SCOMM

#48:7

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

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UNITED FISHERMEN OF ALASKA

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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:

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

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

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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 lets 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 on 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 there 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.

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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.

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
Olé Mathisen, U of A
Stan Moberly, ADF&G
Dick Nevé, 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:

- SOCIAL AND ECONOMIC OPPORTUNITIES THAT EXIST FOR ONE FORM OF AQUACULTURE, SALMON FARMING; AND

- 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.

- THE CURRENT MARKET PRICE FOR FARMED SALMON IN HOUSTON OR LOS ANGELES IS IN EXCESS OF $4.00 PER POUND.

- 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:

- UNDERTAKE EFFORTS TO INFORM THE PUBLIC OF AQUACULTURE OPPORTUNITIES AND ISSUES.

- CONDUCT STUDIES RECOMMENDED BY THE AQUACULTURE ADVISORY COMMITTEE TO ASSESS THE EFFECTS OF SALMON FARMING AQUACULTURE ON THE COMMERCIAL FISHING INDUSTRY; AND

- 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:

- AQUACULTURE CREATES NEW PRODUCT FORMS AND SUPPLIES TO MEET GROWING CONSUMER DEMAND FOR HIGH QUALITY AQUATIC FOOD PRODUCTS, INDUSTRIAL MATERIALS, PHARMACEUTICALS AND ENERGY.

- AQUACULTURE OFFERS ONE OF THE SINGLE GREATEST NEW OPPORTUNITIES TO DEVELOP AND DIVERSITY STATE AND LOCAL ECONOMIES AND CREATE NEW JOBS.

- THE RESPONSIBILITY FOR COMMERCIAL AQUACULTURE FARMING WILL REST PRIMARILY WITH THE PRIVATE SECTOR EXCEPT FOR ENHANCEMENT OF AQUATIC PRODUCTS FOR COMMON PROPERTY HARVEST.

- 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.

- 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, PRODGENY 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.

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

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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.

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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;

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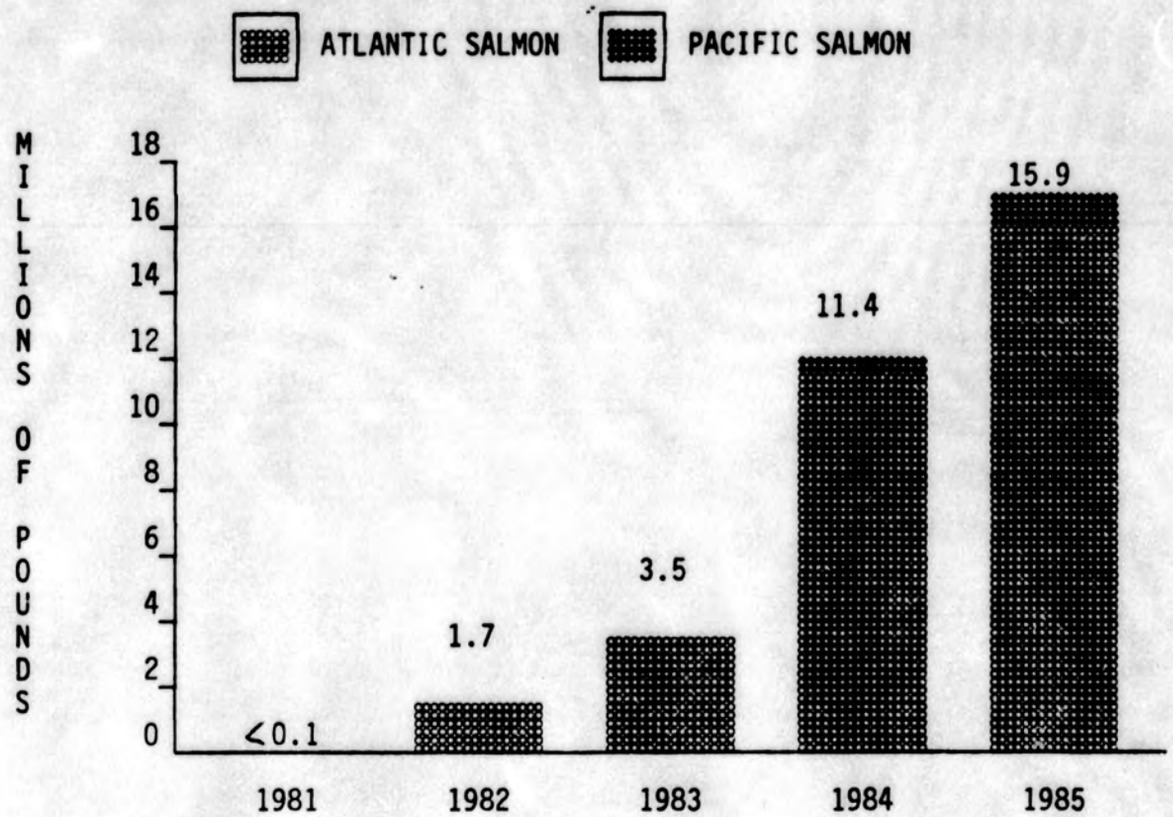
cc: Fisheries Mini-Cabinet Staff
Cass Parsons, United Fishermen of Alaska
Rick Lauber, Pacific Seafood Processors Association

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 Kingdon	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.



IMPORTS OF FARMED SALMON INTO U.S. MARKETS

by country
by species

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
Governor

Overseas Fishery Cooperation Foundation

By _____
Toshihiko Ohba
President

Japan Fisheries Association

By _____
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 COMMERCIALLY 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 NOWTHWEST 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 FFASIBLE IN ALASKA UNDER CURRENT CONDITIONS, HOWEVER, COST CONTROL FARM EFFICIENCY AND A FAVORABLE REGULATORY STRUCTURE ARE ESSENTIAL TO MAINTAIN PROFITABILITY.

- THE CURRENT MARKET PRICE FOR FARMED SALMON IN HOUSTON OR LOS ANGELES IS IN EXCESS OF $4.00 PER POUND.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

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

- 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, HOWVER, 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.

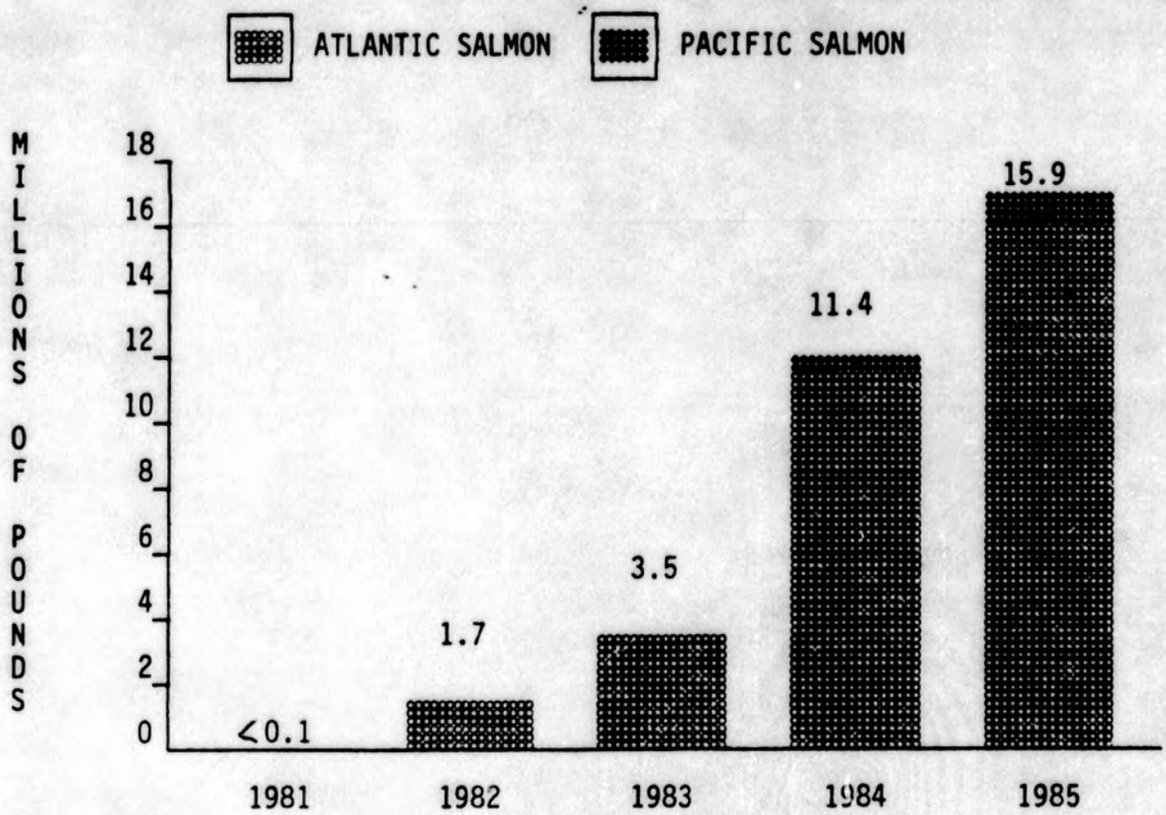
3. PROVIDE SIGNIFICANT NEW SMALL BUSINESS OPPORTUNITIES TO OUTLYING COMMUNITIES; AND

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.



IMPORTS OF FARMED SALMON INTO U.S. MARKETS

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 Kingdon	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 sidestepped 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 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.

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."

STATE OF ALASKA
THE LEGISLATURE

POUCH V - STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3800

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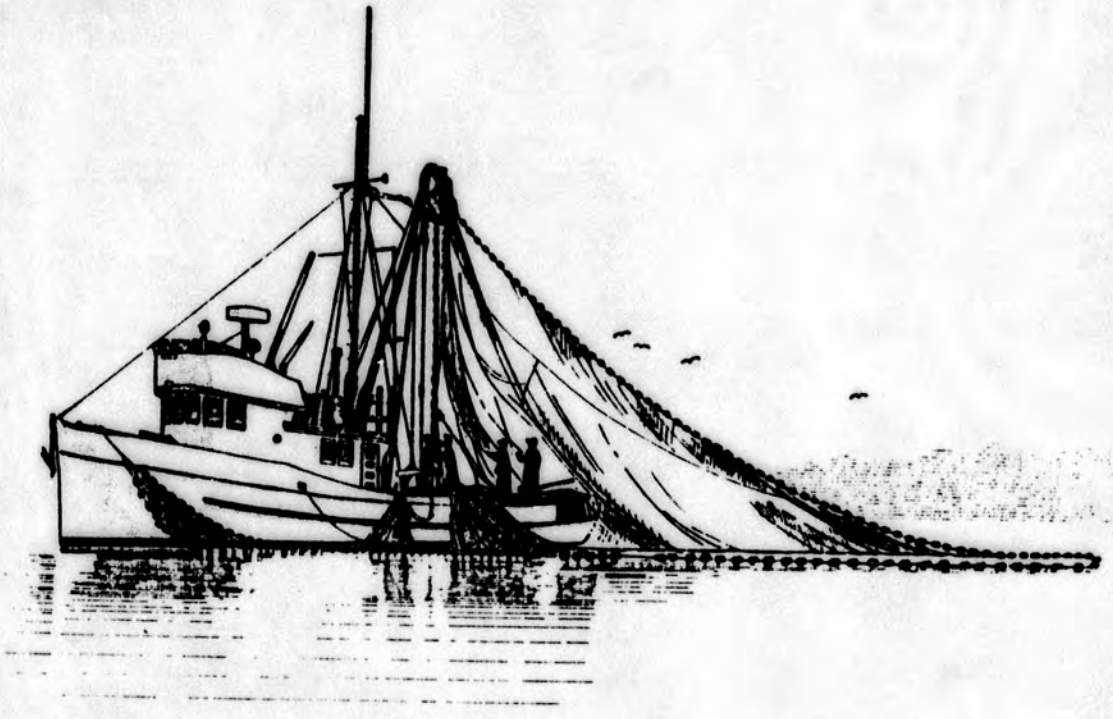
May, 1986

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



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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
Economic Development
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.

Brian Allee
Andrew Alley
Lee Alverson
Don Amend
Nels Anderson
Phillip Appleyard
Clinton E. Atkinson
Jerry Babbit
R. C. Baker
Don Bevan
Martha Blaxall
Jim Branson
Alec Brindle
Alvin Burch
Bud Burgner
Chris Carter
Larry Cotter
James A. Crutchfield
Don DeVoretz
Bill Dietrich
Lauren Donaldson
John Doyle
Oscar Dyson
Ralph Eluska
Thomas R. Eyestone
Captain Barry Fisher
Jay Gage
Doug Gordon
Abby Gorham
Murry Hayes
Jeff Hendricks
Jack Hice
Roy Jackson
Keith B. Jefferts
Tim Joyner
Jon Karpoff
Albert S. Kawabe
Frank Kawana
Curt Kerns
Ernie Kolhase
Tsune Kusakawa
Bert Larkins
Doug Larson
Rick Lauber
Patricia A. Lavin
John Lecture
Peter Leitz
Rebecca J. Lent
Biing-Hwan Lin
Jon Lindbergh
Rae MacFarland
Byron Mallott
John Martin
Ole Mathisen
Jay Matsen
Richard McCormick
Bob Morgan
Eric Norgaard
Dick Pace
Steven Pennoyer
Walter Pereyra
John Peterson
Rick Ranta
Bruce Rettig
James A. Richardson
Arnold Roseman
Don Rosenberg
Carl Rosier
William F. Royce
Edward A. Ryan
Robert Ryan
Teruji Sakiyama
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.

- 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 outlook. Define and develop the demand potential for seafoods, understand the seafood consumer, and long-term trends in consumption.

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(Continued)

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- "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.

- 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).

- 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 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).

- Alaska needs salmon farming to open up year-round markets for high quality fish, assuming that pen-rearing is technically and economically feasible.

- 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.

- 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.

- 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.

- Pen culture should be encouraged. The State should allow a pen farming network of size, scope, and marketing operations similar to Norway.

- "Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- The major factors that affect the competitiveness of the domestic processing industry are: foreign labor costs, exchange rates, trade barriers and foreign government subsidies.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

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* Linestone, 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 insufficent 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

- Important Issues Facing the North Pacific Seafood Industry in the Next 20 Years.
- Selected Potential Developments in the Seafood Industry in the Next 20 Years.
- Impediments to the Development of Alaska's Fishing Potential.
- 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 hatchey 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.

ISSUES SELECTED BY THE PANEL	PERCENTAGE OF PANEL SELECTING EACH ISSUE AS VERY IMPORTANT
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%

(R2-Q:6.1, Sec. A-K, average n = 72)

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

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

IMPEDIMENTS SELECTED BY THE PANEL	PERCENT OF PANELISTS SELECTING EACH ISSUE AS VERY IMPORTANT
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

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

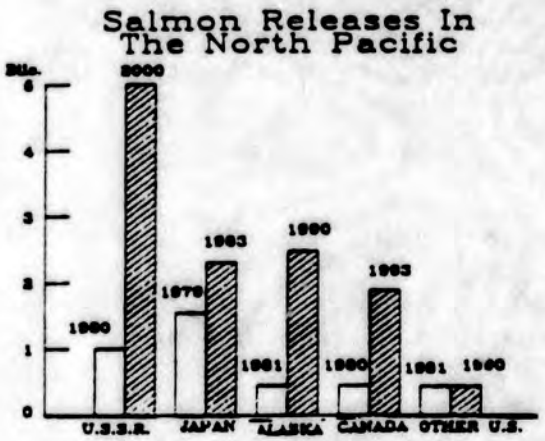
The significant implications of the increasing Japanese coastal salmon catch and declining high seas catch for the U.S. salmon industry are that the Japanese import demand for red salmon will increase (thus U.S. exports should increase), and that the U.S. salmon market must be further expanded to compensate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

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*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.

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
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.

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
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%

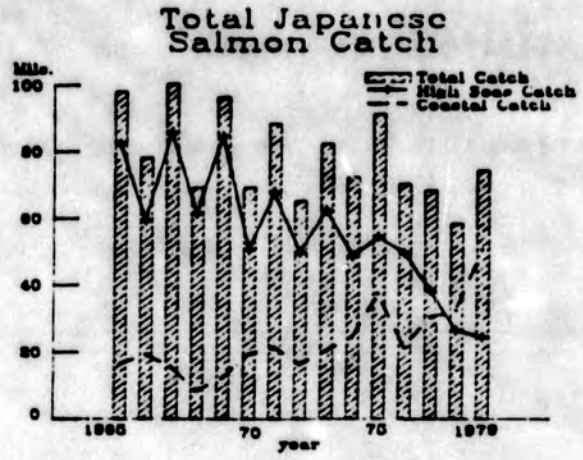
*The validity ratings of panelists that indicated a low level of expertise for this question have been excluded from the table.

(R2-Q:1.1; average n = 83)
(R3-Q:1.1; average n = 44)

Implications of the Increasing Japanese Coastal Salmon Catch and Declining High Seas Salmon Catch for the U.S. Salmon Industry.

The effectiveness of the Japanese hatchery programs can be seen from the graph below.* The high seas salmon catch has decreased significantly since the early 1970's, due mainly to international agreements to restrict the high seas harvest. During the same period, the Japanese coastal catch (consisting mainly of hatchery raised adult chum salmon) has increased enough to equal the previous 15 year average.

The panelists were requested to review the factual information given below, then were asked to state the implications of the trend in the increasing Japanese coastal catch and declining high seas harvest for the U.S. salmon industry in the next 20 years. They were additionally instructed to identify species in their responses.



There was a high degree of consensus among the panelists' responses to this question. Japanese demand for reds is likely to continue to increase due to declining high seas catches (T3.4,#2,4,7,12). This could be moderated somewhat in the short term by the strength of the dollar (T3.4,#14). Hatchery produced pinks and chums are not close substitutes for reds in the Japanese market (T3.4,#5). Therefore, export sale of these species (pinks and chums) and sujiko (salmon roe) will probably weaken and prices will likely stay low (T3.4,#9,10,15,16). Most panelists stated that alternative domestic markets need to be aggressively developed for the price of pinks and chums to increase significantly (T3.4,#6).

*Alaska Fish Tales and Game Trails, Spring, 1982, p. 36.

TABLE 3.4

Implications of the Increasing Japanese Coastal Salmon Catch
and Declining High Seas Salmon Catch for the U.S. Salmon Industry.

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
1. These trends suggest a continuing shake out of the U.S. industry with only those having a special market niche, financial strength, and sustained profits remaining.	91%
2. Japanese salmon imports are 70 - 75% reds. With a decreasing high seas catch, demand for reds will increase.	88%
3. This implies that we must solve institutional questions related to salmon ranching if the U.S. is to compete effectively with Japan.	84%
4. The more significant trend for U.S. exports to Japan is the decreasing Japanese distant water catch.	84%
5. Chums and reds aren't good substitutes for one another in the Japanese market.	84%
6. The number one implication is to develop the U.S. salmon market.	76%
7. The Japanese coastal catch consists mainly of chums and pinks while the high seas catch concentrates on reds. Therefore, there would be negative effects on U.S. export markets for the low value species while the higher valued species would only be marginally affected, if at all.	74%
8. These trends will force U.S. producers to market fish elsewhere. European demand will be met by Norway and the U.S.S.R. One alternative will be the Third World which cannot absorb much at today's prices. The king and coho market will continue to be strong in the U.S. at reduced prices. Sockeye looks good in the frozen domestic market. Also, there will be increased domestic consumption at lower prices for pinks and chums.	74%
9. There will be a decline in export markets for chums.	71%
10. Alternative markets for salmon roe must be found.	70%
11. The Japanese per capita demand for all fish products will decline in the next 20 years due to changes in tastes and preferences among the younger generation.	61%
12. The overall Japanese salmon market has increased over the last 20 years and will continue to do so.	58%
13. The Japanese success with hatchery production provides a model to predict economic success of domestic hatchery production.	52%

TABLE 3.4
(Continued)

Implications of the Increasing Japanese Coastal Salmon Catch
and Declining High Seas Salmon Catch for the U.S. Salmon Industry.

	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
PANEL ASSERTIONS	
14. One implication is to develop the overseas market (especially for canned products) in anticipation of a declining U.S. dollar.	50%
15. There will be a decline in the export markets for pinks.	46%
16. The greatest detrimental effect will be on sujiko (salmon roe) exports and not on the export of fish.	40%

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

(R2-Q:1.1, average n = 51)
(R3-Q:1.1, average n = 40)

CHAPTER 4

ALASKA HATCHERY ISSUES

- The Role of Pen-reared Salmon in Alaska's Future.
- Political Implications of Farming Versus Hunting in Alaska Salmon Fisheries.
- Geographical Dislocation of Traditional Fisheries Due to the Distribution of Hatchery Fish.
- Future Changes Needed for Alaska Hatchery Programs to Maintain Competitiveness.
- Types of Cost Recovery for Privately Held Hatcheries.
- Expected Net Profits to Producers.

PRINCIPAL RESULTS

Alaska needs salmon farming to open up year-round markets for high quality fish, assuming that pen-rearing is technically and economically feasible.

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.

Salmon pen-rearing should be profit motivated to attract investors, but the fishing lobby who view pen-rearing as competition will exert political pressure on the Legislature to prevent private for profit pen-rearing.

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.

Pen culture should be encouraged. The State should allow a pen farming network of size, scope, and marketing operations similar to Norway.

"Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons.

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.

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.

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 efficienty (CPUE) as long as limited entry is in place.

The Role of Pen-reared Salmon in Alaska's Future.

Norway has developed a successful salmon farming industry. Production of pen-reared salmon exceeded 40 million pounds in 1984 and is expected to at least double by 1986. Other European countries are also entering this industry. Alaska salmon could largely be displaced from European markets for fresh and fresh/frozen salmon by 1990, and competition for U.S. markets is likely to intensify. Given these developments, we requested the panelists to describe the role that they foresee for pen-reared salmon in Alaska's future. In Round 2, panelists responded to an open ended format. For Round 3, the panelists' responses were fed back as a set of assertions. They were requested to rate the validity of each assertion using the six point validity scale.

