater competition will occur outside the FCZ and in nonterminal interception areas.

The major economic implication of the release of 11 billion salmon fry is that there will be a long term increase in the supply of pink and chum salmon which will probably result in a more stable supply, lower price, and greater consumer demand.

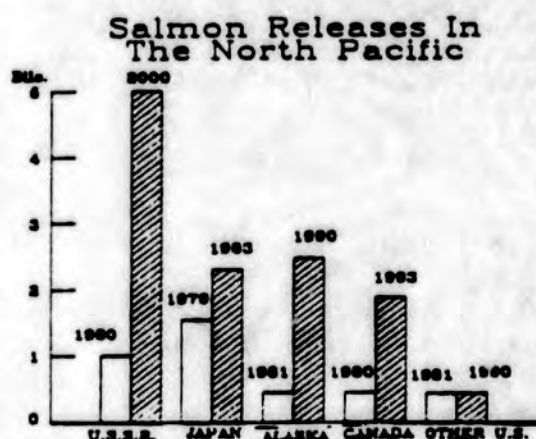
The significant implications of the increasing Japanese coastal salmon catch and declining high seas catch for the U.S. salmon industry are that the Japanese import demand for red salmon will increase (thus U.S. exports should increase), and that the U.S. salmon market must be further expanded to compensate for the loss of Japanese import of the low valued salmon species (i.e., chum).

Salmon aquaculture has expanded the supply of fish in the North Pacific and there is concern that a serious oversupply could occur. To obtain the panelists' views on this issue, we formulated a question that created a hypothetical situation, then requested the panel to react to this "what if" situation. The purpose here was to create a description of the future that is considered a plausible if not probable reality in the future. The panel was requested to describe the impacts of this possible future reality.

The intent of the second question in this section concerning the Japanese coastal and high sea salmon catches is based on a projection from historical trends into the 20 year future. For both of the questions in this section, the source data received two evaluations by the panel. Specifically, the data which was rated as valid or reliable on the validity scale by 66% or more of the panel was evaluated once. The data that was rated valid or reliable by less than 66%, but more than 40% of the panel at the first rating stage (Round 2) was resubmitted for rating by the panel in Round 3. The purpose the second stage of rating was to discover whether the panel would change their original response due to the insights they gained by reviewing the complete panel's responses and the panel's ratings.

Implications of the Potential Release of 11 Billion Salmon Fry into the North Pacific by the Year 2000.

Japan is the world's largest producer of hatchery salmon. It is estimated that between 70% and 80% of the salmon fry descending Japanese rivers are hatchery raised. The U.S., U.S.S.R., and Canada have also embarked on ambitious hatchery programs as shown in the accompanying graph.* If all of the planned releases materialized (which is unlikely), there could potentially be 11 billion salmon fry released throughout the North Pacific by the year 2000.



The panel was given the factual information above in order to provide a common base of information for answering the following question. The panelists were requested to explicate the biological implications of the projected releases; the political implications of the hatchery plans in terms of future shares of ocean rearing grounds and the economic implications of the projected releases. The group's self-rated level of expertise for this subject area was 49% high expertise, 29% medium expertise, and 22% low expertise (n = 87). In Round 2 and Round 3, panelists rated the relative validity of other panelists' responses using the six-point validity scale described in Chapter 8. The results from the panel rating are given on Table 3.1. Note that panel members who indicated they had a low level of expertise for this question (on Questionnaire #1) have been excluded from the table data.

*Alaska Fish Tales and Game Trails, Spring, 1982, page 35.

There was general agreement among panelists that the biological implications of these projected hatchery releases cannot be accurately predicted until more is known about environmental factors affecting salmon mortality on the high seas (T3.1,#2). The carrying capacity of North Pacific Ocean feeding grounds and the interaction between North American and Asian salmon stocks were frequently cited as key unknown variables. A significant minority of the panelists felt that the impact of hatchery production has been vastly overrated in comparison to natural runs (T3.1,#10). Several stated that hatchery runs (at least in North America) can contribute only marginally (one panelist of high expertise in this area estimates perhaps 10 - 15%) to the overall harvest, even during poor production years. The species and timing of releases were also cited as important variables when considering biological implications (T3.1,#9).