A majority of the panelists thought Alaska should try to develop some type of salmon pen culture program at least on an experimental basis (T4.1,#3,6,7). The species most commonly proposed for farming were Kings, cohos, Atlantic salmon, and steelhead (T4.1,#14,15). Most respondents stated that a year round supply of high quality fresh salmon would be a great help in developing high priced domestic specialty markets (T4.1,#1). New fisheries could also be developed to supply feed to farms. Fish byproducts from processing plants could be converted into feed to add value to existing production (T4.1,#11). Some panelists, with a long-term outlook, said that the era of the "fisherman farmer" is beginning, where fishermen harvest wild and hatchery stocks during the regular season and harvest farmed fish in the winter (T4.1,#1). For the near term, about a third of the panel thought salmon farming in Alaska will be of minor importance compared to traditional salmon fisheries (T4.1,#9,12).

Panelists taking the opposing view argue that pen rearing in Alaska is too costly and politically unacceptable to fishermen (T4.1,#13). Several noted that the Norwegian program took many years to develop and massive government subsidies. Other negative factors mentioned include labor and capital costs, distance from markets, and lack of local brood stocks (which mature in winter).

Panelists stated that economic impacts on fishermen need to be better understood (T4.1,#2). It should be decided whether to allow large companies to enter or a network of small individually owned farms as in Norway (T4.1,#10). Lease and site arrangements need to be settled (T4.1,#4). Brood stocks need to be located and further biological research undertaken. In addition, questions such as the following were posed. "What about using Atlantic salmon in Alaska? How about eyed eggs from the Southern hemisphere which would have an opposite growth cycle from our fish?" These issues and more need to be thought through according to the panel.

In summary, the panel felt that some type of pilot or experimental pen-rearing program should be attempted. Careful study is needed, however, and an institutional framework needs to be worked out before a more ambitious program is undertaken.

TABLE 4.1

Role of Pen-reared Salmon in Alaska's Future.

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. Alaska needs salmon farming to open up year-round markets for high quality fresh fish. Farmed fish may actually increase the demand for high quality fresh and fresh frozen kings and cohos by assuring a steady supply.	76%
2. Assuming that pen rearing in Alaska is technically and economically feasible, the market effect of competition between farmed and troll caught kings and cohos needs to be better understood.	75%
3. The State should offer experimental permits to fishermen to conduct a pilot program and develop a system of individually owned small farms such as Norway has.	73%

TABLE 4.1
(Continued)

Role of Pen-reared Salmon in Alaska's Future.

	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
4. Depends on government stance concerning leases, culture of Atlantic salmon, and financing of support facilities (i.e., brood stock and disease control).	70%
5. Southeast Alaska enjoys a comparative advantage in shipping costs to the Lower 48 ($.22/lb from Southeast vs. $1.10/lb from Norway). Therefore, we should concentrate on pen rearing salmon for the domestic market.	66%
6. Alaska should get into pen-rearing. It has the great advantage of site availability at least in Southeast and Southcentral Alaska.	60%
7. The development of pen reared salmon farming in Alaska is biologically feasible, but its economic feasibility is doubtful. High production and transportation costs will limit potential.	54%
8. There is absolutely no comparative advantage in North American pen rearing for European markets.	41%
9. Pen rearing in Alaska will be of very little importance compared to natural and hatchery production.	40%
10. Pen rearing by cooperatives composed of small producers would be a viable adjunct to total market development. Pen rearing of Alaskan chinook could potentially exceed or replace troll production.	36%
11. Pen-rearing would open up markets for fish wastes and by-products.	36%
12. For the near future (10-20 years), Alaska should stick to what she does best: harvesting salmon in her waters, not pen raising them.	32%
13. Alaska should not divert public funds into pen-raising and private industry will not find it profitable either.	32%
14. Coho, chinook and steelhead are the only species which should be considered for pen rearing.	29%
15. There are very few places in Alaska where the temperature conditions would be warm enough year round to compete with the growing conditions in Norway.	27%
16. One problem is high production costs for desired species, i.e., chinook and coho. Seasonality of production plus brood stock problems also limit present potential. Atlantic salmon may be Alaska's best bet for pen rearing at present.	23%
17. Pen rearing should be developed along the lines of the "mom and pop" hatcheries in rural areas.	16%

(R3-Q:2.1, average n = 57)

Political Implications of Farming Versus Hunting in Alaska's Salmon Fisheries.

We proposed the following premise to the panel for their response. "Salmon aquaculture will create a new interest group in Alaska salmon fisheries. This new group will possess a farming philosophy which can contribute to conflict with a traditional industry which is based on hunting. Legal and institutional structures for farming and hunting economies are quite different."

In reference to these assumptions, we asked the panelists to tell us what would be the political implications of farming versus hunting to Alaska salmon fisheries. A corollary question also posed was, "Can a salmon industry based on hunting survive with one based on farming?"

Most panelists agree that there need not be any philosophical conflict between "hunters" (fishers), "ranchers" (hatchery owners and operators), and "farmers" (future pen-rearing operations) in the future of Alaska's salmon industry (T4.2,#2). One respondent pointed to the current system of public and privately owned hatcheries that supply salmon to the common property fishery as a successful integration of "hunting" and "ranching" which enjoys widespread political support.

Pen rearing looms as a separate issue however. Many panelists observed that pen reared salmon are generally marketed fresh in the winter and thus fill a different market niche than traditional fresh and frozen products (T4.2,#4). Most respondents felt that fishermen would perceive pen rearing as a threat to their livelihood regardless of the "separate season-separate markets" argument (T4.2,#1). Therefore, any State sponsored pen rearing program may have to be designed to provide direct economic benefits to fishermen to be politically acceptable (T4.2,#3,4,5,6). Several panelists stated that fishermen are the best organized and most politically powerful segment of the salmon industry. Fishermen also have a great amount of political support in rural areas where pen-rearing operations would most likely be located (i.e., Southeast and Southcentral Alaska).

Panelists discribed a wide range of models and options for a State supported pen rearing program. About half of the panel said ADF&G should at least supply smolts and monitor the program (T4.4,#7). The most commonly mentioned ideas were: a fishermen's cooperative approach (as in Japan), a State controlled system of small farms owned by individuals (the Norwegian model), or allowing the private nonprofit associations to begin pen rearing (T4.2,#5). A few respondents commented that since trollers are the gear type whose markets are most affected by pen-reared species, perhaps they should receive some type of compensation or entry preference for issuing permits, licenses, sites, etc., if a pen-rearing program is started.

In general, panelists agree that "hunting," "ranching," and "farming" can and must be successfully integrated if Alaska's salmon industry is to remain competitive in traditional and developing markets. Many in the panel forecast a future salmon industry structure where net fisheries that harvest natural and ranched fish would supply the "low value-high volume" end of the market during the regular season; and farmed fish would predominate in the "high value off season" markets (T4.2,#2).

TABLE 4.2

Political Implications of Farming
Versus Hunting in Alaska Salmon Fisheries

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. Salmon pen rearing must be profit motivated to attract investors. Fishermen view pen-reared salmon as competition and resist aquaculture for profit. This strong fishing lobby will keep political pressure on the Legislature to prevent private for profit pen rearing.	71%
2. There is no reason why hunting and farming cannot be integrated into a single industry. Salmon farming will dominate the high priced fresh market particularly in the off season while hunting and ranching interests will hold the lower priced, high volume end of the market.	70%
3. An integration of the processing and farming sectors seems inevitable. Fishermen must be included to make this politically viable.	68%
4. You must be able to demonstrate some definite advantages to the "hunters" and to the State's economy as a whole. I think you can argue that the two products aren't all that competitive - they serve different market niches so far as pen reared versus wild/ranched fish are concerned.	62%
5. Only some type of fishermen's cooperative approach, where fishermen could fish during part of the year and farm during the remainder (as in Japan), would be politically acceptable.	37%
6. A salmon industry based on hunting can survive with one based on ocean ranching because the benefits of increased adult production are being realized by fishermen. Strict pen rearing will be incompatible unless it can somehow be integrated into the existing institutional structure possibly via fishermen's cooperatives or by allowing private nonprofit aquaculture associations to participate.	36%
7. The interests between hunting and farming may not necessarily be different. This has not been the case in Norway. Limit the farm size and limit farming to individuals by amending the limited entry permit to allow farming by a permit holder.	34%
8. We would not see any basic conflict for years, as Alaska's largest political group is made up of its fishermen. The big problem of DomSea in Puget Sound came from real estate, antipollution forces, and other directions - little opposition from fishermen.	33%
9. Only large corporations such as Weyerhaeuser or possibly Native corporations can afford the capital costs of pen rearing.	24%

(R3-Q:2.2, average n = 57)

Geographical Dislocation of Traditional Fisheries Due to the Distribution of Hatchery Fish.

Experience has shown that successful hatcheries can support major fisheries. We asked the panelists if they foresee changes in the geographical location of major fishing grounds in response to the distribution of hatchery fish.

In response, 38% of the panelists indicated 'Yes,' 33% indicated 'No,' and 29% indicated 'Don't Know' (n = 69). This question also included an open-ended comments section, and the summarized results of the group comments are given in Table 4.3. Few panelists responded to the open-ended portion of this question.

A general trend toward more terminal harvest fisheries is a theme that emerges from all of the salmon hatchery questions posed in this study. This coincides with the consensus reached early in the Delphi process by the panel that mixed stock fisheries should be managed to protect natural runs. Again, there is some skepticism about the relative importance of hatchery production compared to natural production. One panelist pointed out that some geographical movement has already occurred as special season openings are allowed to harvest surplus fish at certain hatchery sites, e.g. Hidden Falls hatchery in Southeast Alaska. This type of geographic dislocation is likely to continue as "new" fish become available through hatchery production. The major implication from this trend to terminal fisheries is more fish of lower quality (pinks and chums in particular). Most traditional fishing grounds will remain unaffected, with some minor changes in localized areas.

TABLE 4.3

Geographic Dislocation of Traditional Fisheries
due to the Distribution of Hatchery Fish

Summarized Panel Comments
o Generally there will be a geographical trend toward more terminal fisheries in response to successful hatchery programs to avoid overfishing of natural runs in areas where natural and hatchery runs mix. Witness the Hidden Falls and Neets Bay terminal fishing areas.
o Except for isolated areas for pinks and chums, most traditional Alaskan fishing grounds are likely to remain unaffected.
o Harvest areas can be tailored by releasing smolts at selected times and sites. These do not have to be coincident with hatchery locations.
o No doubt that "new" fish will change some of the traditional fleet distribution/allocation patterns and already have. In some cases, we have seen relocation of gear within established fishing areas, in others, we will probably see regulatory bodies such as the Board of Fisheries respond to allocation problems by changing local fishing areas. Hatchery location, species, and timing of releases can be a powerful management tool, but in many cases logistical limitations (water sources, construction costs, etc.) will force us to adapt the fishing to the opportunity.

(R2-Q:1.6)

Future Changes Needed for Alaska Hatchery Programs to Maintain Competitiveness.

In 1982, approximately 50% of the salmon eggs taken in Alaska were handled by private, nonprofit hatcheries. At the present time private-for-profit hatcheries, as such, are not allowed in Alaska. Currently three types of hatcheries exist in the State: public hatcheries (funded by tax dollars), private nonprofit hatcheries (PNP's, started by State loans and/or grants and funded by an aquaculture assessment on the ex-vessel value of the commercial catch landed in a particular region, e.g., 3% in Southeast, and the sale of surplus salmon), and so called "Mom and Pop" operations (started with State money and funded by the sale of surplus fish). Surplus fish are defined as fish which have passed through the common property fishery and returned to the terminal area over and above the numbers needed for cohort recruitment. Currently all of these programs are coordinated by the Alaska Department of Fish and Game.

Panelists were requested to give us their views on what type of institutional arrangement, different from that given above, will be necessary to maintain Alaska's competitiveness in future world salmon markets. In Round 1, the panelists responded in their own words. For Round 2, their responses were summarized and fed back as assertions. The panelists then rated the assertions using the six-point Validity Scale. In Round 3, assertions that revealed a lack of consensus of ratings in Round 2 were again fed back in order to possibly produce a greater consensus. Panelists' self-rated level of expertise for this question was 33% high expertise, 29% medium expertise and 38% low expertise (n = 84).

Panelists with high expertise in this area tended to have very strong ideological preferences on the public vs. private ownership issue. Many of the responses are lengthy and complex. As a result, in this section we will establish a general context based on the assertions given on Table 4.4. Other more specific questions about aquaculture programs grew out of panelists' responses to this question and are dealt with in detail later in this chapter.

One theme that recurs in panelists' responses is the realization that future development of the present institutional arrangement is constrained by a diminishing public funding source. Apparently the panel believes the present institutional arrangement will not be adequate for future development (T4.4,#8,14). Most panelists have no quarrel with the State providing funds through loans or grants to set up private for profit or private nonprofit hatcheries, but feel they should become self-sustaining fairly quickly. There is some concern that private sector hatcheries will require continual subsidies.

Panelists strongly agree that ADF&G should continue to manage hatchery runs and perform their regulatory role for the private sector hatcheries (T4.4,#4). Panelists also agree that the ADF&G, Fisheries Rehabilitation and Enhancement Division (FRED), should concentrate on research, distant upriver and sportfish hatcheries and not compete with the private sector for commercial production (T4.4,#12). A number of panelists said that ADF&G currently plays a dual role as regulator and competitor with private (PNP's and PFP's) hatcheries which can produce fish cheaper and more efficiently (T4.4,#10). Several respondents felt that current restrictions on the transfer of eggs by private hatcheries from one region to another are too restrictive (T4.4,#13). In their view, provided they are disease free, eggs should be more widely distributed so that the very earliest and latest runs can be enhanced to lengthen the harvest season (T4.4,#3).

Another concern of panelists, expressed repeatedly throughout the salmon hatchery series of questions, was whether State money spent to build and finance hatcheries might be better used for stock assessment, research, management, or enhancement (T4.4,#1). This question has at least been partially answered by empirical research conducted in tandem with this study by the Alaska Department of Commerce and Economic Development, Office of Enterprise, and ADF&G's FRED Division staff for the Governor's Fisheries Mini-Cabinet Task Force. These studies computed positive benefit/cost ratios for Alaska's private and public hatchery systems. While this research doesn't completely answer the question of where State dollars could be more wisely spent, it does indicate that the current hatchery systems produce more in economic benefits over time than they remove in costs.

In general, panelists' answers indicate they would like to see the State's hatchery systems run on a more businesslike basis (T4.4,#6,8). As one panelist put it, "The nonprofit concept was instituted to protect the salmon industry from the upheaval of too rapid change. It does not promote the best efficiency and innovativeness that a profit motive generates. Alaska should introduce the profit concept to private hatcheries at a deliberate pace or State interests will

fall behind more efficient foreign competition." Various ideas were proposed for consideration including affiliation of PFP's with fishermen's cooperatives, allowing PNP's to begin pen rearing, and giving property rights to private hatcheries for runs developed on barren systems that could be harvested with traps (T4.4,#11). Several panelists urged the State to pursue policies aimed at enhancing both competitiveness and vertical integration in the private hatchery systems (T4.5,#6).

TABLE 4.4

Future Changes Needed for Alaska
Hatchery Programs to Maintain Competitiveness

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
1. Costs should be carefully evaluated to assure 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 enhancement.	88%
2. Salmon stocks should be managed to protect natural runs.	82%
3. "Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons.	75%
4. ADF&G should continue to manage hatchery runs and perform their regulatory role.	72%
5. Pen culture which should be encouraged and can be controlled in its entirety.	70%
6. Private <u>For Profit</u> hatcheries that can make some level of profit and still contribute to the common property fishery should be encouraged.	70%
7. The State should allow a pen farming network of size, scope and marketing operations similar to Norway.	67%
8. The nonprofit concept doesn't promote efficiency and innovation that the profit motive generates. Alaska should introduce profit at a deliberate pace or State interests will fall behind more efficient foreign competition.	55%
9. The State should fund a smolt operation for the purpose of getting the farming network started and maintaining a genetically strong strain.	48%
10. Private Non Profit (PNP) hatchery corporations, both local and regional, are stifled by overregulation from the Alaska Department of Fish and Game (ADF&G). The primary cause is the Fisheries Research and Enhancement Division (F.R.E.D.) playing a dual role as competitor and regulator.	46%
11. Exclusive area rights with no restriction on how the catch is taken. Should be in the form of fishermen/processor cooperatives. Offshore interceptions should be kept at a minimum through individual quota licensing arrangements.	41%

TABLE 4.4
(Continued)

Future Changes Needed for Alaska
Hatchery Programs to Maintain Competitiveness

	Percentage of Panelists Selecting Each Assertion as Valid or Reliable*
12. The primary role of ADF&G should be research and development and disease control.	41%
13. Transfer of stocks, providing they are disease free, should be allowed between regions.	38%
14. The present institutional arrangement is practical in terms of political support and is functional.	19%

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

(R2-Q:2.1, average n = 65)
(R3-Q:1.3, average n = 32)

Types of Cost Recovery for Privately Held Hatcheries.

The panelists were requested to give us their views on whether fishermen and processors should share in the costs and/or profits of privately held hatcheries. In response, the panel as a group was divided. That is, 48% of the panel responded with a "Yes," 38% with a "No" and 14% indicated "Don't Know" (n = 63).

The comments provided by the panel from this question were combined for analysis with the panel responses to the two additional questions below.

> Private nonprofit hatcheries are allowed to sell surplus adults as a means to generate funds for operations and debt repayment. Should the State (ADF&G) manage common property fisheries to allow sufficient escapement for total cost recovery? Partial cost recovery? No cost recovery?
>
> If there is partial or no cost recovery from returning adults, what means should be used to finance nonprofit, private, hatcheries?

Over 50% of the panelists indicated that they would like to see fishermen and processors share in the costs and/or benefits of privately held hatcheries above and beyond the current aquaculture assessment (T4.5,#6). A majority of the respondents stated that vertical integration between fishermen, processors, and hatchery owners and managers will become increasingly desirable to keep costs down and maintain competitiveness (T4.5,#6). One panelist suggested, "Provide 'buy-in' opportunities for fishermen and/or processors who wish to participate. Exclusive ownership by a single individual, partnership, or corporation should be discouraged."

Over half of the panel indicated that hatcheries, fishermen, and processors are separate entities and should remain so (T4.7,#3). They pointed out that fishermen already benefit by having more fish available in the common property fishery (T4.5,#4). Several stated that if a particular hatchery is sited so that its returns can be segregated from mixed stocks, then it may be possible to tax those who harvest them (T4.5,#3,5).

Panelists' responses were split on the issue of cost recovery for private nonprofit hatcheries. A majority felt that partial cost recovery was the most viable option (T4.5,#4; T4.6,#3; T4.7,#1,4). Those who objected to total cost recovery argued that terminally harvested fish are of poor quality and don't command the higher price of salmon caught in the open water fishery (T4.6,#2). Those who answered no cost recovery generally stated that only the number of fish necessary for brood stock should be allowed to return to the hatchery (T4.6,#7; T4.7,#5).

A number of respondents felt that trying to manage for a particular level of cost recovery for hatcheries was unrealistic given the historical accuracy of stock assessments and would add unneeded complication to an already complex job (T4.6,#1,4). In their view, this type of "fine tuning" is better left to the Alaska Board of Fisheries where local harvesting area boundaries and seasons can be set on an annual basis.

Most of the panel who stated that PNP's should be financed with partial or no cost recovery felt that the aquaculture assessment was the most equitable means of distributing costs on a "user pays" basis (T4.5,#4; T4.7,#2). Several stated that PNP's should learn to live within the funding limits of a combination of aquaculture assessments and partial cost recovery from the sale of surplus fish (T4.7,#1). It is also important to the private nonprofit concept that they are not put in a position of competing with fishers by having to depend on total cost recovery at the hatchery.

TABLE 4.5

Whether Fishers and Processors Should Share
in the Costs and/or Profits of Privately Held Hatcheries

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. Private for profit hatcheries should carry their own costs and/or profits.	79%
2. The public is precluded from commercial fishing by the limited entry system. Therefore, all of the costs and benefits of private hatcheries should be borne by those who are directly involved - fishermen, processors, and hatchery owners.	73%
3. In localized areas where fishermen can derive determinable benefits in increased catch, and where the major return is to hatcheries, fishermen should be assessed to fish.	71%
4. The current assessment is a good means for providing capital and operating costs on a "user pays" basis. The profit side should be covered by the availability of more fish to benefit the greatest number of people.	64%
5. The answer depends on identification of increases on production due to such hatcheries. The simplest mechanism is to allow an adequate escapement to hatcheries and assess no costs. If catch (interception) rates are set high, a cost-sharing arrangement may be in order.	58%
6. Yes, they should share costs and profits. Vertical integration and a better definition of property rights are necessary for Alaska to maintain its competitiveness.	56%
7. The ideal arrangement would be a joint stock company or limited partnership arrangement with fishermen as stockholders. The hatcheries should be private for profit complete with a manager and a board of directors.	35%
8. There should be no private for profit hatcheries. The only private for profit operations that should be allowed are pen rearing salmon farms. These should buy their smolts from ADF&G controlled hatcheries.	12%

(R3-Q:2.3, average n = 54)

TABLE 4.6

Whether Alaska State Should Allow Sufficient
Escapement for Total, Partial, or No Cost Recovery

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. 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.	86%
2. Partial recovery should be allowed. Terminal fisheries necessary for total recovery equal poor quality and are therefore economically inefficient.	64%
3. Partial cost recovery should be used to cover development costs. Assistance should be phased out eventually to convert nonprofits to profit status.	54%
4. Management costs should not be tied or limited to the actual year-by-year production of a fishery that is periodically depressed.	48%
5. Total cost recovery should be required of all hatcheries including State operated hatcheries.	28%
6. The present system for private nonprofit partial cost recovery is working well.	26%
7. No cost recovery. Surplus fish at the hatchery are of poor quality and should be used only for breeding stock.	11%

(R3-Q:2.4, average n = 53)

TABLE 4.7

What Means Should be Used to Finance
Nonprofit, Private Hatcheries

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. A balance between an enhancement assessment and partial cost recovery from fish sales is a good financial arrangement.	67%
2. Tax those who benefit, fishermen or processors. In any case, the cost will be passed on to the final consumer, tacked onto the price paid for the fish.	66%
3. Private for profit hatcheries should probably remain independent - to make their own profit or suffer loss, and they have to be assured of sufficient profit to encourage investment.	57%
4. PNP's must learn to live within what is provided by assessments.	51%
5. The simplest mechanism is to allow an adequate escapement to hatcheries and assess no costs.	15%

(R3-Q:2.5, average n = 53)

Expected Net Profits to Producers

Panelists were asked to assume that the planned fivefold increase in Alaskan hatchery releases of salmon fry (by 1990) would materialize into a long-term increase in salmon stocks. Given this, the panel was requested to indicate whether U.S. salmon fishers' and processors' net profits would increase, decrease, or stay about the same. The panel's response is presented on Table 4.8 below.

TABLE 4.8

Effect on Net Profits to Producers

	DECREASE	STAY ABOUT SAME	INCREASE
U.S. Salmon Fishers	15%	28%	57%
U.S. Processors	19%	32%	49%

(R1-Q:B15b, p. 11, n = 81)
(R2-Q:4.1, n = 67)

Panelists' opinions were evenly split on the two parts of this question, with about half thinking that fishers' and processors' net profits would increase and about the same number saying they would decrease or remain the same. Many respondents commented that the question was phrased too vaguely and didn't provide sufficient reference to current hatchery production (and species) as well as other important variables. A majority of panelists framed their answers in conventional economic terms of supply and demand, price elasticity of demand for salmon, etc. (T4.9,Ø5,11)

The rationale cited by those who felt fishers' net profits would increase was that returns from the increased catch volume would more than compensate for a drop in the ex-vessel price caused by a larger supply of fish on the market (T4.9,Ø1,2,4). The main concerns were that if too much of the total catch were composed of low valued species and low quality fish, it could further depress prices and cause gross revenues, thus, profits to decline (T4.9,Ø9). Another concern was that short-term profits tend to be dissipated in capital improvements which adversely affect long-term profitability when prices decline in the future (T4.9,Ø3,10).

TABLE 4.9

Expected Net Profits to Fishers and Processors

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. More fish will increase unit efficiency (CPUE) so long as limited entry is in place.	76%
2. The same level of effort with larger stocks will increase profits if we assume there is profit at current levels.	69%
3. Common property tends to erode average profitability.	63%
4. Price will decrease, but the overall increase in harvest volume will increase fishermen's net return.	59%
5. Net profit will increase initially since demand is price elastic.	59%
6. If properly managed, releases can stabilize the annual harvest, bringing stable prices and enhanced marketability.	54%
7. Profitability will vary widely from fishery to fishery, but will increase for those that catch predominately sockeye (i.e., Bristol Bay).	41%
8. An increase in the catch volume will lead to greater profits for only 5 - 10% of the fleet.	39%
9. Profitability will decline in areas where pinks and chums are the dominant species due to foreign competition.	39%
10. Profits will decline in the long run because short-term profits will be dissipated by reinvestment in the fleet and prices will decline.	35%
11. Net profit will decrease later as demand becomes more price inelastic.	34%

TABLE 4.9
(Continued)

Expected Net Profits to Fishers and Processors

	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
12. Current profitability is recession oriented and will strengthen.	31%
13. Without corresponding increases in demand, current demand will be met by more efficient foreign operations including structured/fabricated products.	29%

(R2-Q:4.1, average n = 64)

Those panelists who felt processors' net profits would increase with larger catch volumes reasoned that production costs could be spread over larger product volumes. One concern was that hatchery production should ideally lengthen the processing season (through enhancement of early and late runs) to derive the greatest economic benefit. Intensifying production during the peak of the season when processors are already operating at capacity is not a desirable consequence and would only result in lower quality products.

Several panelists with a marketing orientation pointed out that several countries are increasing hatchery releases at once, particularly pinks and chums, which could lead to worldwide oversupply of these species (T4.10). Compounding this trend, at least in the short term, is the strength of the dollar (especially against the pound) which has depressed canned sales for the past few years (T7.6). Most of the marketing-oriented panelists view hatchery production positively. They feel that a larger and more stable supply of lower priced fish will lead to new products (e.g., salmon loaf, sausage, or skinless and boneless canned salmon) and increased markets (T4.10). The main problem with this viewpoint expressed by other panelists with a financial perspective is that the very companies who are best suited to handling large volumes (i.e., major salmon canning companies) have been hurt badly by depressed canned sales overseas. Major salmon canning companies should be in the forefront of the development of new salmon products for the domestic market, but don't have the financial ability to undertake major investments (T5.2,#8).

Empirical research has tentatively shown that the price inelastic (ex-vessel) portions of the demand curve for Alaska pink and chum salmon occur when the harvest levels near 120-150 thousand mt. for pinks and 30-40 thousand mt. for chums. The panel was requested to assume these numbers are correct and that total gross revenues for fishers began to decline when these harvest levels are reached. They were then asked the following questions.

> Given the current levels of Alaskan fishing effort in those fisheries where pinks and chums are the predominate species harvested, do you believe that world salmon markets can absorb these supply levels at prices which will provide an adequate return on investment for fishermen?

Fifty percent of the panel indicated a "Yes" response, 16% indicated a "No" responses, and 34% indicated "Don't know" (n = 62). A summary of the panel's comments is given in Table 4.10.

The Alaska Board of Fisheries convenes annually in each region of the State to set commercial salmon seasons and area allocations between gear types. In public testimony at meetings for Southcentral and Southeast Alaska during the past few years, salmon fishers have often complained of falling gross revenues while catching larger volumes than ever before. This is especially true for gear types which harvest mainly pinks and chums. The Commercial Fisheries Entry Commission

keeps track of returns on investments for limited entry permit holders by gear type. These data show that in some pink and chum dominated fisheries, real permit prices and returns on investments have declined as catch volumes have increased.

Most panelists stated in their explanation that a greatly expanded marketing and promotion effort by the State for pink and chum salmon products is the most important thing that could be done to insure future profitability for fishers and returns on hatchery investments. As one panelist put it, "Demand doesn't happen by itself, it is created by sustained promotional efforts." Another panelist pointed out that one Norwegian salmon company spent more on advertising and marketing in 1983 than the Alaska Seafood Marketing Institute (ASMI).

Other respondents pointed out that market prices of pinks and chums have become competitive with other forms of protein, thus opening a broader domestic market. Several stated that broader foreign market development is unlikely to occur until the dollar weakens.

TABLE 4.10

Will Fishers Get an Adequate Return on Their Investment?

Summarized Panel Comments
o We cannot assume static markets but the pink and chum products appear to be mostly traditional and not easily moved to the frozen market.
o Yes, if foreign owned processing companies are not allowed to dictate price and if product innovation is promoted and fostered in the industry.
o Not in the short-term anyway. New markets with U.S. dollars for foreign exchange will have to be created. The domestic markets tend toward the higher value species and imports of Atlantic salmon continue to foster the use of these higher value species.
o A recent study relating Bristol Bay ex-vessel price to Tokyo wholesale market price for red salmon at current conditions of inflation, consumption, etc., shows that a 14 to 23 percent increase in supply (as inventory) would still mean a 10 to 12 percent increase in market price and translates directly down to ex-vessel price. Red salmon, of course, are much different than pinks or chums but this does give you some idea of what we are looking at here.
o Better, more stable supply should allow a better market development effort.
o Adequate returns is the key word. I believe that increased pinks and chums can and will find markets and that return on present investments will be increased.
o Major marketing efforts, both domestic and foreign are the key here. The State of Alaska should make a major commitment in this area if it is going to get an adequate return on its hatchery investment and insure an adequate return for fishermen and processors.
o World wide increase in production of pink and chum will decrease price, but this will be overcome by new markets; and value added products - such as skinless, boneless fillets using <u>fresh</u> caught fish.

(R2-Q:4.5)

CHAPTER 5

INTERNATIONAL GROUNDFISH ISSUES

- Displacement of Imports by Domestic Groundfish Production
- Some Reasons why the U.S. Seafood Industry is Not in the Forefront of the Development of the Domestic Surimi Market
- Factors Affecting the Competitiveness of the Domestic Processing Industry
- Effects on the U.S. Industry Resulting from a 50% Cut in the TALFF
- Expected Retaliation by Other Nations Should a Large Cut in the TALFF Occur

PRINCIPAL RESULTS

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.

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.

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 of financing a fully integrated operation will be necessary.

The major factors that affect the competitiveness of the domestic processing industry are: foreign labor costs, exchange rates, trade barriers and foreign government subsidies.

Displacement of Imports by Domestic Groundfish Production

In Round 1, we asked the panel whether they believed that domestic groundfish production would generally displace imports in the next 20 years. We also requested their comments which were subsequently turned into assertions and given in Round 2 for the panelists to evaluate using the six-point validity scale. After the panel evaluated the comments in Round 2, they were again requested to indicate whether domestic groundfish production would displace imports.

Responses to Round 2 indicate that 57% of the panel believe that domestic production will generally displace imports in the next 20 years. Thirty-four percent (34%) indicated that domestic production will not displace imports (9% indicated "Don't Know," n = 78). An analysis of the evaluated assertions given on Table 5.1, reveals substantial agreement among panelists that domestic groundfish production will greatly increase during the next 20 years. Many panelists remain doubtful that imports of groundfish products will be completely displaced however (T5.1,#1,7). The U.S. white fish market has been carefully developed by foreign fishing interests which will not be easily dislodged. Fishery exports to the U.S. are an excellent means to gain hard currency and thus are promoted and subsidized by foreign governments. So, although the overall domestic market for groundfish products has considerable scope for growth and is forecasted to continue growing at a rapid rate by the panel, American producers will still face stiff competition from foreign products.

Regulating foreign fleets out of the U.S. Fisheries Conservation Zone (FCZ) is only the first step in domestic market development. Several panelists pointed out that the comparative advantage of exclusive access to a major supply of raw product must be followed closely by technological and quality control improvements in order to produce high quality, moderately priced, consumer products (T5.1,#3). Ultimately, price and quality are the two most important variables in domestic consumer preference (T7.3). Respondents pointed out that some nationalistic prejudice does exist in consumer choices and U.S. groundfish products still suffer from a reputation of poor quality compared to foreign products (T7.3, T7.5). If the "made in U.S.A." or "fresh frozen from the pristine waters of Alaska" image is going to be promoted successfully, consumers must have an objective standard for product differentiation. A large majority of panelists feel that product standards are the most important factor influencing the consumer's quality perception (see Chapter 7, Table 7.4). Foreign production of higher valued groundfish species such as Pacific cod and black cod could be substantially replaced by domestic production fairly soon but the higher volume/lower priced species such as pollock and yellowfin sole are likely to remain dominated by foreign and joint venture production for the intermediate future (10 years).

A few panelists raised concerns about the long-term (10-20 years) outlook for domestic fishermen and processors. They pointed out that in every developing Alaskan fishery, open access has eventually led to overcapitalization, overharvesting, and financial hardship for all concerned. Several respondents thought that some type of restrictive licensing scheme, limited entry, share quota system, or property rights, need to be established before this resource is subjected to the same apparently inevitable boom and bust cycle of exploitation.

Other panelists pointed out that fisheries trade issues are perceived by the U.S. State Department as being of minor importance in the broader overall context of foreign trade. Thus, the amount of diplomatic pressure the U.S. Government is likely to exert on behalf of domestic fishers and processors is limited. The "fish and chips" trade policy of recent years (where foreign groundfish allocations are parcelled out in exchange for the technological, economic, or scientific contributions that a particular foreign country makes to the development of the U.S. fishery) will probably remain in effect for some time yet. Several panelists stated that even with complete Americanization of the Total Allowable Level of Foreign Fishing (TALFF), groundfish imports will still occupy certain niches in the U.S. market.

TABLE 5.1

Expected Displacement of Imports by
Domestic Groundfish Production

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. Our groundfish consumption will require imports. We can find some foreign markets, but price will be the main problem for U.S. producers.	84%
2. Displacement will occur very slowly. Development would be assisted by the development of table ready or easy to prepare items.	81%
3. Once we achieve domestic utilization of the TALFF, the U.S. market will increase if the price and quality are good.	68%
4. This question is too difficult to answer without an analysis of the direction of change in the key variables affecting domestic and foreign demand: exchange ratios, relative prices, import trade barriers, subsidies, etc.	68%
5. Yes, displacement will occur, but there will be more losers than winners in groundfish production due to low margins.	67%
6. New marketing companies are entering the business to take advantage of new supplies of raw product.	66%
7. Displacement will not occur completely unless tariffs or subsidies are employed.	58%
8. Complete displacement will not occur unless there is more of a movement toward development of a fleet of factory trawlers.	47%
9. Displacement will not occur unless cheap foreign processing hulls can be bought outright rather than borrowed through joint ventures.	32%
10. Yes we can displace imports, if identity standards are enforced which would keep foreign sources from using nonfish additives.	30%
11. The U.S. Government will not make the cuts in foreign catch to allow domestic production to displace imports.	20%

(R2-Q:3.1, average n = 66)

Some Reasons Why the U.S. Industry is Not in the Forefront of the Development of the Domestic Surimi Market

Surimi and remanufactured analog products (particularly imitation crab legs made from minced pollock flavored with King crab) are the fastest growing U.S. seafood import - 30 million pounds in 1983 vs 16 million pounds in 1982. Since much of the pollock used to make these products is caught in Alaskan waters, we asked why the domestic processing industry in not in the forefront of the development of the U.S. market. The self-rated level of expertise of the panel for this question was 41% high; 42% medium; and 17% low.

Most panelists feel that the main reason why the domestic processing industry hasn't shared in the U.S. surimi/analog products bonanza is simply that it's not a traditional U.S. product. Several pointed out that the products, markets, and technology used in producing surimi and remanufactured/analog items were developed over many years in Japan and Korea (T5.2,#1). Since entry costs are very high in this capital intensive industry and official and unofficial trade barriers have made it virtually impossible to penetrate the Far Eastern markets, U.S. processors have traditionally focused on the high value end of groundfish markets and products (T5.2,#5,13). Because of this, in the view of many in the panel, domestic processors were caught off guard by the success of the aggressive U.S. marketing campaign mounted by their Oriental competitors in recent years (T5.2,#3,6).

There is some skepticism among panelists about the eventual size of the domestic market for surimi and analog products although none doubt that at least some of these items will win long-term consumer acceptance. A "wait and see" attitude pervades. Several felt that once the novelty wore off, U.S. consumption would level out and domestic producers could establish their own market niches. Other panelists feel that it is precisely this kind of complacent attitude which has largely kept domestic processors from sharing in the U.S. market.

One of the greatest difficulties facing U.S. processors is to raise enough capital to enter the industry (T5.2,#18). Domestic harvesters have unlimited access to the resource while foreign competition is being regulated out of the FCZ. There is a growing domestic market and trade barriers are beginning to come down in the Far East. Foreign technology can be purchased (T5.2,#2). The availability of capital was the key for many on the panel. One processor panelist said, "Banks are unwilling to loan money for as yet unproven products in the domestic market, while the Japanese and Koreans refuse (in one way or another) us entry into their market" (T5.2,#14). In addition, many of the processors who should be investing heavily into expanding groundfish production have been financially strapped by the strength of the dollar and its effect on their traditional export sales of other seafood products. Another complication mentioned by a few panelists is that several West Coast processors are controlled by foreign capital (particularly Japanese holding companies) which also is heavily invested in distant water fisheries and overseas processing. Although these foreign controlled processors are in business to make a profit wherever they can, it may not be in the interest of the parent firm to provide them with capital to enter the surimi/analog business (T5.2,#10). This would be true if a holding company controlled distant water fleet was not fully depreciated, production capacity under-utilized, or capital commitments to overseas production not completely amortized.

Since the surimi/analog production process is very capital intensive, labor costs don't seem to be as important an obstacle to competitiveness as it would be for the domestic seafood products (T5.3). It is apparent from panelists comments that most feel the best way to economically produce surimi is to process at sea (T6.2). It is also apparent that many panelists think that with the advent of U.S. factory trawlers, the old perception of being unable to compete with foreign factory fleets due to the limitations of the Jones Act, high domestic shipbuilding costs, etc., may be changing (T5.3). Most of the financial problems listed previously apply to domestic shore-side processors (T5.2,#12). As one panelist put it, "New companies or cash rich food companies may find this a very attractive investment."

TABLE 5.2

Some Reasons Why the U.S. Seafood Industry is Not in the Forefront of the Development of the Domestic Surimi Market

PANEL ASSERTIONS	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
1. The Japanese have had many years of catching and processing pollock behind them; surimi products and the technology to produce them were all developed in Japan, and the markets are traditionally Japanese and Korean.	96%
2. The job will have to be done by joint ventures or by a U.S. major capable of financing a fully integrated operation. Technical expertise can be purchased. One domestic company turning a profit would do wonders for the industry.	91%
3. Domestic producers were surprised at the U.S. market's acceptance of analog products.	86%
4. It takes more than a spirit of challenge. It takes time and a skilled and dedicated labor force. It takes a dedicated interest rather than a venture capital interest. It takes painstaking hard work.	81%
5. Domestic processors find it extremely difficult to raise enough capital (in an extremely capital intensive business) to produce surimi for an as yet unproven U.S. market.	80%
6. Domestic processors are tradition bound by existing products and markets. They don't show the imagination and aggressive marketing abilities of their foreign competitors.	74%
7. Now that foreign fishing efforts are being phased out of the U.S. FCZ, there is great reluctance to allow U.S. penetration of these traditional Japanese and Korean markets.	69%
8. The large domestic processing firm's parent companies are getting out of Alaska seafoods (e.g. Castle and Cook, Amfac, R.J. Reynolds, Con Agra). The remainder are small and underfinanced for the long-term investment needed to produce Kamoboko-type (fish cake) products.	69%
9. Surimi production is relatively high tech compared to traditional processing methods of canning, freezing, etc. It requires an entrepreneur rather than an operator to push into a new production area.	63%
10. Many companies have a high degree of foreign ownership as a means of securing a supply of raw product. A foreign company is unlikely to encourage the development of surimi production that could hurt it in other areas.	62%
11. Domestic processors lack technical competence and quality control. These products are particularly susceptible to poor quality. Any rush of U.S. firms into the business could damage market potential.	58%
12. Shore-side processed surimi sells for half the price (in Japan) as processed at sea products. The substandard shore-side products could be manufactured into ham, salami, etc., all good products, but very low priced and difficult to make pay.	55%

TABLE 5.2
(Continued)

Some Reasons Why the U.S. Seafood Industry is Not in the Forefront of the Development of the Domestic Surimi Market

	Percentage of Panelists Selecting Each Assertion as Valid or Reliable
13. It is virtually economically impossible for the U.S. industry to invest the necessary capital to acquire surimi processing equipment, process pollock into surimi either on land or at sea, and acquire analog equipment to manufacture products to sell in competition with foreign products at today's interest rates. Domestic entry into the market requires all new equipment to compete with largely amortized and often subsidized foreign competition.	52%
14. There is distrust among investors about returns on "imitation" products.	52%
15. Labor costs demand floating processors. Americans are not interested in spending six months at sea at a time in a factory ship.	49%
16. One problem with surimi products is that people tire of them quickly.	10%

(R2-Q:3.3, average n = 65)

Factors Affecting the Competitiveness of the Domestic Processing Industry

Domestic processors have generally found it difficult to compete with Joint Ventures and foreign factory ships in world groundfish markets. The panel was asked to review the factors given on Table 5.3 and rank the factors according to which had the greatest impact. Several panelists suggested additional factors. Chief among these was a lack of adequate infrastructure which is dealt with in greater detail in Chapter 6.

TABLE 5.3

Factors Affecting the Competitiveness of the Domestic Processing Industry

FACTORS	Percentage of Panel Indicating the Factor is One of the Five most Important PERCENT
Foreign labor costs.	47%
Exchange rates	47%
Trade barriers - including tariffs and quality controls.	45%

TABLE 5.3
(Continued)

Factors Affecting the Competitiveness of
the Domestic Processing Industry

	Percentage of Panel Indicating the Factor is One of the Five most Important
FACTORS	PERCENT
Foreign government subsidies.	41%
Jones Act - Requires U.S. crews on U.S. built ships operating in U.S. waters.	35%
Complacent attitude - traditionally production oriented industry.	32%
Low quality of products.	28%
Total Allowable Level of Foreign Fishing (TALFF) too high.	23%
Foreign capital (particularly Japanese holding companies) having a major financial stake in the domestic processing industry.	23%
Lack of knowledge about foreign markets.	21%
Foreign technology.	19%
Government regulations.	18%
Taxes.	3%

(R1-Q:D7, maximum n = 47)

Effects on the U.S. Industry Resulting from a 50% Cut in the TALFF

The question posed to the panel in Round 1 was: If a large cut in the Total Allowable Level of Foreign Fishing (TALFF), say 50%, were to occur, what would be the resulting positive and negative effects on U.S. fishing, processing, and marketing forms?

Approximately 20% of the panelists did not respond to this question, and several others only partially responded vis-a-vis their position within the industry. Because of this partial response and the relatively low level of self-rated expertise for this question, we decided not to reiterate this question in subsequent questionnaire rounds. However, some valuable ideas were given by the panel, and thus they are presented in Table 5.4. The panelists' responses give a fair sampling of the range of opinion on this issue.