The major biological concerns expressed by panelists were that such massive hatchery releases could replace natural runs, making the gene pool more homogenous, and thereby increasing the chances for disease and epidemics (T3.1,#8). Several panelists thought that overall harvest levels would fluctuate dramatically as hatchery programs come to fruition, while a majority felt that the net result would be an overall long-term increase in the supply of salmon - especially pinks and chums which are the easiest and most economical species to produce (T3.1,#6). Several panelists, with high expertise in this area, cited specific signs of biological stress which would occur before the carrying capacity of North Pacific feeding grounds is reached. These include smaller average adult size, increased mortality in juvenile and estuary rearing grounds, diminishing return/release ratios, and disruptions in the food chain (i.e., declines in herring stocks or unusual increases in numbers of marine mammals) (T3.1,#4,5,7).

TABLE 3.1

Biological Implications of the Release of 11 Billion Salmon Fry
Into the North Pacific by the Year 2000.

Percentage of Panelists Selecting Each Assertion as Valid or Reliable*	
<u>PANEL ASSERTIONS</u>	
1. Salmon stocks will not increase proportionately to projected releases.	82%
2. There is insufficient factual data available in order to reliably predict the biological implications of the projected releases. In order to predict, the following information must be known: the carrying capacity of ocean forage grounds, nature of mortality processes, the interaction between natural and hatchery stocks, environmental factors, hatchery techniques, and species and timing of releases.	81%
3. The impact on natural stocks could be severe if harvest is not carefully segregated between wild and hatchery stocks (i.e., greater emphasis placed on "terminal" harvest of hatchery runs).	80%
4. Juvenile rearing grounds have a finite holding capacity and will result in increased competitive pressure on other species (e.g. herring).	80%

TABLE 3.1
(Continued)

Biological Implications of the Release of 11 Billion Salmon Fry
Into the North Pacific by the Year 2000.

Percentage of Panelists Selecting Each Assertion as Valid or Reliable*	
PANEL ASSERTIONS	
5. Localized areas (e.g. estuaries, near shore feeding grounds) will be stressed before the carrying capacity of the open ocean is reached.	77%
6. There will be increased concentration on the most cheaply raised species (i.e., pinks and chums).	70%
7. The overall size average will become smaller with larger returns.	51%
8. The gene pool will become more homogenous and thus more susceptible to disease and environmental changes.	44%
9. The timing and species of hatchery releases need to be coordinated internationally to avoid overburdening the seasonal carrying capacity of feeding grounds.	37%
10. Effect will be minimal. Hatchery stocks would occupy only a small fraction of the ecosystem compared to natural stocks.	26%

*The validity ratings of panelists that indicated a low level of expertise for this question have been excluded from the table.

(R2-Q:1.1; average n = 83)

(R3-Q:1.1; average n = 44)

Responses concerning the political implications of projected hatchery releases generally were divided into short-term issues of immediate or near future importance and long-term implications if and when the carrying capacity of North Pacific Ocean rearing grounds is reached. In the near term, the most important issue appears to be the high seas salmon fishery (T3.2,#2,5). Most panelists agree that existing regulatory regimes will predominate within the 200 mile Fisheries Conservation Zone (FCZ) into the foreseeable future (T3.2,#1). There is strong sentiment among respondents that some type of international agreement is necessary to curtail high seas salmon interceptions for investments in hatchery production to be worthwhile (T3.2,#3). The most often mentioned vehicle for controlling the high seas salmon fishery is to link foreign groundfish quotas within the Alaska FCZ to high seas salmon harvests.

Long-term political implications center around disputes over harvest levels in nonterminal fisheries, which would require agreements similar to the U.S.-Canada treaty based on the "country of origin principle," and allocation of ocean rearing grounds for hatchery releases as the carrying capacity of the sub-Arctic Pacific becomes imminent. Many panelists felt that if this level were reached, grandfather rights of some sort would be invoked by one or more of the countries involved (T3.2,#3). In any international hatchery releases agreement then, those countries with the largest number of releases out there first would benefit most.