TABLE 5.4

Effect on the U.S. Industry Resulting from a 50% Cut in the TALFF

SUMMARIZED PANEL COMMENTS

FISHING FIRMS

POSITIVE EFFECT:	NEGATIVE EFFECT:
o Decreased gear and grounds conflicts.	o The resulting decrease in supply would have a negative effect on established markets.
o Increase in joint ventures.	o Profits would be recapitalized without fleet control.
o Increase in the catch per unit of effort (CPUE).	o Would decrease foreign nations willingness to participate in joint ventures.
o Very little positive effect, U.S. fishermen have priority for all they can catch.	o Would force industry into smaller, more efficient vessels for shore-side delivery.
o Would force the industry to look at domestic shore-side deliveries and/or build at sea processing vessels.	o Would decrease the competitive incentive.
o Would help provide year-round usage of vessels.	o Domestic processing would not be able to handle the increase in supply, at least in the short run.
	o Japanese threat of retaliation.

PROCESSING FIRMS

POSITIVE EFFECT:	NEGATIVE EFFECT:
o May encourage further shore-based processing capacity.	o I assume by joint ventures, you mean over-the-side purchases by foreign processing vessels. Also, that the pattern will follow a gradual shift from TALFF, to joint operations, to U.S. complete processing and marketing and the next shift that we are looking at here is from TALFF to joint operations - we are not ready to go all the way. There has also been the suggestion to close out the TALFF completely, thus forcing the price up. Don't depend on it - there are other products for surimi and there is a lot of pollock off Japan, Korea and the U.S.S.R.
o Open foreign markets for groundfish and surimi.	o Very little negative effect.
o Perhaps allow for more rapid growth in the groundfish area by an infusion of foreign dollars into domestic fish plants.	
o Allow more control over domestic market penetration by foreigners.	
o Would increase the available fish supply for a few years until overcapitalization forced season reductions.	

Table 5.4
(Continued)

Effect on the U.S. Industry Resulting from a 50% Cut in the TALFF

PROCESSING FIRMS
(Continued)

- Would increase the interest of U.S. investors.
- With increased raw material availability and increased export demand, production could expand to maximize the use of domestic processing facilities and profits would increase.
- There is a serious domestic lack of know how.
- Would increase foreign equity ownership in the U.S. industry.
- Inability to expand to match market growth with a potential loss to foreign firms with access to other supplies.
- We would need a radical change in processing capability as our processors are used to speculative marketing in low capital intensity, low volume, high unit priced fisheries.
- Joint ventures could become so strong that we would never get rid of them.

MARKETING FIRMS

POSITIVE EFFECT

- An increase in fish through traditional channels. However, the rise of multinational marketing firms through joint ventures appears imminent.
- Would increase the variety and volume of products available.
- Get our foot in the door of foreign markets and thus develop a broader foundation.
- Not necessarily any effect if joint venture caught.
- Markets would firm for Alaskan whitefish products and margins would increase.
- Could help U.S. firms to fully exploit the domestic market.

NEGATIVE EFFECT

- Possible quality control problems.
- Inability to adequately respond to market growth.
- Would increase resistance and decrease cooperation by displaced nationals.
- We might lose the urgency for domestic resource development.
- Instability of supply would increase prices.

(R1-Q:D1)

Expected Retaliation by Other Nations Should a Large Cut in the TALFF Occur

The panel was requested to indicate whether or not a large cut in the TALFF would result in retaliation in other seafood markets, e.g., salmon, and to briefly explain their answer. Panel comments are summarized in Table 5.5.

Thirty-seven percent (37%) of the panel indicated that retaliation would occur and 43% indicated retaliation would not occur (20% indicated "Don't know," n = 89). Clearly the panel was split on this issue. Several panelists suggested that a retaliatory response to a cut in the TALFF would depend on how it was perceived by foreign participants in the U.S. Fisheries Conservation Zone (FCZ). If U.S. harvesters were able to step right in and take over production, retaliation would seem unlikely. If they weren't and a cut was seen as a political gesture, then retaliation would be likely to occur. Any retaliation would probably consist of a decrease in over-the-side sale type in joint ventures rather than any direct market response. A number of respondents pointed out that foreign fishing is being phased out of the U.S. FCZ anyway so that in the long-term an accelerated TALFF cut would not have much effect. There seems to be general distrust among most panelists of the U.S. Government interference in seafood markets through national interest policies. As was noted previously, in the overall context of foreign trade, foreign fishing and domestic seafood exports are not viewed as vitally important by the U.S. State Department.

TABLE 5.5

Expected Retaliation By Other Nations
Should a Large Cut in the TALFF Occur

Summarized Panel Comments
o The cut would mostly affect foreign fishing companies which are usually different from the Export Trading Companies that market their products. Export markets are more often with trading companies which would just discontinue marketing some of their seafood lines of products.
o They didn't retaliate when we cut off King and Tanner crab.
o North America has 20% of all continental shelf species. We can overcome any situation in the long-term.
o There is probably too much competition between trading companies for significant organized resistance.
o Yes, they would retaliate, they have nothing to lose.
o Japan will not like U.S. joint venture catches, but, the cost of the product from the U.S. fishermen will be less than from their own fishermen.
o The consumer will still demand the product and competition will cure any attempt at retaliation.
o Certainly the Japanese would look hard for alternative supplies and/or substitutes and might increase informal trade barriers.
o The main reaction would likely be from Japan. If the result was a diversion of large quantities of cheap salmon to European markets (through refusal to purchase U.S. salmon), the EEC would probably implement their reference price arrangement approved in principal, but currently suspended.
o We have been told by the Japanese that we could lose markets if we get too tough. Filling in foreign groundfish production in the FCZ with domestic fishing and processing, in an orderly phase-out, is a plan we can both live with.

(R1-Q:D2)

CHAPTER 6

ALASKA GROUNDFISH ISSUES

- What Alaska Can do to Encourage the Development of a "Value-added" Groundfish Industry
- How to Overcome Limitations to the Development of Shore-based Processing of Pollock and Yellowfin Sole
- Medium Sized Factory Vessels as an Option for Increasing Alaska's Share of the "Value-added" Industry
- Domestic Groundfish Processing: Floaters vs. Shore-side
- Alaskan Groundfish Production: Joint Ventures vs. Domestic Processors vs. Foreign Catch

PRINCIPAL RESULTS

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.

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.

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.

Domestic processors are foecasted to increase by 20% their relative share in Alaska's groundfish harvest compared to joint ventures and foreign catch levels by the year 2000.

What Alaska Can do to Encourage the Development of a "Value-added" Groundfish Industry

The twelve Seattle-based American flag factory trawlers currently operating within the Alaskan FCZ add little to Alaska's economy. Over-the-side sale type joint ventures provide income for some local fishermen, but all of the "value added" from processing the harvested fish into its final product form escapes overseas. Processed-at-sea surimi sells for twice as much as the shore processed product in export markets. Given these facts, the panel was asked to tell us what Alaska can do to encourage the development of a "value-added" industry around its abundant groundfish resources.

Infrastructure development in the Aleutian Chain and a steady regulatory environment would be the most encouraging things the State could do to promote Alaskan groundfish development according to the panel (T6.1,#1,4,5). "Value added" will enter the State economy first through support services (i.e., cold storages, trans-shipment facilities, brokers, and suppliers) for domestic factory trawlers and J.V. catcher vessels, and later as facilities expand, through secondary manufacturing and distribution (T6.1,#3; T6.5). Several panelists likend Alaska to a developing country, in that Seattle and other West Coast ports have historically provided the base for extracting Alaska's resources in the raw. The fishing industry has grown around this status quo and is unlikely to change its structure very rapidly. Market connections to the "Lower 48" and foreign countries are steadily improving via improved air freight service. One panelist pointed out that there is no major brokerage sector in Alaska, it is based in Seattle which has the advantages of being a major port with regular transport links to foreign and domestic markets.

Several themes emerge in analyzing panelists' responses to this question. Aside from strong support for further Americanization of the Alaska FCZ, which is virtually unanimous among the panel, the panel indicated that the State should encourage U.S. factory trawlers and provide services to them (T6.1,#3). Local harvesters should concentrate on the high valued species, e.g. (T6.1,#9), blackcod, rockfish, Pacific Ocean perch, etc. Shore-side processing facilities should only be encouraged for ports which are very close to the fishing grounds such as Akutan, Kodiak, Sand Point, and Dutch Harbor (T6.2). Products must be targeted at the domestic market with an integrated effort promoting both shore based products and those which are cheaper to process on factory ships at sea. The Alaska Fisheries Development Foundation and Alaska Seafood Marketing Institute were singled out as vehicles for development and promotion. As one panelist put it, "We must create a market development program that stimulates demand - not just for added value retail/food service, but to increase industrial consumer demand. There are functional advantages for the protein quality of salmon, roe, pollock, etc., as components or ingredients in other products. We should not promote the 'image' of fish alone. A constant question asked should be 'where else can we use the properties of this resource.' There is a great future volume potential for added value products in competition with meat and poultry if fish products are modified for the remanufacture market." Other respondents noted that the domestic market doesn't have any basis for discriminating between "at sea" and "shore-side" processed surimi, so no price differential exists as it appears to, in the Japanese marketplace (T6.1,#7).

A general sense of the panelists' responses is that as Americanization of Alaska's FCZ increases, so should the domestic groundfish industry. It is important to establish a broad domestic market for groundfish. The State can help with support services, product development, tax incentives, financial support, and marketing (T6.1,#2).

TABLE 6.1

What Alaska Can do to Encourage the
Development of a "Value-added" Groundfish Industry

PANEL ASSERTIONS	Percent of Panel that Selected Each Assertion as Valid or Reliable
1. Encourage steady improvement in infrastructure. Stay away from subsidies.	81%
2. Employ tax incentive schemes to generate modernization of plants and vessels.	66%
3. To be competitive, the U.S. industry must develop around factory trawlers. Alaska can benefit by providing support facilities and support services.	60%
4. Provide long-term, low interest loans for infrastructure development in Alaskan coastal communities and most important, low cost electrical energy and tax incentives.	57%
5. I'm not sure it would be wise to pursue any development policy other than providing a stable regulatory environment - using State funds to develop a fishery merely transfers wealth from the State as a whole to the relatively few individuals who would benefit.	56%
6. Surimi is the bottleneck at the present time. Under current restrictions, surimi processing is hard to put together economically. I would suggest that we forget surimi processing and turn to production of surimi products to take advantage of the growing U.S. market now.	52%
7. Shore-based processors have to process pollock into surimi for the domestic market. The domestic market doesn't recognize the quality difference between at sea or shore-based processing. Subsidies and/or proof of profitability will stimulate processors into the bottomfish industry.	41%
8. Alaska should take a hard look at "in State waters" joint ventures and take advantage of them for a while.	39%
9. Concentrate efforts on higher value species, i.e., rock fish, flounder, cod. Pollock can follow at a much later date. Provide information on direct marketing of higher value species.	37%
10. Allow the landing of Japanese produced product, restricted to U.S.-Japan joint operation produced product if necessary, directly into Alaska ports.	36%
11. Restructure the raw fish tax; graduate it from tax credit to actual tax determined on the extent to which a product is locally processed.	33%

(R3-Q:2.6, average n = 56)

How to Overcome Limitations to the Development of Shore-based Processing of Pollock and Yellowfin Sole

Several factors inhibit the development of shore-based processing of pollock and yellowfin sole, the most abundant commercial groundfish resources in Alaska's FCZ. Chief among these are the rapid deterioration of pollock after it is caught and the relatively small average size of yellowfin sole which makes fillets unattractive to the domestic consumer. Panelists were requested to tell us how these limitations can be overcome. The responses given on Table 6.2 represent what we considered to be a representative sampling of the responses.

Panelists treated these limitations as technological and marketing problems. Their assertions fall into two categories: those who believe these limitations can be easily overcome by the application of appropriate technology or marketing strategy; and those who believe shore-side processing of these species will never be viable.

TABLE 6.2

How to Overcome Limitations to the Development
of Shore-based Processing of Pollock and Yellowfin Sole

Summarized Panel Comments
o First, explore the technology available. The U.S. is always far behind in most fisheries research; we always end by adopting someone else's methods. Use an organization that has a history of successful application of appropriate technology to overcome the apparent technological obstacles. This takes time and money.
o A selective, long-line fishery for sole should eliminate the problems of small fillets, unwanted incidental catches and trawl damage to fishing grounds.
o There are many markets for small sole fillets. Other fish also deteriorate rapidly, but this is overcome by handling methods at sea. TV dinners require small chickens to fit into the package. The market can accept the small fillets - it is a matter of market research. (In 1966, Howard Johnson's was trying to buy millions of pounds of sole fillets from 1 to 2 ounces, without success.)
o Why should these limitations be overcome? Presently the accepted technology worldwide is floating processors. They make sense. Shore-based processing facilities will probably never make it with pollock or yellowfin sole nor should they. This is not their comparative strength.
o Shore-side facilities should concentrate on processing and shipping species which can be delivered in fair to excellent condition.
o I seriously doubt there will ever be substantial (relative to the actual harvest) shore-side processing of either specie. Instead, Alaska should set the Aleutians up as a series of service stations where floaters can offload the product for trans-shipment, brokering, secondary processing, and to take on supplies. Tax incentives to make this attractive also need to be incorporated.
o NEFCO tried to overcome these problems at their Kodiak Plant and lost millions. Provide at sea processing, this is the only way the U.S. industry can compete given the present level of technology.

TABLE 6.2
(Continued)

How to Overcome Limitations to the Development
of Shore-based Processing of Pollock and Yellowfin Sole

Summarized Panel Comments
o There is no simple answer. However, for pollock, turn to other surimi products that can be manufactured from the lower quality shore-side processed surimi - they do it in Japan, why not here?
o For yellowfin sole, it is too small for U.S. and Japan markets (pricewise). Two suggestions: (1) use the surimi extractors to extract the flesh from the yellowfin and reconstitute the product into fish product of some kind, or into Fish Protein Concentrate, etc., or (2) dry and sell to third world poor countries that generally like dried fish (Africa, etc.).

(R2-Q:3.5)

Medium Sized Factory Vessels as an Option for Increasing Alaska's Share in the "Value-added" Industry

One option that would help capture some "value added" from groundfish production is a fleet of locally based vessels, of smaller size than the factory trawlers, which could harvest and process their catch at sea and ship their frozen finished product from Alaskan ports in freezer containers.

Panelists were asked if this was a viable option and to further comment. Fifty-two percent (52%) indicated it was a viable option and 19% indicated it was not a viable option (28% indicated "Don't Know," n = 68)

A majority of panelists felt the idea of a fleet of medium sized locally based vessels (as compared to the current generation of American factory trawlers) was a viable option at least for some groundfish species and products. Several panelists stated this idea wouldn't be practical for large scale surimi production which requires the economies of scale found with factory trawlers or speedy delivery to a shore-side plant (T6.3,#8,10). Smaller vessels equipped with automated whitefish filleting lines which are adaptable to several species could pay off however (T6.3,#6). In any case, panelists thought development of more trans-shipment facilities to take advantage of Alaska's proximity to the Orient should proceed as quickly as possible (T6.3,#5).

It is clear from panelists responses that the economics of various sized catcher/processors, their products, and market niches are not well known. It is also apparent that with the Americanization of the FCZ, serious study needs to be done in this area if domestic vessels are going to replace foreign factory ships and joint ventures in a timely manner. The general sense of the panelists' responses is that the future composition of the domestic fleet in Alaska's FCZ will be different than it is today, and it will also be much different than the distant water foreign fleets it will be replacing.

One panelist summed up the marketing situation well, "I don't know whether economics make it worthwhile. I remember the nonsuccess of the ALEUTIAN MISTRESS which was in that (midsized) category. We may need factory trawler production volume to be able to compete pricewise. The real question in my mind as an economist and marketing person is whether the primary processed food service layered puck fillet (the one factory trawlers make, 15 lb. block, 3/15 per case) can compete with the imports. Without question, a more targeted marketing effort involving much person-to-person contact will be needed to develop a segmented market for an Alaskan product which is equivalent to the Icelandic marketing strategy. Did you know Icelandics get from 50-65¢ more per pound because of their market niche?"

TABLE 6.3

Medium Sized Factory Vessels as an Option for
Increasing Alaska's Share in the "Value-added" Industry

PANEL ASSERTIONS	Percentage of Panelists that Rated the Assertions as Valid or Reliable
1. The focus of smaller sized vessels must be on higher valued species and high quality markets.	89%
2. We see some of it already, especially in higher value fish, sablefish, cod, turbot, but must have storage and shipping facilities greatly improved.	86%
3. Locally based vessels would tend to contribute more to the local economies. However, if high wages are required for Alaskan crews and smaller boats are inherently less efficient, such boats may be marginal operations at best.	84%
4. Lower priced imports from Korea, Canada and other countries seeking hard currencies will probably make it difficult. Specialized market niches, especially with high quality/value products are a viable option, however.	84%
5. Because of Alaska's transportation cost advantage to the Orient, offloading in Alaskan ports for trans-shipment should be encouraged.	75%
6. Some studies I have seen indicate that the most efficient processors are of medium size and the size of boat has to be carefully matched with efficiency of production. I don't know at the moment what the optimum size is. Otherwise, a viable option I think.	72%
7. Shore based processing companies simply must get out of the mind-set that they are adversaries to floating processors or else they will die on the vine. I dare say that had there been some innovative thinkers among the shore based processors or the new larger class of factory trawlers would never have been built in the U.S. Someone still has to do the groundwork for vessels once they land their catch. Why not break into this?	65%
8. Pollock and yellowfin sole are caught in such tremendous quantities and are of such low value that it dictates a large boat, large volume fishery.	46%
9. If government leadership is provided for R & D, grants for production equipment and extension and marketing help, this could be accomplished.	45%
10. The fact that there is little movement in this direction indicates that it is probably not "viable," i.e., profitable.	44%
11. Shipping costs are too great and the dollars going into Alaska's economy would be negligible.	20%

(R3-Q:2.7, average n = 54)

Domestic Groundfish Processing: Floaters vs. Shore-side

Domestic groundfish processors can be classified as floaters (consisting mainly of U.S. factory trawlers - twelve in operation currently, mostly producing frozen-at-sea cod fillets) and shore based processors. Panelists were asked to forecast their relative share of production for the years 1990 and 2000. As a group, the panel forecast very little change from the current status quo.

TABLE 6.4

Relative Share in Production

	Panel Group Means		
	1983 (Prelim.)	1990	2000
Floaters	65%	67%	63%
Shore-based	35%	33%	37%
	100%	100%	100%

(R1-Q:D5, n = 73)

Alaskan Groundfish Production: Joint Ventures vs. Domestic Processors vs. Foreign Catch

Ninety-eight percent (98%) of the Pacific Coast groundfish catch is taken in Alaska's waters. As shown in the table below, the 1983 production is divided into the three categories of joint ventures, domestic processors, and foreign catch. The panel was requested to forecast the relative percentage shares of the total Alaskan harvest in the three categories for the years 1990 and 2000.

The data show a continual decline in foreign catch and a steady increase in domestic processing. Joint ventures will increase into the intermediate future and a decline in the long-term future.

TABLE 6.5

Relative Shares in Alaska's Groundfish Harvest

	Panel Group Means		
	1983	1990	2000
Joint Ventures	23%	42%	38%
Domestic Processors	3%	19%	43%
Foreign Catch	74%	39%	19%
	100%	100%	100%

(R1-Q:D4, average n = 70)

CHAPTER 7

MARKET ECONOMICS

- Growth Potential of Six U.S. Seafood Market Segments
- Future U.S. Demand for Selected Product Forms
- Factors Affecting Domestic and Foreign Demand
- Most Important Factors Necessary to Insure Consistent Quality of Domestic Seafood Products
- Consumer Product Differentiation Between "Wild" and "Farmed" Salmon
- Role of Exchange Rates in the Development of the Domestic Groundfish Industry
- Strategies to Insulate U.S. Fishery Exports from Exchange Rate Fluctuations
- Effect of U.S. Export Trading Companies Upon Price Fluctuations

PRINCIPAL RESULTS

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.

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.

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.

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.

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.

Growth Potential of Six U.S. Seafood Market Segments

The panel was requested to rank the six seafood market segments shown in the left column on Table 7.1. They were instructed to rank the segments according to their growth potential in the next 20 years. The panel felt that demand for seafood products would continue to increase in all market segments with fast food restaurants and convenience type products showing the greatest growth.

TABLE 7.1

Growth Potential of Six U.S.
Seafood Market Segments

Percentage of panel selecting a sector as having the greatest growth potential. Also, percentage of panel selecting the sector as among the top three sectors.

Seafood Sectors	Sector With Greatest Growth Potential	Sector Selected Among Top Three
Fast food restaurants	34%	76%
Convenience type foods (e.g., frozen fillets or fish sticks)	30%	62%
Home prepared entrees (e.g., fresh whole, eviscerated, or filleted fish)	16%	49%
Family restaurants	14%	54%
White tablecloth restaurants	11%	25%
Institutional (e.g., large volume canned products or frozen blocks)	8%	40%

(R1-Q:D9, n = 87)

Future U.S. Demand for Selected Product Forms

The U.S. market for fishery products is widely regarded as the largest underdeveloped market in the world. The American per capita annual consumption of edible commercial fish and shellfish products at 12.9 lbs. is less than half the world average of 27.1 lbs. The panel was asked to project whether per capita U.S. demand will increase or decrease from the current level for the product forms and species given in Table 7.2. Panelists were to consider a 20 year time frame in making their responses.

The panel forecast that demand would increase for fresh and frozen salmon with groundfish products increasing the most. Per capita demand for regular canned salmon is forecasted to 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. Of the smoked and cured products listed, salmon appears to be the most likely to increase in demand.

TABLE 7.2

Future U.S. Demand for Selected Product Forms

	Percentage of Panel Indicating Demand will Decrease, Stay about the Same or Increase *			
U.S. Per Capita Demand Will:	Decrease	Stay About the Same	Increase	No. of Panelists
Product Forms				
Fresh whole, eviscerated or filleted:				
- salmon	4	14	82	71
- groundfish	4	4	92	70
- crab	20	54	28	66
- shrimp	6	52	43	68
Frozen natural fillets:				
- salmon	1	17	82	71
- groundfish	1	10	87	70
Frozen:				
- crab	23	44	33	66
- shrimp	6	48	32	67
Frozen processed:				
- breaded fillets	10	28	62	68
- breaded fish sticks	24	25	51	69
- breaded shrimp	9	41	50	66
- salmon	0	33	67	67
- seafood analogs				
a. minced products	1	12	86	67

TABLE 7.2
(Continued)

U.S. Per Capita Demand Will: Product Forms	Decrease	Stay About the Same	Increase	No. of Panelists
- seafood analogs				
b. restructured seafood based meat products (i.e., sausages, ham, etc.)	0	8	92	63
Canned:				
- skinless and boneless salmon	16	40	44	67
- canned salmon	34	37	29	68
- crab	48	36	16	67
- shrimp	45	39	16	67
Cured:				
- salmon	9	46	45	68
- salmon roe	9	62	28	64
- herring roe	8	73	19	64
- groundfish	9	52	39	65
- groundfish roe	5	71	24	62

* Group expertise for this question is high 17%, medium 54%, and low 26%. The ratings of panelists who indicated a low level of expertise for this question have been excluded from the table.

(R1-Q:C2, average n = 71)

Factors Affecting Domestic and Foreign Demand

Seven factors that affect consumer demand for seafood products were submitted to the panel to rank. The panel was requested to review the list and rank the top five factors according to their impact on domestic and foreign demand. The panel was also instructed to add other factors not included in the list we provided.

As presented in Table 7.3, product price, consistency of supply, and perceived quality appear to affect foreign demand for seafood products more than domestic consumer demand, while change in dietary habits, price of substitutes, and ease of preparation appear to be relatively more important to American consumers. Exchange rate (which could be subsumed under product price) was the most often suggested additional factor affecting foreign demand while advertising and promotion were the most frequently suggested additional factors that affect domestic demand. Per capita income exerts about the same amount of influence in foreign and domestic seafood demand.

TABLE 7.3

Factors Affecting Domestic and Foreign Demand

Percentage of Panel that Ranked the Factor Among the Top Three Factors Having the Greatest Impact Upon Demand

Factors affecting demand	RANK	
	DOMESTIC	FOREIGN
1. Product price	87%	96%
2. Per capita income	54	57
3. Consistency of supply	40	48
4. Perceived quality	62	74
5. Change in dietary habits	61	35
6. Price of substitute products (beef, pork, chicken)	64	42
7. Ease of preparation	39	29

(R1-Q:C3, maximum n = 91)

Most Important Factors Necessary to Insure Consistent Quality of Domestic Seafood Products

U.S. seafood products are widely perceived as being of inferior quality when compared to the same products produced by foreign competitors. Given this, the panel was requested to rank the list of factors, given in the left column of Table 7.4, according to their importance for insuring consistent quality within the domestic seafood industry. The panelists were also requested to add important factors that were not included on the list we provided.

Product standards, education, product inspection, financial incentives for quality, and grading were the most important factors indicated by the panel. These confirm, at least partially, the group consensus reached in Chapter 5 (Displacement of Imports by Domestic Groundfish Production), that objective criteria are very important factors in the consumer's perception of quality. Additional factors that were most frequently suggested by the panelists were: advertising, loans and/or subsidies, and promotion of at-sea processing.

The main obstacles to improving domestic seafood quality may be the structure of the industry itself and the American consumer's relative lack of sophistication about seafood products. Even if producers can provide a prime quality product, distributors and brokers may be unwilling to pay a premium price if they think their customers aren't able to differentiate between a prime quality product and one of lesser quality. The ultimate solution to this problem is to educate the American consumer. A major promotional effort of seafood product standards should come from within the industry and would go a long way toward developing the domestic market according to panelist's comments.

TABLE 7.4

Most Important Factors Necessary to
Insure Consistent Quality of Seafood Products

FACTORS	Percentage of Panel Indicating the Factor as One of the Five Most Important
Product Standards	70%
Education	61%
Product Inspection	57%
Bonus payments to fishermen for quality	57%
Product grading	52%
Plant verification of quality control	38%
Quality seal	32%
Research	27%
Regulations - e.g., trip limits	10%
Operations plan	10%
Vessel/hold inspection	8%
Delivery schedules for fishermen	8%

(R1-Q:C7, maximum n = 70)

Consumer Product Differentiation Between "Wild" and "Farmed" Salmon

In the European white tablecloth restaurant market, particularly the British portion, wild Atlantic salmon (as opposed to pen-reared) has enjoyed a premium position. Customers apparently have some basis for this product differentiation. The panel was instructed to provide what they believe is the basis for this consumer preference. Most panelists gave a similar response. That is, that the premium price and prestige accorded to "wild" Atlantic salmon is primarily based upon snob appeal, image, or national chauvanism rather than objective criteria.

In addition, the panel was asked the following corollary question. "Over time, would 'wild Pacific salmon' maintain a preferred U.S. market position over pen-reared Atlantic salmon without special advertising?" In response, 28% of the panel answered "Yes," 51% answered "No," (21% indicated that they did not know, n = 64). Comments were solicited for both of these questions and selected comments are reported on Table 7.5. The comments were selected on the basis of the frequency of a single or similar concept or issue being stated by the panel members.

TABLE 7.5

Basis for Product Differentiation Between
Wild and Farmed Salmon

Summarized Panel Comments

- Most Europeans are convinced that "salmon salar" is superior to any Pacific salmon. I think the most important factor in the European market is that Atlantic salmon is almost always marketed fresh, while Pacific salmon have been frozen and shipped by boat. Some of the preference may be a "snob" effect, i.e., wild Atlantic salmon is more expensive, so supposedly it is better.

- Before we get into advertising, lets do more about quality. U.S. Pacific salmon's reputation has improved over the past few years, but we can do more. Advertising is very expensive and complex (we may end up increasing the consumption of Norwegian salmon).

- This is an example of prejudice based on a cherished belief rather than verifiable experience. It is possible that a slight flavor or texture distinction can be made. Perhaps the "wild" fish has firmer flesh due to better muscle tone, or that the feed of "wild" fish imparts a different flavor detectable by gourmets.

- Premium quality product at a premium price. Only Pacific Coast steelhead probably could command same price with a little promotion.

- Snob appeal, i.e., at the gourmet restaurant level. The thought that someone has risked life and limb to "hunt" to provide the meal carries great prestige. Could also be due to the appeal of being "natural."

- Only blindfold tests to compare organleptic perceptions by expert taste panelists would be a valid way to affirm or disspell any real differences. A good marketer would know exactly how to "glamorize" the pink or chum salmon through other means (e.g., diet entrees for weight watchers) rather than exact competition with the solidly established red and Kings. For three decades the South African lobster tail has brought a premium price over warm water species, but even the experts cannot detect a difference.

- Any industry should have its "high end, or superior product," and the leaping, wild salmon is a natural. However, special advertising would still be needed to guide public attitudes.

- Competition with "wild Atlantic salmon" could be extremely difficult. It is a different fish and tradition. Product substitution becomes more difficult at a narrow margin of sophistication in buyer's discrimination. We are talking about a very small segment of the consumers in any case.

- Relative scarcity, larger size and prestige of a "wild" fish.

- A natural consumer preference for domestic product over imports, assuming that quality is as good or better, frequently occurs the marketing of fish. You will find the same thing on the U.S. East Coast where Atlantic salmon (pen-reared) will have a strong appeal to the consumer because of the magic historical link to the once native Atlantic salmon in New England. It is also observed in the Japanese consumer preference for domestic produced salmon products over imports. Even the very carefully prepared chum salmon from Kotzebue or the Yukon, of excellent quality, still does not quite get the price of domestically produced chum salmon in Japan. I simply call this consumer preference based almost upon tradition alone.

TABLE 7.5
(Continued)

Basis for Product Differentiation Between
Wild and Farmed Salmon

Summarized Panel Comments
o "Image!" Perceived quality of wild fish is higher, perhaps customers feel wild diet is "more natural."
o I doubt that a promotional campaign could produce positive net benefits. Also, I doubt that the market size for this premium fish is large enough to warrant advertising.
o You must be prepared to market the "wild salmon" of equal quality and at a competitive price. Incidentally, the advertising campaign put on by Alaska two or three years ago was excellent and I don't what to discourage this kind of effort. Quality and price, however, are more important than special advertising in maintaining a premium position in the market.

(R2-Q:4.6 & 4.7, n = 64)

Role of Exchange Rates in the Development of the Domestic Groundfish Industry

The panel was requested to indicate on a four-point importance scale the relative importance of the role of exchange rates in the development of the U.S. groundfish industry. Ninety-two percent (92%) of the panel indicated that the role of exchange rates was either "Very Important" or "Important," 8% indicated exchange rates were of little importance, and 2% indicated exchange rates were unimportant. Panelists that indicated a low level of expertise for this question are not included in the above percentages. Seventy-two panel members responded to this question, of which 20% or 16 persons indicated a low level of expertise for this question. The panel was also requested to briefly explain their response and their summarized explanations are given on Table 7.6.

A large proportion of the panel believe exchange rates will play an important role in future groundfish development. In their comments, panelists noted that even if domestic groundfish markets are aggressively promoted, a strong dollar only encourages imports and of course, the price of domestic products will be directly affected in export markets. There are a great many substitute species for groundfish products so Americanization of the FCZ is not the only answer, since alternative sources of supply are available in other parts of the world.

TABLE 7.6

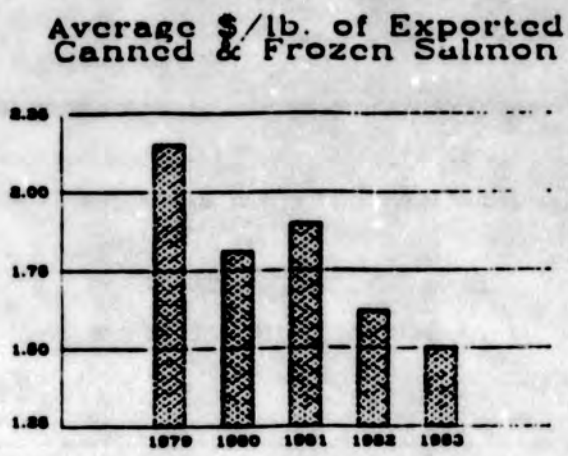
Role of Exchange Rates in Groundfish Development

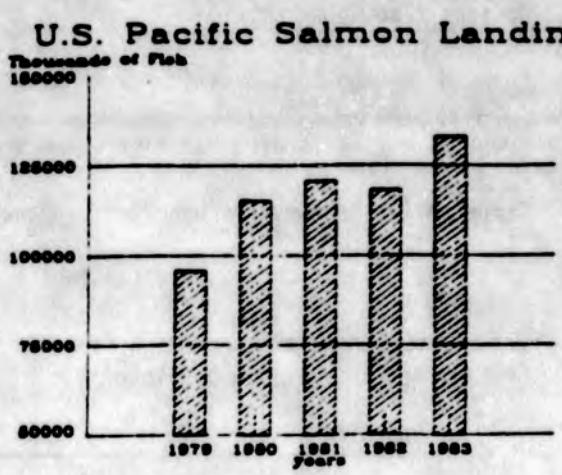
Summarized Panel Comments
o A strong dollar retards sales in a high volume, capital intensive, low unit value fishery. Differences of $5 - $20/mt. of finished product can be crucial.
o In my recent discussions with Japanese and European traders, exchange rates have outstripped quality as a major impediment to sales of Alaskan products.
o This problem makes it much harder for U.S. producers to keep their share of the U.S. market e.g., Arctic Trawler cod in the U.S. food service sector must compete with Icelandic imports which get steadily cheaper as the dollar increases in value.
o Exchange rates probably impact prices for all fish species more than any other factor in the long run.
o To the extent that we export groundfish products, a strong dollar will discourage sales.
o Current world markets are in other countries, U.S. acceptance of pollock and hake will be slow so exchange rates are very important.
o All EEC currencies at present make it nearly economically impossible to export salt cod even though there are currently good markets. Once trade barriers are lifted, the same will hold true for surimi and pollock blocks to Japan.
o There is not much elasticity in fish prices and absolutely no place to cut costs in U.S. groundfish production. Cheap imports will kill the U.S. effort.
o The world groundfish market is fiercely price competitive and largely determined by production outside the U.S.

(R1-Q:C6)

Strategies to Insulate U.S. Fishery Exports from Exchange Rate Fluctuations

Since 1979, the value per pound of canned and frozen salmon exported from the U.S. has fallen 25% (see graph at left). This drop has almost exactly paralleled the fall of the British pound (-25%), the French franc (-36%), to a lesser extent the Japanese yen (-9%) and the Canadian dollar (-5%). At the same time the supply of U.S. salmon was steadily increasing (see graph at right).*





Panelists were asked what could be done, aside from reducing the federal deficit, to insulate U.S. fishery exports from exchange rate fluctuations. They were instructed to briefly answer in terms of hedging strategies, futures markets, etc., that they were aware of in other countries or commodities.

As we expected, the overall level of panel expertise for this question was quite low. Forty-eight percent (48%) of the panel indicated a low level of expertise, 33% indicated a medium level of expertise, and 18% indicated a high level of expertise (n = 73).

There was considerable agreement among the panelists that little can be done to avoid long-term currency rate fluctuations. For the long-term, the most frequently mentioned strategies (Table 7.7) were: to develop the U.S. market, improve overall domestic seafood quality to stabilize the price, diversify product lines, and work to decrease tariffs, import quotas, and barriers to trade. Several panelists thought that a futures market, similar to agricultural futures, might work for frozen and canned products but was somewhat impractical for more perishable products and products with major supply fluctuations.

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*The source for the graphs is: At right, Alaska 1984 Catch and Production, Commercial Fisheries Statistics, Alaska Department of Fish and Game, 1984. At left, Fisheries of the United States, 1983, Current Fisheries Statistics No. 8320, National Marine Fisheries Services, April, 1984, p. 58.

TABLE 7.7

Strategies to Insulate U.S. Fishery Exports
from Exchange Rate Fluctuations

Summarized Panel Comments
o Options trading market.
o Forward funding foreign exchange contracts.
o Hedge by buying foreign currency - speculate.
o Compensation schemes for exporters - draw backs, tax deductions, custom duty deductions.
o Subsidize freight charges similar to the Norwegians.
o Enter into long-term supply agreements specified in commodities. With the Export Trading Company Act this is now possible.

(R1-Q:C4)

Effect of U.S. Export Trading Companies Upon Price Fluctuations

The panel was requested to reveal what they believed would be the effect of the recent advent of U.S. export trading companies upon future price fluctuations in exported seafood products.

As presented in Table 7.8, most panelists indicated that U.S. export trading companies will have little or no effect on price fluctuations for exported seafood products. Those panelists who view these companies as important factors in future international trade predict only moderate influence on prices. Several panelists pointed out that these companies are unlikely to become as powerful within the U.S. legal system as they are in Japan with its system of legalized cartels.

TABLE 7.8

Effect of U.S. Export Trading
Companies Upon Price Fluctuations

Summarized Panel Comments
o Probably very little as it is unlikely that long-term contacts would be specified in dollars.
o If U.S. companies were structured similar to Japanese zaibatsu (conglomerates unrestricted by anti-trust laws), then diversified export activity could stabilize prices since fish exports would be part of a larger portfolio.
o Very little, export trading companies don't seem to like perishables.
o Export trading companies are absolutely critical to get market power and deal with foreign exchange fluctuations.
o They may moderate fluctuations if trading companies are in a position to take advantage of hedging strategies.
o Very little effect unless U.S. exporters can learn to be cooperative instead of engaging in the fierce competition that now characterizes the export business.
o They will have a moderate impact. They won't be as effective as similar organizations in other countries due to anti-trust legislation.
o Price fluctuations should stabilize since trading companies could collude to establish price floors.
o Export trading companies will follow market demand and not lead it, thus, they will not exert price control.

(R1-Q:C5)

CHAPTER 8

METHODOLOGY

- The Delphi Method
- Study Design
- The Delphi Panel
- The Delphi Questionnaires
- Procedure
- Analysis and Interpretation of the Results

The Delphi Method

The basic Delphi process in involves a small research team that designs a questionnaire which is sent to a larger respondent group. After the questionnaire is returned the research team summarizes the results and, based upon the results, develops a new questionnaire for the respondent group. The respondent group is given an opportunity to re-evaluate its original answers based on an examination of the group response. This form of Delphi represents a combination of a polling procedure and a conference procedure that attempts to shift a significant portion of the effort needed for individuals to communicate from the larger respondent group to the smaller research team.

Usually the Delphi process undergoes three phases. The first is characterized by exploration of the subject under discussion, where each respondent contributes information (s)he feels is germane to the issue. The second phase involves reaching an understanding of how the group views the issue (where the members agree or disagree). Typically, new areas of inquiry are added as a consequence. If there is significant disagreement, then it is explored in the third phase.

Study Design

The study's focus was defined by the Director of the Office of Commercial Fisheries Development at the direction of the Governor's Mini-Cabinet on Fisheries. The study focus was refined in consultation with an advisory consulting work group, which was composed of eight persons who have in-depth knowledge of different aspects of the North Pacific seafood industry. This group met for a total of three days with the research team in order to identify critical issues and events facing the industry in the next 20 years and to identify issue areas that could be usefully analyzed using the Delphi method.

Once identified, the issue areas were translated into questionnaire items for the first questionnaire. A total of three questionnaires were constructed by the research group and disseminated to the respondent panel. The panel was composed of industry representatives who were judged to have expert knowledge by the eight member consulting work group. After the return of the first and second questionnaires, the research team analyzed the panel responses, then constructed the next questionnaire based on the responses to the previous one. In the case of the first questionnaire, most respondent data was in the form of written narrative responses. These data were analyzed, summarized, and turned into a set of panel assertions. The assertions represent the panel's narrative responses and were presented to the panel to evaluate in the second questionnaire.

The analysis of the results of the second questionnaire was primarily based on the tabulated frequency distributions for each rated assertion in the previous questionnaire. The panel used a six-point validity scale or a four-point importance scale to rate the assertions (Tables 8.10 and 8.11). Construction of the third and last questionnaire involved selecting assertions for re-evaluation by the panel, and reporting assertions that revealed a high amount of consensus by the panel. Also, new questions that were introduced in the second questionnaire was evaluated by the panel in the third questionnaire.

The Delphi Panel

The panel members were selected on the basis of expertise, the sector of the industry they represent, and on maintaining a regional balance. The eight member consulting work group was responsible for nominating most of the prospective panel members. This advisory group provided a list of 249 names and rated each nominee according to two criteria. The criteria were: level of expertise in the six seafood issue categories of supply, demand, trade, marketing, price, and policy. The second criteria was the sector of the seafood industry that the nominee represents, i.e., government, university, industry-harvester, industry-processor, and industry-distributor. The final determination of the membership of the panel of respondents was the responsibility of the research group based upon these criteria and on producing a regional balance of representation. The advisory group also provided narrative descriptions of the panel nominee's expertise.

From an initial list of 249 potential panelists, 183 were invited to participate in the study with the expectation that about 50 percent would accept. Of the 183 potential panelists, 101 (55%) returned a completed questionnaire. For Round 2, 101 questionnaires were sent to the Round 1 panelists and 78 (77% response rate) panelists completed and returned the questionnaire. For Round 3, 78 questionnaires were sent to the Round 2 panelists and 70 were completed and returned. This represents a 90% response rate for the third questionnaire. Eight questionnaires were returned too late to include in the Round 3 analysis. Based on the initial panel size of 101, the response rate at the Round 3 stage was 69%.

The relatively high response rate is an indication of the dedication and patience of the panel. They persevered through 140 pages of instructions and questionnaires which contained over 500 variables.

In the Round 1 questionnaire, the panel members were requested to rate their level of expertise in six seafood categories and the sector of the industry that they represent. The panelists used the same scales as those used by the advisory group who nominated them. Table 8.1 displays the panel composition categorized by the six seafood issue categories. Panelists self-rated their expertise level according to the criteria given in the expertise scale (Table 8.2). The panel composition for Rounds 2 and 3 are also given on Table 8.1. The proportions among the six seafood issue categories remained relatively constant across the three rounds of questionnaires.

Table 8.1

Panel Expertise for Three Questionnaire Rounds

	Expertise Level	Seafood Issue Categories					
		Supply	Demand	Trade	Market-ing	Price	Policy
Round 1	High	57%	33%	27%	27%	31%	49%
N = 101	Medium	32	52	45	53	46	40
	Low	11	15	28	20	23	11
Round 2	High	55%	33%	24%	25%	28%	48%
N = 78	Medium	37	53	54	55	47	43
	Low	8	14	22	20	25	9
Round 3	High	61%	33%	27%	23%	28%	49%
N = 62	Medium	34	54	50	55	43	44
	Low	5	13	23	22	29	7

(R1-p.3, maximum missing = 7 in Round 1)

Table 8.2

Expertise Rating Scale

High	Actively involved in decisions, research or analysis in this area.
Medium	Informed in this area through reading reports, listening to expert testimony, or conversation with experts.
Low	Knowledge or expertise about the same as a well informed citizen.
No Response	If you feel you have insufficient expertise for a particular question or topic, you may leave the expertise scale and the question blank.