TABLE 3.2

**Political Implications of the Release of 11 Billion Salmon Fry
Into the North Pacific by the Year 2000.**

Percentage of Panelists Selecting Each Assertion as Valid or Reliable*	
PANEL ASSERTIONS	
1. Existing regimes would largely predominate within the 200 mile zone, but greater effort and cooperation will be necessary to manage resources outside the U.S. Fisheries Conservation Zone.	88%
2. If disputes between nations do arise, they will first involve conflict over high seas and nonterminal interceptions.	84%
3. Well before the carrying capacity of the sub-Arctic Pacific is reached in regard to salmon, signs will be evident. Some international agreement would have to be reached like the Canadian/U.S. treaty where stocks are harvested based on the country of origin. Also, grandfather rights, where each nation could claim quotas based on its hatchery contribution, would be sought.	78%
4. The danger is that certain elements in the industry will want hatchery production curtailed in order to boost the market price.	61%
5. There will be continued pressure by some countries to fish the high seas (Taiwan now, China next?). Other than high seas fishing, I can't see any serious implications.	44%
6. Ocean rearing grounds can be shared and effects monitored by following growth rates of natural stocks. If a drop in the growth rate occurs, hatchery production could be curtailed.	41%

*The validity ratings of panelists that indicated a low level of expertise for this question have been excluded from the table.

(R2-Q:1.1; average n = 83)

(R3-Q:1.1; average n = 44)

If the projected hatchery releases cited above actually materialized (there was considerable skepticism among panelists that they would) and the result was a long-term increase in the world salmon supply, the major economic implications cited by respondents were lower prices and declining export markets, particularly for pinks and chums (T3.3,#1,2,4,13). Panelists' conclusions were mixed as to whether the net effect would be positive or negative for the U.S. salmon industry. Many respondents viewed an increased supply of low priced fish enthusiastically as a great domestic marketing opportunity with the potential to reinstate salmon as a cheap staple commodity in the American diet (T3.3,#3,5,9,14). Several respondents cautioned that this would only occur if more popular product forms (such as microwave ready frozen fillets or diet entrees as opposed to traditionally canned salmon) were developed. Another factor mentioned is that

increased industry profitability is dependent on lengthening the production season (by enhancing early and late runs) in order to increase harvesting efficiency and processing productivity (T3.3, #10,11,12). Other panelists forecast a future glut of low quality and low priced salmon on both domestic and international markets which would decrease profits for fishermen and processors (T3.3., #7,15,17). Aggressive marketing and product development appear to be the key differences between the two scenarios.

TABLE 3.3

Economic Implications of the Release of 11 Billion Salmon Fry
Into the North Pacific by the Year 2000.

Percentage of Panelists Selecting Each Assertion as Valid or Reliable*	
1. There will be a long term increase in the supply of salmon, particularly chums and pinks.	89%
2. Most of the effect will be on the pink and chum markets since these are the cheapest species to raise.	89%
3. High volume production which could lead to increased profits at a lower price if accomplished effectively.	84%
4. There will be a decline in price for Alaskan salmon if current marketing strategies are followed.	84%
5. If biological and political problems could be solved, the supply of salmon should become more stable. We would see an increase in inexpensive salmon on the market causing consumer demand to increase.	80%
6. Economic implications depend on the regulatory regime. For example, an increase in fish stocks under an essentially open access regime will not increase the net productivity of the fishery.	78%
7. If the U.S.S.R. carries through with its projected releases (5 billion by 2000), the U.S., Canada, and Japan could lose some of their European market shares.	76%
8. The market price will be lower causing demand to increase.	71%
9. This could be a tremendous marketing opportunity. There is a need for a lower ex-vessel price, lower processing costs, and lower consumer price.	64%
10. The need in Alaska is to enhance the earliest and latest runs so as to lengthen the harvest and processing seasons thus spreading fixed costs over more product.	62%
11. Fishermen can increase their CPUE (catch per unit of effort) and thus make as much or more at a lower ex-vessel price.	61%
12. Processors will have a more stable supply and, therefore, a more efficient operation.	54%

TABLE 3.3
(Continued)

Economic Implications of the Release of 11 Billion Salmon Fry
Into the North Pacific by the Year 2000.

Percentage of Panelists Selecting Each Assertion as Valid or Reliable*	
13. Export demand will decline.	50%
14. Price will decline as salmon returns to being a staple cheap protein commodity as pre-WWII.	49%
15. The more efficient harvesting sectors in the U.S.S.R. and Japan will reduce the price of pinks and chums which will severely affect U.S. fishermen.	48%
16. No effect on the red salmon market since these are difficult and costly to rear in hatcheries. They aren't native to Japan, and the U.S.S.R. doesn't have the lakes to support more than a limited supply.	47%
17. Prices will decline as supply increases. As this happens, there will be a demand for curtailing the ocean rearing programs.	37%

*The validity ratings of panelists that indicated a low level of expertise for this question have been excluded from the table.

(R2-Q:1.1; average n = 83)

(R3-Q:1.1; average n = 44)