Table 8.3 displays the relative expertise of the Round 1 panel according to the number of high ratings the panelists self-designated in the six seafood issue categories. A maximum of six high designations, one for each of the six categories, was allowed. About 7% of the panel self-rated their expertise as high in all six seafood issue categories. About 38% of the panel self-rated their expertise as high in three or more of the six categories. Approximately 20% of the panel rated their expertise in the seafood issue categories as medium or low.

Table 8.3

Number of High Ratings Each Panelist
Self-assigned in the Six Seafood Issue Areas *

	Frequency	
Number of High Ratings	Percent	No. of Panelists
6	7.4%	7
5	7.4	7
4	5.3	5
3	18.1	17
2	25.6	24
1	14.9	14
0	21.3	20
Total	100.0	94

* A maximum number of six ratings per panelist was allowed.

(R1-p.3)

In the Round 1 questionnaire, the panelists indicated which sectors of the seafood industry that best described their knowledge area. The panelists could indicate up to five seafood industry sectors. Table 8.4 illustrates the percent of panelists that indicated each of the five sectors as the area(s) that best described the industry sector they represent. Panelists were allowed to designate more than one sector. The relative proportion of representation in the industry sectors was maintained throughout the three rounds, with only the Industry-Distributor sector as an exception. This sector changed from 21% to 13% from Round 1 to Round 3. This reduction indicates that the greatest attrition rate was in the Industry-Distributor sector. Of the 48% of the panel (in Round 1) that indicated the Government category, 53% (n = 25) also indicated the Industry-Harvester category, 36% (n = 17) of the panel that indicated the Government category also indicated the University category, and 30% (n = 14) of those who indicated the Government category also indicated the Industry-Processor category.

Table 8.5 displays the percentage of panelists that indicated five (the maximum allowed) or less seafood industry sections. About 50 percent of the panel indicated one sector, 21% indicated two sectors, and 22% of the panel indicated three sectors. The geographic representation of the panel is given on Table 8.6. About one-third of the panel had mailing addresses in Alaska, about one-third in Washington, and about 13% of the panel had addresses outside the U.S.

Table 8.4

Panel Representation In Five Industry Sectors
for Three Questionnaire Rounds *

	Sectors				
			Industry		
Round	Government	University	Harvester	Processor	Distributor
1	48%	30%	38%	44%	21%
N = 101					
2	51%	35%	35%	41%	18%
N = 78					
3	51%	36%	30%	43%	13%
N = 61					

* Panelists checked more than one category, therefore the rows will not sum to 100 percent.

(R1-p.3, maximum missing = 3 in Round 1)

Table 8.5

Percent of Panelists Indicating Five or Less Seafood Industry Sectors*

No. of Categories Indicated	Frequency	
	No. of Panelists	Percent
5	2	2.0
4	3	3.1
3	22	22.5
2	21	21.4
1	50	51.0
Total	98	14

* A maximum number of five categories per panelist was allowed.

(R1-p.3, missing = 3)

Table 8.6

Geographic Representation of the Panel
at the Round 1 Stage

Geographic Location	Percent	Number
United States		
Alabama	1	1
Alaska	36	37
California	5	5
District of Columbia	2	2
Illinois	2	2
Kansas	2	1
Kentucky	1	1
New York	2	2
North Carolina	1	1
Oregon	4	4
Rhode Island	1	1
Washington	30	31
Canada		
British Columbia	5	5
Nova Scotia	1	1
Quebec	1	1
United Kingdom		
England	1	1
Ireland	1	1
Scotland	1	1
Japan	2	2
Chile	1	1
Total	100	101

The Delphi Questionnaires

The questions that were posed to the panel covered a wide range of topics and issues and generally were technical in nature. The questionnaire items were constructed by the research team after consultation with the advisory consulting group. The questionnaires were pretested by having the advisory group of experts complete and comment on each of the three questionnaires. The selection of subject areas of inquiry were directed by the project objectives and the advisory group. The basic format used for the questions was to provide a factual/historical context of information about the subject area, then the specific question followed. Tables 8.7, 8.8, and 8.9 list the contents of the three questionnaires. The three questionnaires are shown in Appendix B.

Table 8.7
Contents of the First Round Questionnaire

Panelists were requested to:

- Identify the three most important issues or questions facing the North Pacific seafood industry in the next 20 years.
- Predict global and national developments that may affect the North Pacific seafood industry.
- Predict the effects of the potential release of 11 billion salmon fry into the North Pacific by the year 2000.
- Project whether net profits to fishers and processors will increase as a consequence of a five-fold increase in the Alaska hatchery release of salmon fry.
- Describe the implications of the trend in the increasing Japanese coastal salmon catch and declining high seas harvest for the U.S. salmon industry.
- Predict U.S. demand for selected product forms.
- Rank the relative importance of factors that affect consumer demand for seafood products.
- Identify strategies to insulate U.S. fishery exports from exchange rate fluctuations.
- Evaluate the role of exchange rates in the development of the domestic groundfish industry.
- Rank the most important factors necessary to insure consistent quality of seafood products.
- Describe the effects on the U.S. industry resulting from a 50% cut in the TALFF.
- Identify areas of comparative advantage for U.S. producers in international markets.
- Predict the relative share of groundfish production for joint ventures vs. domestic processors vs. foreign catch.
- Predict the future share of domestic groundfish processing: floaters vs. shore-side.
- Predict whether domestic groundfish production will displace imports in the next 20 years.
- Rank the factors that affect the competitiveness of the domestic processing industry.

Table 8.7
Contents of the First Round Questionnaire
(Continued)

- Identify the reasons why the U.S. seafood industry is not in the forefront of the development of the domestic surimi market.
- Rank the growth potential of six U.S. seafood market segments.
- Describe future changes needed for Alaska hatchery programs to maintain competitiveness.
- Rate the relative importance of 15 seafood areas where further research is needed.

Table 8.8
Contents of the Second Round Questionnaire

- General feedback from Round 1

Panelists were requested to:

- Rate the relative validity of the panelists' predictions about the effect of the potential release of 11 billion salmon fry into the North Pacific by the year 2000.
- Rate the relative validity of the panelists' answers describing the implications of the trend in the increasing Japanese coastal catch and declining high seas harvest for the U.S. salmon industry.
- Describe the role they foresee for pen-reared salmon in Alaska's future.
- Identify the political implications of farming versus hunting in Alaska salmon fisheries.
- Describe the geographic dislocation of traditional fisheries due to the distribution of hatchery fish.
- Rate the relative validity of the panelists' responses to the question on future changes needed for Alaska hatchery programs to maintain competitiveness.
- Evaluate and explain the preferred types of cost recovery for privately-held hatcheries.
- Rate the relative validity of the panelists' responses to whether domestic groundfish production will displace imports in the next 20 years.
- Rate the relative validity of the panelists' responses to why the U.S. seafood industry is not in the forefront of the development of the domestic surimi market.
- Describe what Alaska can do to encourage the development of a "value-added" industry.
- Explain how to overcome limitations to the development of shore-based processing of pollock and yellowfin sole.
- Indicate whether medium sized factory vessels are a viable option for increasing Alaska's share of the "value-added" industry.

Table 8.8
Contents of the Second Round Questionnaire
(Continued)

- Rate the relative validity of the panelists' responses to whether net profits to fishers and processors will increase as a consequence of a five-fold increase in the Alaska hatchery release of salmon fry.
- Re-evaluate whether U.S. salmon fishers' net profits will increase or not.
- Predict whether U.S. salmon fishers' net profits will increase at a 21 to 28 million salmon catch level.
- Predict the average total Alaska commercial salmon harvest for the next 20 years and the range around the average they would use for a confidence interval.
- Indicate whether world salmon markets can absorb projected pink and chum supply levels at prices which will provide an adequate return on investment for fishers.
- Explain the basis for consumer product differentiation between wild and pen-reared salmon.
- Rate the relative importance of the panelists' responses describing the major impediments to the development of Alaska's fishing potential.
- Rate the relative importance of the panelists' responses describing the most important question or issues relevant to the development of the North Pacific seafood industry in the next 20 years.

Table 8.9
Contents of the Third Round Questionnaire

- A "Feedback Document" accompanied this questionnaire which was a report of a preliminary analysis of Round 1 and 2 data.

Panelists were requested to:

- Re-evaluate panel assertions concerning the implications of the potential release of 11 billion salmon fry into the North Pacific by the year 2000.
- Re-evaluate panel assertions concerning the implications of the trend in the increasing Japanese coastal salmon catch and declining high seas harvest for the U.S. salmon industry.
- Re-evaluate panel assertions related to future changes needed for Alaska hatchery programs to maintain competitiveness.
- Evaluate panel answers describing the role of pen-reared salmon in Alaska's future.
- Evaluate panel responses concerning the political implications of farming versus hunting in Alaska salmon fisheries.
- Evaluate panel responses to whether fishers and processors should share in the costs and/or profits of privately held hatcheries.

Table 8.9
Contents of the Third Round Questionnaire
(Continued)

o Evaluate panel responses concerning whether the State (ADF&G) should manage common property fisheries to allow sufficient escapement for total, partial, or no cost recovery.
o Evaluate panel answers describing the means that should be used to finance nonprofit, private hatcheries if there is partial or no cost recovery from returning adults.
o Evaluate panel responses about what Alaska can do to encourage the development of a "value-added" industry.
o Evaluate panel responses concerning how to overcome limitations to the development of shore-based processing of pollock and yellowfin sole.

A number of different response formats were used in the questionnaires. The primary format used during the first and second questionnaire was open-ended and required panelists to write in their own unique response. Another primary format used in the second and third questionnaires was close-ended and required the panel to rate the questionnaire items by using a six-point validity scale or a four-point importance scale (Tables 8.10 and 8.11). These scales have been frequently used in Delphi studies to define validity and importance. Panelists also responded to a three-point expertise scale for a number of questions in Round 1 (Table 8.2). The group's relative expertise for a question is reported with the analysis. A General Comments section was provided at the end of each questionnaire for the panel to comment on specific items and the Delphi process in general.

The time horizon used in this study about future developments in the seafood industry was the year 2000 and/or 20 years into the future.

A key feature of the Delphi is the process where the panel reviews and evaluates the contributions of the other panel members. In Rounds 2 and 3, panel responses were summarized and transformed into conceptual "assertions." These assertions represent the conceptual answer originally offered by the panelist to the question. The wording of the responses frequently had to be modified or shortened. However, whenever possible, the exact wording of a panelist's comment was retained. The assertions, the summarized panel responses, were fed back to the panel along with the original question. The panel was instructed to review the original question and evaluate the list of assertions according to how valid or reliable each assertion was as a contribution to an answer to the original question. The bulk of Rounds 2 and 3 questionnaires was largely due to the panel assertions (i.e., responses/ variables) that were presented to the panel to evaluate.

In Rounds 2 and 3, the panel evaluated approximately 500 assertions and reevaluated 40 assertions that revealed no clear panel position. Specifically, items for re-evaluation in Round 3 were selected from Round 2 assertions which displayed a frequency distribution where less than 66% of the panel, but more than 40% of the panel, indicated the assertion was valid or reliable. Panel assertions that were judged valid and/or reliable by 66% or more of the panel were defined as having a high amount of consensus. As a result, these assertions were given as feedback information only in Round 3.

Table 8.10

Validity Rating Scale

Numeric Scale		
1	VALID	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	RELIABLE	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	NOT DETERMINABLE	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	RISKY	- substantial risk of being wrong - not willing to make a decision based upon this - many incorrect inferences can be drawn
5	UNRELIABLE	- great risk of being wrong - worthless as a decision basis
6	NOT PERTINENT	- even if the assertion is VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

Table 8.11

Importance Rating Scale

Score Value	Importance (Priority or Relevance)
1 Very Important	- a most relevant point - first-order priority - has direct bearing on major issues - must be resolved, dealt with, or treated
2 Important	- is relevant to the issue - second-order priority - significant impact but not until other items are treated - does not have to be fully resolved
3 Of Minor Importance	- insignificantly relevant - third-order priority - has little importance - not a determining factor to major issue
4 Unimportant	- no priority - no relevance - no measurable effect - should be dropped as an item to consider

Procedure

The first Delphi questionnaire was mailed in June 1984, the second in November, and the third was mailed in March, 1985. The Round 1 questionnaire was accompanied by a letter from the Governor of Alaska that invited the prospective panelist to participate. Panelists were given six weeks to complete and return their questionnaire. The questionnaire was 27 pages long and requested many open-ended narrative responses. Many panelists commented that it took them about three hours to complete.

The content of the open-ended narrative data was analyzed using a rigorously applied method to control for subjective bias. Responses to a question were compiled and reviewed. Content areas which were unique conceptually and represented the position of a significant portion of the panel were listed. This preliminary list of summarized panel responses was then re-applied to the body of panel responses in order to validate their importance and to refine the preliminary list. This process was applied to all open-ended questions.

Inevitably, some ambiguity about the meaning of a panelist's response occurred during the summarization of the narrative data. By requiring the panel to evaluate the validity of each summarized panel assertion, the potential bias of the research group is mitigated. In other words, the panel as a group essentially selected which assertions were valid and which were not by rating the assertions.

Analysis of the content of the panel's response to the open-ended questions was an exceedingly time-consuming process. Those panelists with strongly held views on a particular issue tended to express themselves in detail and at great length. The panel was encouraged to make comments at any point in the questionnaire, and many did.

The second questionnaire, sent in November 1984, was 76 pages long and contained over 200 panel assertions to be rated. It also contained 14 new "probe" questions that were generated from analysis of the Round 1 results. The panel was allowed two months to complete and return the

questionnaire. The evaluated and rated data were coded and submitted for computer analysis using SAS Software in the State's IBM Mainframe computer. The open-ended data was analyzed using the same procedure described in the analysis of Round 1 narrative data.

In Round 3 analysis, some assertions that received less than 40% support at this evaluation phase were retained for analysis. The frequency distribution of the panel responses from Round 2 were reported along with the assertions presented in the Round 3 questionnaire. No new questions were included in the last questionnaire. The third questionnaire was mailed to 87 panelists in March 1985, and 62 were returned within six weeks. Since this questionnaire contained only fixed response data, analysis was performed on the computer.

Analysis and Interpretation of the Data

In this final report, the data gathered in all three rounds of the questionnaires were brought together. Each question (or group of questions where they have been combined) is accompanied by a "summary statement" that gives a general sense of the group response and a set of assertions which are representative or provacative. In other cases, particularly where there were many lengthy or complicated answers, a fairly long summary was necessary to provide a context for the panelists' responses. Occasionally statements from the general comments section are brought in to clarify a point. In all cases, the analysis and interpretation have remained minimal and secondary to the panel's responses. In some cases the assertions themselves tell the story and need little summarization.

The reader should read through the questions, tables, and summary statements for a general overview and then explore the assertions and their ratings for a more complete range of views on a particular issue. The principle form of the data reported in the foregoing chapters are tables of panel responses that have been validated by the panel using either the validity or importance scales. The panel responses or assertions that were judged as valid or reliable (2 of the 6 points on the validity scale) by at least 40% of the panel were considered sufficiently valid for inclusion in the final analysis. Although this proportion represents a minority, we nonetheless consider it a significant minority.

The assertions represent what the panelists believe to be valid or reliable statements. These statements (assertions) were interpreted as reliable indicators relevant to producing an answer to the original question. The assertions represent relevant concepts that should be considered in a search for a complete answer to the questions. The assertions may also be defined as a set of statements that are important to consider in an analysis of future trends in the industry. At the same time, the assertions do not represent a total answer to a question. Generally, the questions were complex, broad, and far-reaching. Each could require years of basic research to fully address. What the assertions do reveal is what a group of industry representatives think about the future outcome of some of the critical issues facing the North Pacific seafood industry in the next 20 years.

APPENDIX A

THE DELPHI PANEL

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Small Business Dev.
Victoria, B.C. Canada

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Natural Resource Consultants
Seattle, Washington

Don Amend
Southern Southeastern Alaska
Regional Aquaculture Assoc.
Ketchikan, Alaska

Nels Anderson
Dillingham, Alaska

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Alvin Burch
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Warehousemen's Union
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JAC Creative Foods, Inc.
Los Angeles, California

Curt Kerns
University of Alaska
Juneau, Alaska

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National Marine Fisheries Service
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APPENDIX B

THE DELPHI QUESTIONNAIRES

DELPHI QUESTIONNAIRE #1

Department of Commerce and Economic Development

Office of Commercial Fisheries Development

Please return completed questionnaire to;

Department of Commerce and
Economic Development
Pouch D
Juneau, Alaska 99811

Lynn Hutton, Project Director
(907) 465-2079 ext. 43

Jeannette Mitchell
Research Assistant
(907) 465-2079 ext. 20

GENERAL INSTRUCTIONS

This is the first of the three Delphi questionnaires you will receive on future developments in the North Pacific seafood industry. We are interested in knowing what you think will happen, and why it will happen. Thus, we are asking you to provide both projections of future events or trends, and comments explaining your reasoning.

Because this study is being undertaken on behalf of the Office of Commercial Fisheries Development, of the Alaska Department of Commerce and Economic Development, our questions focus heavily upon the North Pacific seafood industry and the U.S. seafood market. Unfortunately, other aspects of the U.S. seafood industry, such as East and Gulf coast markets are beyond the scope of this particular study. The inclusion of a project, trend, or policy in this questionnaire should not be interpreted to imply a bias, for or against, rather they are included due to their potential impact.

This first questionnaire focuses on an overview of events and trends that may impact the future of the North Pacific seafood industry, while the two subsequent questionnaires will provide feedback from previous round results and examine disagreement in greater depth. This first questionnaire consists of the following sections:

- FUNDAMENTAL ISSUES

  In this section, you are requested to identify the three most significant questions or issues facing the North Pacific fisheries.

- GLOBAL AND NATIONAL FORECASTS

  In this section, you are asked to identify international developments of importance to U.S. and Alaskan fisheries.

- MARKET PLACE

  In this section, the U.S. seafood industry's position in national and international markets is explored.

- FUTURE ALTERNATIVES

  In this section, long-term issues affecting the future competitiveness of the U.S. and Alaskan fishing industries are raised.

Included with a number of the questions which follow is an expertise scale. Please rate your self-assessed level of expertise in reference to the specific question to which it refers. Use the following guideline as a basis for your self rating.

Knowledge or expertise rating scale

High	Actively involved in decisions, research or analysis in this area.
Medium	Informed in this area through reading reports, listening to expert testimony, or conversation with experts.
Low	Knowledge or expertise about the same as a well informed citizen.
No Response	If you feel you have insufficient expertise for a particular question or topic, you may leave the expertise scale and the question blank.

A GLOSSARY of terms is included on page four of the questionnaire for reference.

In order to classify the type of fisheries expertise of the panel members, we request that you self-rate your level of expertise in the six seafood issue categories given below. Put "H" for high, "M" for medium or "L" for low in each box.

Supply	Demand	Trade	Marketing	Price	Policy

Put a check in the appropriate box(s) to indicate which sector of the seafood industry you believe best describes your knowledge area.

		Industry		
Government	University	Harvester	Processor	Distribution

Glossary of terms

Jones Act - Requires U.S. crews on U.S. built boats conducting commerce between U.S. ports.

Cohort recruitment - A cohort is a given year class of salmon. Stocks of salmon are managed to insure enough escapement of spawners to provide for continuation of supply.

TALFF - Total Allowable Level of Foreign Fishing quota system for foreign vessels operating within the U.S. Fisheries Conservation Zone (200 mile limit) established by the Magnuson Act in 1977.

Surimi - A high protein fish paste used heavily by the Japanese usually made from minced pollock. Surimi products include imitation crab legs, shrimp "perfects," fish portions, sausages and hams.

Joint Ventures - A co-operative harvesting/processing agreement between domestic fishermen and foreign processor within the U.S. Fisheries Conservation Zone. Joint ventures can be classified as "over the side" operations, where U.S fishermen just sell their catch to a foreign processing vessel; or a true joint venture, where equity and profits for the whole operation are shared by both parties. At present, of the 21 so called joint ventures, only one Marine Resources (U.S. and U.S.S.R.) qualifies as something of a true joint venture. The others are all "over the side" operations.

Common Property Salmon Fishery - Salmon returning to their rearing streams and lakes are intercepted by U.S. fishing fleets in what is known as the common property fishery. Salmon stocks from hatcheries (public and private) as well as native stocks mingle together until they reach their terminal areas. The common property fishery is controlled by limited entry permits, vessel size, area, and gear limitations. Escapement for each area is managed through season openings and closures with the primary purpose of maintaining wild stocks.

A. FUNDAMENTAL ISSUES

On the following pages, we will ask you to respond to specific questions regarding the future of the world and national seafood industries. However, the mere statement of a particular question focuses thinking in a particular direction, and thus introduces a form of bias. We believe that it is necessary to obtain some insights from you before your thinking may be influenced by the questionnaire. IN YOUR OPINION...

what are the three most important questions or issues relevant to the development of the North Pacific seafood industry in the next 20 years?

(After responding, please rank your list in terms of their priorities; first, second, and third.)

_____

_____

_____

_____

_____ Priority:

_____

_____

_____

_____

_____ Priority:

_____

_____

_____

_____

_____ Priority:

B. FORECASTING GLOBAL AND NATIONAL DEVELOPMENTS

The future of the U.S. seafood industry is affected by developments outside its borders, and thus, outside its direct control. In order to fully understand your views of the U.S. seafood industry's future, we need to have some idea of how you see the global and national context in which the U.S. industry will exist from now until the year 2000. Some possible key developments are listed on the next page.

Please indicate with a checkmark for each development:

1. the likelihood or probability of the event occurring.
2. the impact on the U.S. seafood industry should the event occur.
3. your level of expertise for each.

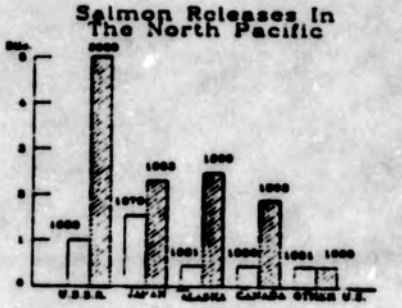
If important developments have been omitted, please enter them in the spaces provided at the end of the list.

POTENTIAL DEVELOPMENTS	LIKELIHOOD OF OCCURRENCE BY 2000						IMPACT ON U.S. SEAFOOD INDUSTRY IF DEVELOPMENT WERE TO OCCUR				MY EXPERTISE LEVEL FOR THIS QUESTION		
	Very Probable (80-100%)	Probable (60-80%)	Either Way (40-60%)	Improbable (20-40%)	Very Improbable (0-20%)	No Judgement	Strong	Moderate	Slight or None	No Judgement	High	Medium	Low
1. Pacific Rim Common market established.													
2. Dramatic increase in "protectionism" in world trade.													
3. Pen reared (farmed) salmon will largely displace "caught at sea" salmon in the white tablecloth restaurant and European smoker markets.													
4. The maximum sustainable production and yield of ocean reared (wild stocks and hatchery releases) salmon is reached in the North Pacific.													
5. Japan will dramatically reduce imports of U.S. salmon by meeting demand through domestic production.													
6. Europe will dramatically reduce imports of U.S. salmon by meeting demand through domestic production.													

POTENTIAL DEVELOPMENTS (Continued)	LIKELIHOOD OF OCCURRENCE BY 2000						IMPACT ON U.S. SEAFOOD INDUSTRY IF DEVELOPMENT WERE TO OCCUR				MY EXPERTISE LEVEL FOR THIS QUESTION		
	Very Probable (80-100%)	Probable (60-80%)	Either Way (40-60%)	Improbable (20-40%)	Very Improbable (0-20%)	No Judgement	Strong	Moderate	Slight or None	No Judgement	High	Medium	Low
7. Third world countries will become major markets for U.S. salmon.													
8. Third world countries will become major markets for U.S. groundfish.													
9. Alaska becomes the principal supplier of U.S. groundfish.													
10. 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 Conservation Zone.													
11. U.S. fishermen and processors completely displace foreign fishing effort in the U.S. FCZ.													
12. A futures market for U.S. seafoods is developed.													

POTENTIAL DEVELOPMENTS (Continued)	LIKELIHOOD OF OCCURRENCE BY 2000						IMPACT ON U.S. SEAFOOD INDUSTRY IF DEVELOPMENT WERE TO OCCUR				MY EXPERTISE LEVEL FOR THIS QUESTION		
	Very Probable (80-100%)	Probable (60-80%)	Either Way (40-60%)	Improbable (20-40%)	Very Improbable (0-20%)	No Judgement	Strong	Moderate	Slight or None	No Judgement	High	Medium	Low
13. U.S. export trading companies begin trading substantial quantities of seafood on world markets.													
14. The world fisheries harvest, exclusive of aquaculture, reaches its maximum sustainable level.													
15. Privately-owned salmon ranching operations largely displace publicly financed hatcheries in the U.S.													
16. The domestic common property salmon fishery is largely replaced by privately-owned ranching operations and automated harvesting facilities.													

14. 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.



a. What are the biological implications of these projected releases?

_____

_____

_____

b. What are the political implications of these hatchery plans in terms of future shares of ocean rearing grounds?

_____

_____

_____

c. What are the economic implications of these projected releases?

_____

_____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

15. Assuming that the planned five-fold increase in Alaskan hatchery releases of salmon fry (by 1990) will result in a long-term increase in the supply of salmon stocks; how will net profits be affected? (Assume a constant level of effort and constant dollars.) Check one of the three options.

a. Will U.S. salmon fishermen's net profit (check one):

___ - Increase
___ - Decrease
___ - Stay the same?

Briefly explain: _____

_____

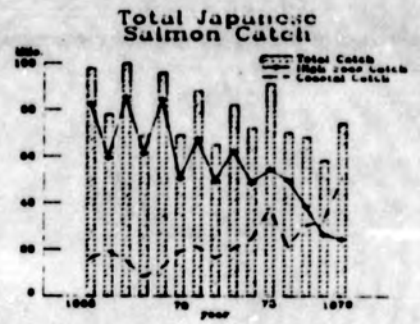
b. Will domestic processor's net profit (check one):

___ - Increase
___ - Decrease
___ - Stay the same?

Briefly explain: _____

_____

16. The effectiveness of the Japanese hatchery programs can be seen from the graph below. The high seas salmon catch has decreased significantly since the early 1970's, due mainly to international agreements to restrict the high seas harvest (Japan accounted for 61% of all U.S. fishery exports in 1983). During the same period, the Japanese coastal catch (consisting mainly of hatchery raised adult chum salmon) has increased enough to equal the previous 15 year average.



a. What are the implications of this trend (i.e., increasing Japanese coastal catch) for the U.S. salmon industry in the next 20 years? Please identify species in your answer.

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

C. MARKET PLACE

1. Canada (8.0%), the U.S. (7.4%), and Norway (6.5%) are the three leading exporters of fishery products (seven major fishery commodity groups compiled by FAO 1978-81) in order of market share. These respective market shares have remained relatively stable over the period for which data is available, while the total worldwide export market grew 32.8% to $5.3 billion in 1981.

What other exporters (nations) especially emerging players will become important in the next 20 years and in which species?

	Nation	Species
a.		
b.		
c.		

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

2. The U.S. market for fishery products is widely regarded as the largest underdeveloped market in the world. The American per capita annual consumption of edible commercial fish and shellfish products at 12.9 lbs. is less than half the world average of 27.1 lbs. Project whether per capita U.S. demand will increase or decrease from the current level for the product forms and species given below. Consider a 20 year future time frame in making your responses. Add product forms you believe will become important. Put one check mark for each product form (i.e., per row).

U.S. per capita demand will:

Product Forms and species	Decrease Sharply	Decrease Moderately	Stay about the same	Increase Moderately	Increase Sharply
Fresh whole, eviscerated or filleted:					
- salmon					
- groundfish					
- crab					
- shrimp					
- other shellfish (specify)					
Frozen natural fillets:					
- salmon					
- groundfish					
- other (specify)					
Frozen:					
- crab					
- shrimp					
- other shellfish (specify)					

U.S. per capita demand will:

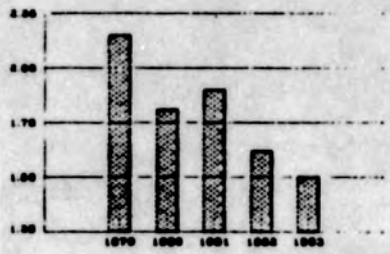
Product Forms and species	Decrease Sharply	Decrease Moderately	Stay about the same	Increase Moderately	Increase Sharply
Frozen processed:					
- breaded fillets					
- breaded fish sticks					
- breaded shrimp					
- salmon					
- seafood analogs					
a.. minced products					
b. restructured seafood based meat products (i.e., sausages, ham, etc.)					
- other (specify)					
Canned					
- skinless and boneless salmon					
- canned salmon					
- crab					
- shrimp					
- other (specify)					
Cured:					
- salmon					
- salmon roe					
- herring roe					
- groundfish					
- groundfish roe					
- other roe (specify)					

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

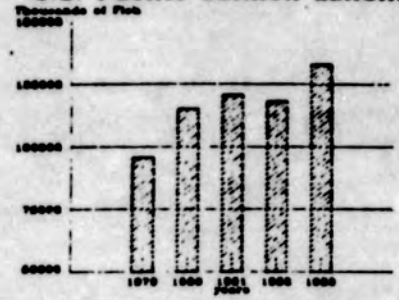
3. Given below are some factors that affect consumer demand for seafood products. Please review the list and add factors you think should be included. Then rank the top five factors (1 = greatest impact) according to their impact on foreign and domestic demand.

RANK ORDER FOREIGN	Factors affecting demand	RANK ORDER DOMESTIC
____	Product price	____
____	Per capita income	____
____	Consistency of supply	____
____	Perceived quality	____
____	Change in dietary habits	____
____	Price of substitute products (beef, pork, chicken)	____
____	Ease of preparation	____
____	_____	____
____	_____	____
____	_____	____

Average $/lb. of Exported Canned & Frozen Salmon



U.S. Pacific Salmon Landings



4. Since 1979, the value per pound of salmon exported from the U.S. has fallen 25% (see graph). This drop has almost exactly paralleled the fall of the British pound (-25%), the French franc (-36%), and to a lesser extent the Japanese yen (-9%) and the Canadian dollar (-5%). At the same time the supply of U.S. salmon was steadily increasing (see graph). What if anything (aside from reducing the federal deficit) can be done to insulate U.S. fishery exports from exchange rate fluctuations? Briefly answer in terms of hedging strategies, futures markets, etc., you are aware of in other countries or commodities.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

_____

5. What effect do you think the recent advent of U.S. export trading companies will have in the future on price fluctuations for exported seafood products?

_____

_____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

_____

6. How important will the role of exchange rates be in the development of the U.S. groundfish industry?

Very Important	Important	Little or Effect	Unimportant

Briefly explain.

_____

_____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

_____

7. U.S. seafood products are widely perceived as being of inferior quality when compared to the same products produced by foreign competitors. From your perspective (as related by your position in the industry checked on page 3), what are the most important factors government and/or industry can do to insure consistent quality within the domestic seafood industry? Listed below are several factors. First, add any additional items you feel may be important; then, rank the top five in order of importance.

RANK

____ Research

____ Education

____ Product Standards

____ Product Inspection

____ Vessel/hold Inspection

____ Regulations - e.g., trip limits

____ Plant verification of quality control

____ Operations plan

____ Product grading

____ Quality seal

____ Delivery schedules for fishermen

____ Bonus payments to fishermen for quality

D. FUTURE ALTERNATIVES

1. The 1983 Total Allowable Level of Foreign Fishing (TALFF) under the Magnuson Act for the U.S. Pacific Coast was 1,767,792 mt. of which 98% of the harvest occurred in Alaskan waters. The relative shares of the total Alaska groundfish harvest can be partitioned as follows:

Joint Ventures	352,874.6 mt	+93% from '82 level
Domestic Processors	46,651.1	+46%
Foreign Catch	1,124,836.2	-16%
TOTAL	1,524,361.9 mt	- 2%

If a large cut in the TALFF, say 50%, were to occur, what would be the resulting positive and negative effects on U.S. fishing, processing, and marketing firms?

a. Fishing firms - positive effect _____

_____

b. Fishing firms - negative effect _____

_____

c. Processing firms - positive effect _____

_____

d. Processing firms - negative effect _____

_____

e. Marketing firms - positive effect _____

_____

f. Marketing firms - negative effect _____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

_____

2. Do you believe a large cut in the TALFF would result in retaliation in other seafood markets, e.g., salmon? YES NO DON'T KNOW

Briefly explain _____

_____

_____

3. Given your knowledge of the species and products involved: what areas of comparative advantage do you think U.S. producers can exploit in the competitive world seafood markets of the future? Consider for examples the recent introduction of pen raised salmon into international markets and the planned North Pacific hatchery releases previously mentioned. Be specific in terms of species and/or product forms, and market segments.

a. _____

_____

_____

b. _____

_____

_____

c. _____

_____

_____

_____

My expertise level for this question is: (Circle One) HIGH MEDIUM LOW

_____

4. 98% of the Pacific Coast groundfish catch is taken in Alaska's waters. Given your knowledge of developments within the U.S. groundfish industry, forecast the relative percentage shares of the total Alaskan harvest for the following years.

	1983	1990	2000
Joint Ventures	23%		
Domestic Processors	3%		
Foreign Catch	74%		
	100%	100%	100%

5. Domestic groundfish processors can be classified as floaters (consisting mainly of U.S. factory trawlers - twelve in operation currently, mostly producing frozen-at-sea cod fillets) and shore based processors. Forecast their relative share of production for the following years.

	1983 (prelim.)	1990	2000
Floaters	65%		
Shore based	35%		
	100%	100%	100%

My expertise level for these two questions is: (Circle One) HIGH MEDIUM LOW

6. Do you believe that domestic groundfish production will generally displace imports in the next twenty years? YES NO DON'T KNOW

Briefly explain _____

_____

_____

7. Domestic processors generally have found it uneconomical to compete with Joint Ventures and foreign factory ships in world groundfish markets. Please review the following list of factors that affect the domestic processing industries' competitiveness in international markets. First, add any factors you feel may be important. Then, rank the five most important factors that cause domestic processors to be less competitive (1 = most important).

___ Jones Act - Requires U.S. Crews on U.S. built ships operating in U.S. waters.

___ Trade barriers - including tariffs and quality controls.

___ Government regulations.

___ Exchange rates

___ Taxes.

___ Total Allowable Level of Foreign Fishing (TALFF) too high.

___ Complacent attitude - traditionally production oriented industry.

___ Foreign capital (particularly Japanese holding companies) having a major financial stake in the domestic processing industry.

___ Foreign technology.

___ Foreign labor costs.

___ Foreign government subsidies.

___ Lack of knowledge about foreign markets.

___ Low quality of products.

___ _____

___ _____

8. Surimi products (particularly imitation crab legs made from minced pollock flavored with King crab) are the fastest growing U.S. seafood import - 30 million pounds in 1983 vs 16 million pounds in 1982. Since much of the pollock used to make the product is caught in Alaskan waters, why isn't the domestic processing industry in the forefront of the development of the U.S. market?

Briefly explain _____

_____

_____

_____

_____

_____

My expertise level for this questions is: (Circle One) HIGH MEDIUM LOW

_____

9. RANK the following six U.S. seafood market segments according to their growth potential in the next 20 years. (1 = greatest growth potential; 6 = least growth potential.) Add any comments you believe may be pertinent.

____ White tablecloth restaurants

____ Family restaurants

____ Fast food restaurants

____ Home prepared entrees (e.g., fresh whole, eviscerated, or filleted fish)

____ Convenience type foods (e.g., frozen fillets or fish sticks)

____ Institutional (e.g., large volume canned products or frozen blocks)

Comments:

10. 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 our 20 year time horizon, the greatest opportunities for growth in seafood production appear to be in salmon, groundfish, and latent species such as mollusks.

Given this general background, what, in your opinion, are the three major impediments to the development of Alaska's fisheries potential?

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

11. In 1982, approximately 50% of the salmon eggs taken in Alaska were handled by private, nonprofit hatcheries. At the present time private-for-profit hatcheries are not allowed in Alaska. Currently three types of hatcheries exist in the State: public hatcheries (funded by tax dollars) private nonprofit hatcheries (started by State loans and/or grants and funded by an aquaculture assessment on the ex-vessel value of the commercial catch landed in a particular region, e.g., 3% in Southeast; the sale of surplus salmon), and so called "Mom and Pop" operations (started with State money and funded by the sale of surplus fish). (Surplus fish are defined as fish which have passed through the common property fishery and returned to the terminal area over and above the numbers needed for cohort recruitment.) Currently all of these programs are coordinated by the Alaska Department of Fish and Game.

a. What type of institutional arrangement with respect to hatchery programs will be necessary to maintain Alaska's competitiveness in future world salmon markets? Why? Please give examples.

_____

_____

_____

_____

_____

_____

My expertise level for this questions is: (Circle One) HIGH MEDIUM LOW

_____

12. We would like to solicit your input on areas where further research is needed concerning North Pacific fisheries species, stocks, products, and trade. Many of the items on the following list were identified by participants at a salmon markets workshop held at the Northwest and Alaska Fisheries Center in Seattle during December 1983. First, add important areas of research that have not been included. Then, rank the research areas on the list in terms of High, Medium or Low priority.

___ Carrying capacity of the North Pacific for salmon.

___ Market forecasting - domestic.

___ Market forecasting - foreign.

___ Volume/Inventory/Price relationships for species and products.

___ Domestic market research.

___ Foreign market research.

___ Identification of trade barriers.

___ Relation between worldwide economic conditions, e.g., deficits, exchange rates - and fisheries exports.

___ Consumer product differentiation.

___ Future salmon stock forecasting.

___ Government subsidies and their market effects.

___ The role of quality in consumer preferences.

___ Foreign catch forecasts.

___ Stock assessments (all species).

___ Product development.

___ Others (specify) _____

___ _____

GENERAL COMMENTS

Please feel free to comment on any of the previous questions, or on the questionnaire in general:

DELPHI QUESTIONNAIRE #2

Department of Commerce and Economic Development

Office of Commercial Fisheries Development

Please return completed
questionnaire to:

Department of Commerce and
Economic Development
Pouch D
Juneau, Alaska 99811

Lynn Hutton, Project Director
(907) 465-2079

Jeannette Mitchell
Research Assistant
(907) 465-2079

November 1984

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INTRODUCTION

This is the second of three Delphi questionnaires you will receive on future developments in the North Pacific seafood industry. The overall purpose of this Delphi project is to obtain the best information about future developments in the industry. The method to accomplish this involves the collection of information from a group of industry experts (those who choose to participate in the study), feedback of the information to the panelists for their evaluation, and finally, organizing the remaining information into a coherent description of what the future might look like.

In the last questionnaire, we asked you to identify the most important issues facing the industry and to respond to a number of specific questions previously defined as important by a board of fishery consultants.

In this questionnaire, we have presented all of the unique answers that were given by the panelists in response to some of the original questions. The method used to analyze the data from the Round 1 questionnaire was content analysis. Each response given by a panelist was listed, then redundant response were eliminated, and similar responses were combined. We endeavored to retain the integrity of each response in lieu of the need to prevent the questionaire from getting too long. The questionnaire should take about the same amount of time to complete as the last one, i.e., one to three hours.

This questionnaire contains a lot of very interesting information. We believe you will agree.

Although the questionnaire may appear to contain too much information, it simply could not be made any shorter. The Delphi method requires that the information given by the panelists be fedback to the panelists for their evaluation. That is, in the first round, the panelist gives an answer to a question; in the second round, the panelist evaluates the answers given by all the other panelists to that question. The average number of content analyzed responses to a question is about 15, although one question contains 30 responses. The bulk of this questionnaire is composed of panelists' responses to round one questions.

A description of the Delphi method used in this study is provided for your information in the Appendix.

GENERAL FEEDBACK FROM ROUND 1

1. Response rate: 55.19%. Number of questionnaires sent: 183
   Number of questionnaires returned: 101

2. Self-reported expertise level of panelists' in the six seafood categories given in Round 1 questionnaire. (Maximum nonresponse = 7)

Percent	Supply	Demand	Trade	Marketing	Price	Policy
High	57	33	27	27	31	49
Medium	32	52	45	53	46	40
Low	11	15	29	20	23	11

3. Self Reported sector of the seafood industry that best describes the panelists' knowledge area. (N = 101, more than one response allowed.)

PERCENT

Government	University	Industry Harvester	Industry Processor	Industry Distribution
48%	30%	38%	44%	21%

4. The last page of the Round 1 questionnaire requested comments on previous questions or on the questionnaire in general. Forty-eight panelists gave comments. Most comments dealt with substantive issues, thus, they were added into other portions of the analysis. With a couple of unique exceptions, the remaining comments related to an evaluation of the overall effort.

Negative comments about the questionnaires effort:

Questionnaire was poorly worded, no benefit will be derived because of ambiguous interpretation of the questions.

Some questions were ambiguous; were not sufficiently qualified; lack of identification of specific species and country in some questions.

The ranking required by some questions is meaningless.

Cannot predict with any accuracy 20 years in the future.

The questionnaire is ambivalent about Alaska versus U.S. industry.

Just because everybody agrees on the future, doesn't make it any more likely.

You ignored the consumer.

We have seriously considered all of the critical comments in the construction of the second questionnaire.

In regard to ambiguity in the open ended questions, this is not perceived as a problem to be fixed, but as a stage in the process of gaining clarity about complex issue areas. The reiterative nature of the Delphi method will bring additional clarity.

The accuracy of predictions is of less importance in this effort than the collection of the best knowledge applied to questions about the future.

The consumers' perspective has not received attention in this study, nor has the East or Gulf Coast fisheries. We simply had to limit the scope of this study which required the exclusion of some portions of the industry.

Positive comments about the questionnaire effort.

Examples:

"This is a very good survey, at least the approach is good."
"This questionnaire and the objective of the Fisheries Mini-Cabinet is in the best interest of Alaska's development of its renewable resources. I think you have done an outstanding job."
"Excellent questionnaire - good, thoughtful questions."
"Congratulations!"
"Taken as a whole, I would rate this questionnaire as good and useful."
"Very well designed questionnaire!"

GENERAL INSTRUCTIONS

In this second questionnaire, you are requested to rate the relative VALIDITY and/or IMPORTANCE of your own and other panelists' responses. The purpose of this method is to reduce and refine the elements of the topic under consideration. That is, those responses (referred to as "assertions" or "items" in the questionnaire) that are rated "high" in validity and importance will be considered as the most significant data. Less highly rated responses will be considered as less significant information. Those assertions which receive a low rating will be considered marginally relevant to the issue. Once this exercise is completed in the Round 2 stage, Round 3 questionnaire will interrelate the assertions and further probe ambiguous assertions. The final product will be a thorough description of the future of the issue as defined by the evaluated responses.

- Enjoy this exercise. We believe you will find the panelists' responses interesting and thought provoking.
- Each of the five sections of the questionnaire contains a "tear out" copy of the scales you are to use for evaluating the panelists' responses. These pages are colored so that they may be easily referred to.
- Respond to ALL of the questions that you have sufficient knowledge about and interest in. Some of the questions are quite technical and probably can't be answered knowledgeably by all of the panelists.
- Complete the questionnaire in 2-3 sessions. It is interesting, but long. Pretesting demonstrated the need for 2-3 sessions, in order to prevent fatigue.
- Avoid the tendency to "skim and check." Give serious consideration to your fellow panelists' responses. Many panelists gave three hours of their valuable time toward this effort. They consider their responses valuable. So do we.
- Add assertions that you believe should be included. Use the extra blank pages in the back of the questionnaire.
- Some open-ended "probe" questions are given for you to respond to, in order to further probe an issue area.
- Some assertions may appear to duplicate others. We tried to eliminate duplication as much as possible, but some very similar assertions remain.
- The numbers in the text in parentheses are for coding purposes and should be ignored.
- Return the completed questionnaire within two weeks after you receive it. You may expect follow-up contact from us.

EXAMPLE QUESTION:

Original question is repeated here so that you may compare the assertions with the question to which they refer.

Report of panelists' self-rated level of expertise for this question

3.3

QUESTION FROM ROUND 1: Surimi (particularly imitation crab legs made from minced pollock flavored with King crab) are the fastest growing U.S. seafood import - 30 million pounds in 1983 vs 16 million pounds in 1982. Since most of the pollock used to make the product is caught in Alaskan waters, why isn't the domestic processing industry in the forefront of the development of the U.S. market?

GROUP EXPERTISE: High = 41% Medium = 42% Low = 17%

Validity Scale

1 Valid	4 Risky
2 Reliable	5 Unreliable
3 Not Determinable	6 Not Pertinent

Please rate the validity of the following assertions:

ASSERTION 1: The Japanese have had many years of catching and processing pollock behind them; surimi products and the technology to produce them were all developed in Japan, the markets are traditionally Japanese and Korean. (113) ____

You evaluate the assertions by putting a number (1-6) on the line to represent the relative validity of the assertion.

ASSERTION 2: Now that foreign fishing efforts are being phased out of the U.S. FCZ, there is great reluctance to allow U.S. penetration of these traditional markets. (114) ____

Response given by a panelist in the 1st questionnaire presented here for you to evaluate.

SECTION I - SALMON AQUACULTURE

This section contains two questions from Round 1 with a set of assertions for each. Following this are four probe questions.

INSTRUCTIONS

- Use the scale on the next page to evaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra pages are provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be tr
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	Risky	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn - the converse, if it exists, is possibly RELIABLE
5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

VALIDITY SCALE

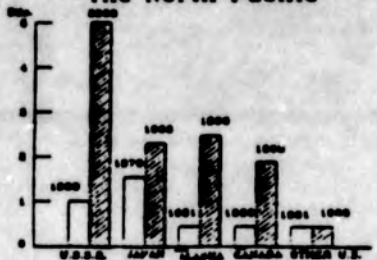
Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	Risky	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn - the converse, if it exists, is possibly RELIABLE
5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

1.1

QUESTION FROM ROUND 1:

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.

Salmon Releases In The North Pacific



What are the biological, political and economic implications of these projected releases?

GROUP EXPERTISE: High = 27% Medium = 45% Low = 28%

Panelists responses are given below in three sections that correspond to the three parts of the question.

BIOLOGICAL IMPLICATIONS

Please rate the validity of the following assertions given by the panelists in response to the Round 1 question.

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: The management of Alaska salmon stocks should be directed toward preserving natural runs. _____ (1)

ASSERTION 2: Effect will be minimal. Natural stocks probably contribute up to 40 billion smolts in peak years with no obvious deleterious effects. Hatchery stocks would occupy only a small fraction of the ecosystem. _____ (2)

ASSERTION 3: Localized areas (e.g. estuaries, near shore feeding grounds) will be stressed before the carrying capacity of the open ocean is reached. _____ (3)

ASSERTION 4: Wild strains of salmon will be displaced by artificially produced runs. _____ (4)

ASSERTION 5: The gene pool will become more homogenous and thus more susceptible to disease and environmental changes. _____ (5)

ASSERTION 6: The variability in yield will increase as abundance increases. _____ (6)

ASSERTION 7: The overall size average will become smaller with larger returns. _____ (7)

ASSERTION 8: Salmon stocks will not increase proportionately to releases. _____ (8)

ASSERTION 9: 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). _____ (9)

ASSERTION 10: The timing and species of hatchery releases need to be coordinated internationally to avoid overburdening the seasonal carrying capacity of feeding grounds. _____ (10)

ASSERTION 11: Juvenile rearing grounds have a finite holding capacity and will result in increased competitive pressure on other species (e.g. herring). _____ (11)

ASSERTION 12: 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. _____ (12)

ASSERTION 13: There will be increased concentration on the most cheaply raised species (i.e., pinks and chums). _____ (13)

QUESTION: What are the POLITICAL implications of these hatchery plans in terms of future shares of ocean rearing grounds?

Please rate the validity of each assertion:

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: If disputes between nations do arise, they will first involve conflict over high seas and nonterminal interceptions. _____ (14)

ASSERTION 2: At the above release level (11 billion by the year 2000) there would be no political implications. _____ (15)

ASSERTION 3: No implications unless the Northern Pacific carrying capacity is reached. _____ (16)

ASSERTION 4: Well before the carrying capacity of the sub-Arctic Pacific is reached in regard to salmon, signs will be evident. For example, some international agreement would have to be reached like the Canadian/U.S. treaty negotiations where stocks are harvested based on the country of origin. Also, grandfather rights, where each nation could claim quotas based on their hatchery contribution, would be sought. _____ (17)

ASSERTION 5: Without a much stronger commitment to hatchery production now, Alaska could suffer. _____ (18)

ASSERTION 6: This question cannot be be adequately addressed until the overlap of rearing grounds between Asian and North American releases is known. _____ (19)

ASSERTION 7: Insignificant. Ocean feeding grounds for North American and Asian salmon are mostly separate. _____ (20)

ASSERTION 8: Probably none. Estimates won't be reached. As supply increases, the price will fall to a no profit point for aquaculture. _____ (21)

ASSERTION 9: 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. _____ (22)

ASSERTION 10: Maintenance of the genetic strength of natural stocks is crucial. 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. _____ (23)

ASSERTION 11: 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. _____ (24)

ASSERTION 12: The danger is that certain elements in the industry will want hatchery production curtailed in order to boost the market price. We must be very careful of this. _____ (25)

QUESTION: What are the ECONOMIC implications of these projected releases?

Please rate the validity of the following assertions:

Validity Scale
1 Valid
? Reliable
3 Not Determinable
4 Risky
5 Unreliable
6 Not Pertinent

ASSERTION 1: There will be a long run increase in the supply of salmon, particularly chums and pinks. _____ (26)

ASSERTION 2: 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. _____ (27)

ASSERTION 3: None. There is sufficient need in the world for fish. An effective marketing effort, quality products, and good price can resolve the problem. _____ (28)

ASSERTION 4: 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. _____ (29)

ASSERTION 5: This could be a tremendous marketing opportunity. There is a need for a lower ex-vessel price, lower processing costs, and lower consumer price. _____ (30)

ASSERTION 6: 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. _____ (31)

ASSERTION 7: In the short run, displacement of domestic processors and harvesters that have to compete with foreign costs. _____ (32)

ASSERTION 8: Prices will decline as supply increases. As this happens, there will be a demand for curtailing the ocean rearing programs. _____ (33)

ASSERTION 9: There will be decline in price for Alaskan salmon if current strategies are followed. _____ (34)

ASSERTION 10: Export demand will decline. _____ (35)

ASSERTION 11: 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. _____ (36)

ASSERTION 12: Price will decline as salmon returns to being a staple cheap protein commodity as pre-WWII. _____ (37)

ASSERTION 13: High volume production which could lead to increased profits at a lower price if accomplished effectively. _____ (38)

ASSERTION 14: A restructuring of the harvest and processing sections sectors would occur to salmon production entities (i.e., vertically integrated operations as opposed to individual operators). The fishermen/processor relationship would be completely altered. _____ (39)

ASSERTION 15: 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. _____ (40)

ASSERTION 16: Most of the effect will be on the pink and chum markets since these are the cheapest species to raise. _____ (41)

ASSERTION 17: 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. _____ (42)

ASSERTION 18: Fishermen can increase their CPUE and thus make as much or more at a lower ex-vessel price. _____ (43)

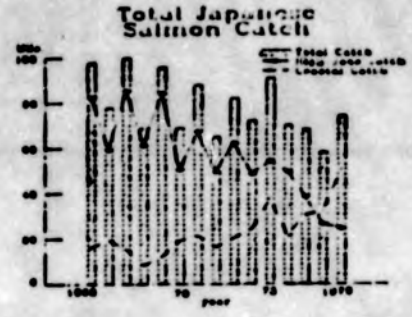
ASSERTION 19: Processors will have a more stable supply and therefore, a more efficient operation. _____ (44)

ASSERTION 20: The market price will be lower causing demand to increase. _____ (45)

ASSERTION 21: This question can only be answered by some sort of cost/benefit analysis of existing hatchery programs. _____ (46)

1.2

QUESTION FROM ROUND 1: The effectiveness of the Japanese hatchery programs can be seen from the graph below. The high seas salmon catch has decreased significantly since the early 1970's, due mainly to international agreements to restrict the high seas harvest (Japan accounted for 61% of all U.S. fishery exports in 1973). During the same period, the Japanese coastal catch (consisting mainly of hatchery raised adult chum salmon) has increased enough to equal the previous 15 year average.



What are the implications of this trend (i.e., increasing Japanese coastal catch) for the U.S. salmon industry in the next 20 years? Please identify species in your answer.

GROUP EXPERTISE: High = 29% Medium = 40% Low = 32%

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 not determinable 6 not pertinent

Please rate the validity of the following assertions:

ASSERTION 1: The Japanese coastal catch consists mainly of chums and pinks while the high seas catch concentrates on reds. Therefore, there would be negative effects on U.S. export markets for the low value species while the higher valued species would only be marginally effected, if at all. _____ (47)

ASSERTION 2: Chums and reds aren't good substitutes for one another in the Japanese market. _____ (48)

ASSERTION 3: The more significant trend for U.S. exports to Japan is the decreasing Japanese distant water catch. _____ (49)

ASSERTION 4: Japanese salmon imports are 70 - 75% reds. With a decreasing high seas catch, demand will increase, but the price of reds will be moderated by the price of domestic chums. _____ (50)

ASSERTION 5: Japan has just about reached their chum production potential and doesn't have the resources to get into other species. U.S. salmon exports to Japan should actually increase in total. _____ (51)

ASSERTION 6: The quality of Japanese coastal caught chums is relatively poor which may represent a market opportunity for the U.S. _____ (52)

ASSERTION 7: These trends will force U.S. producers to market fish elsewhere. European demand will be met by Norway and the U.S.S.R. The alternative will be the Third World which cannot absorb much at today's prices. The King and coho market will continue to be strong in the U.S. at reduced prices. Sockeye looks good in the frozen domestic market. Also, there will be increased domestic consumption at lower prices for pinks and chums. _____ (53)

ASSERTION 8: Japan will no longer import U.S. salmon (all species) within 10 years. _____ (54)

ASSERTION 9: The number one implication is to develop the U.S. salmon market. _____ (55)

ASSERTION 10: Another implication is to develop the overseas market (especially for canned products) in anticipation of a declining U.S. dollar. _____ (56)

ASSERTION 11: The overall Japanese salmon market has increased over the last 20 years and will continue to do so. _____ (57)

ASSERTION 12: Until Japan can successfully raise sockeye, the effect will be minimal. _____ (58)

ASSERTION 13: The greatest detrimental effect will be on sujiko (salmon roe) exports and not on the export of fish. _____ (59)

ASSERTION 14: Alternative markets for salmon roe must be found. _____ (60)

ASSERTION 15: Troll Kings and cohos will be forced out of markets due to pricing as Japanese chums and Norwegian Atlantics penetrate the European market. _____ (61)

ASSERTION 16: There will be a decline in the export markets for chums. _____ (62)

ASSERTION 17: There will be a decline in the export markets for pinks. _____ (63)

ASSERTION 18: There will be a decline in the export markets for black cod. _____ (64)

ASSERTION 19: These trends suggest a continuing shakeout of the U.S. industry with only those having a special market niche, financial strength, and sustained profits remaining. _____ (65)

ASSERTION 20: An assault on the U.S. market share for reds will be made by cultivated coho or imitation salmon. _____ (66)

ASSERTION 21: If we could completely stop the high seas catch of reds, especially by the Taiwanese, the market would dramatically increase. _____ (67)

ASSERTION 22: The Japanese per capita demand for all fish products will decline in the next 20 years due to changes in tastes and preferences among the younger generation. _____ (68)

ASSERTION 23: The overall Japanese salmon catch is declining which bodes well for U.S. producers. _____ (69)

ASSERTION 24: The Japanese success with hatchery production provides a model to predict economic success of hatchery production. _____ (70)

ASSERTION 25: This implies that we must solve institutional questions related to salmon ranching if the U.S. is to compete effectively with Japan. _____ (71)

1.3

PROBE QUESTION: Norway has been developing a successful salmon farm industry. Production of pen-reared salmon exceeded 40 million pounds in 1984 and is expected to at least double by 1986. Other European countries are also entering this industry. Alaska salmon could largely be displaced from European markets for frozen salmon by 1990, and completion for U.S. markets will intensify.

Given these developments, what role do you foresee for pen reared salmon in Alaska's future? Please be specific in terms of species and relative importance compared to natural and hatchery (ranched) production.

1.4

PROBE QUESTION: Salmon aquaculture will create a new interest group in Alaska salmon fisheries. This new group will possess a farming philosophy which can contribute to conflict with a traditional industry which is based on hunting. Legal and institutional structures for farming and hunting economics are quite different.

What are the political implications arising from farming versus hunting in Alaska salmon fisheries?

1.5

PROBE QUESTION: Can a salmon industry based on hunting survive in competition with one based on farming? Can the two be successfully integrated?

1.6

PROBE QUESTION: Experience shows that successful hatcheries can support major fisheries. Do you foresee changes in the geographic location of major fishing grounds in response to the distribution of hatchery fish?

YES _____ NO _____ Don't Know _____ (72)

COMMENTS: _____

_____

_____

_____

_____

SECTION II - HATCHERY ISSUES

This section contains one question and its set of assertions. There are three probe questions.

INSTRUCTIONS

- Use the scale on the next page to evaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra pages are provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	Risky	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn - the converse, if it exists, is possibly RELIABLE
5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
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5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

2.1

QUESTION FROM ROUND 1: In 1982, approximately 50% of the salmon eggs taken in Alaska were handled by private, nonprofit hatcheries. At the present time private-for-profit hatcheries are not allowed in Alaska. Currently three types of hatcheries exist in the State: public hatcheries (funded by tax dollars), private nonprofit hatcheries (started by State loans and/or grants and funded by an aquaculture assessment on the commercial catch within their region and the sale of surplus salmon), and so called "Mom and Pop" operations (started with State money and funded by the sale of surplus fish). (Surplus fish are defined as fish which have passed through the common property fishery and returned to the terminal area over and above the numbers needed for cohort recruitment.) Currently all of these programs are coordinated by the Alaska Department of Fish and Game.

What type of institutional arrangement with respect to hatchery programs will be necessary to maintain Alaska's competitiveness in future world salmon markets?

EXPERTISE LEVEL: High = 32% Medium = 29% Low = 39%

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

Please rate the validity of the following assertions:

ASSERTION 1: The role of Alaska's hatcheries in relation to natural runs has been greatly over-exaggerated. Hatcheries will play only a marginal role in the future and should be considered only for barren stream systems and the enhancement of sportfishing species such as chinook and cohos. _____ (73)

ASSERTION 2: Salmon stocks should be managed to protect natural runs. _____ (74)

ASSERTION 3: Large scale for-profit hatcheries could greatly add to the supply of salmon without imposing costs on the State. _____ (75)

ASSERTION 4: Private Non Profit (PNP) hatchery corporations, both local and regional, are stifled by over-regulation from the Alaska Department of Fish and Game (ADF&G). The primary cause is the Fisheries Research and Enhancement Division (F.R.E.D.) playing a dual role as competitor and regulator. _____ (76)

ASSERTION 5: F.R.E.D. should concentrate on upriver and personal use fish production. _____ (77)

ASSERTION 6: "Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons. _____ (78)

ASSERTION 7: Transfer of stocks, providing they are disease free, should be allowed between regions. _____ (79)

ASSERTION 8: Quality production and terminal fisheries are incompatible, hence any hatchery operation should be funded through assessment on harvest in open fisheries. _____ (80)

ASSERTION 9: Pen culture which should be encouraged and can be controlled in its entirety. _____ (81)

ASSERTION 10: The primary role of ADF&G should be research and development and disease control. _____ (82)

ASSERTION 11: Costs should be carefully evaluated to assure 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 enhancement. _____ (83)

ASSERTION 12: Private For Profit hatcheries are the way to go. If money can be made, capital will flow in. If subsidized, industry will become inefficient and non-competitive. _____ (84)

ASSERTION 13: Exclusive area rights with no restriction on how the catch is taken. Should be in the form of fishermen/processor cooperatives. Offshore interceptions should be kept at a minimum through individual quota licensing arrangements. _____ (85)

ASSERTION 14: The present institutional arrangement is remarkably successful. _____ (86)

ASSERTION 15: The Non Profit concept was instituted to protect the existing industry from too rapid change. It doesn't promote efficiency and innovation that the profit motive generates. Alaska should introduce profit at a deliberate pace or State interests will fall behind more efficient foreign competition. _____ (87)

ASSERTION 16: The Private Nonprofit approach should be emphasized further to include net pen culture. _____ (88)

ASSERTION 17: Private For Profit hatcheries that can make some level of profit and still contribute to the common property fishery should be encouraged. _____ (89)

ASSERTION 18: The current program should be left intact and adequately funded. _____ (90)

ASSERTION 19: For profit hatcheries should be limited to areas where runs do not presently exist without restrictions on harvest methods. _____ (91)

ASSERTION 20: The State should allow a network of size, scope, and marketing operations similar to Norway. _____ (92)

ASSERTION 21: The State should fund a small operation for the purpose of getting the network started and maintaining a genetically strong strain. _____ (93)

ASSERTION 22: The present institutional arrangement is practical in terms of political support and is functional. _____ (94)

ASSERTION 23: ADF&G should concentrate on research and sportfish hatcheries with "regionals" and "mom and pops" producing commercial fish. _____ (95)

ASSERTION 24: ADF&G should manage hatchery runs and perform their regulatory role. _____ (96)

ASSERTION 25: An advocacy agency is required to assure hatchery development as ADF&G is currently not fulfilling this role. _____ (97)

ASSERTION 26: A State Fisheries Authority with an industry board of directors which all hatcheries reported to would provide an atmosphere for rewarding production and provide capital construction funds for development. This coordinating type agency could also see to it that the processing and marketing segment is appraised of hatchery production to take advantage of the supply as it is developed. _____ (98)

2.2

PROBE QUESTION: While there appears to be a wide range in the types of panelists' answers to the question of what institutional form hatchery production should take, there is a fair agreement that salmon stocks should be managed to protect natural returns, and that a profit incentive should be introduced slowly to the private nonprofit hatcheries.

Aside from the current aquaculture assessment, do you believe fishermen and processors should share in the costs and/or profits of privately held hatcheries?

YES _____ NO _____ DON'T KNOW _____ (99)

Briefly explain: _____

_____

_____

_____

2.3

PROBE QUESTION: Private nonprofit hatcheries are allowed to sell surplus adults as a means to generate funds for operations and debt repayment. Should the State (ADF&G) manage common property fisheries to allow sufficient escapement for total cost recovery? Partial cost recovery? No cost recovery?

_____

_____

_____

_____

2.4

PROBE QUESTION: If there is partial or no cost recovery from returning adults, what means should be used to finance nonprofit, private, hatcheries?

_____

_____

_____

SECTION III - GROUNDFISH RESOURCES

This section contains two questions from the first questionnaire with a set of assertions for each question. Three probe questions follow them.

INSTRUCTIONS

- Use the scale on the next page to evaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra pages are provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	Risky	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn - the converse, if it exists, is possibly RELIABLE
5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	Reliable	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	Not Determinable	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
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5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

3.1

QUESTION FROM ROUND 1: Do you believe domestic groundfish production will generally displace imports in the next 20 years?

GROUP RESPONSE: Yes = 48% No = 41% Don't Know = 11%

Please rate the validity of the following assertions:	Validity Scale 1 Valid 4 Risky 2 Reliable 5 Unreliable 3 Not Determinable 6 Not Pertinent	
ASSERTION 1: Once we achieve domestic utilization of the TALFF, the U.S. market will increase if the price and quality are good.	_____	(101)
ASSERTION 2: Yes, if identity standards are enforced which would keep foreign sources from using nonfish additives.	_____	(102)
ASSERTION 3: New marketing companies are entering the business to take advantage of new supplies of raw product.	_____	(103)
ASSERTION 4: Very slowly. Development would be assisted by the development of table ready or easy to prepare items.	_____	(104)
ASSERTION 5: Yes, but there will be more losers than winners in groundfish production due to low margins.	_____	(105)
ASSERTION 6: Not unless cheap foreign processing hulls can be bought outright rather than borrowed through joint ventures.	_____	(106)
ASSERTION 7: Not completely unless tariffs or subsidies are employed.	_____	(107)
ASSERTION 8: Our groundfish consumption will require imports. We can find some foreign markets, but price will be the main problem for U.S. producers.	_____	(108)

ASSERTION 9: I don't believe the U.S. Government will make the cuts in foreign catch to allow domestic production to displace imports. _____ (109)

ASSERTION 10: This question is too difficult to answer without an analysis of the direction of change in the key variables affecting domestic and foreign demand: exchange ratios, relative prices, import trade barriers, subsidies, etc. _____ (110)

ASSERTION 11: Not unless there is more of a movement toward development of a fleet of factory trawlers. _____ (111)

3.2

Now that you have reviewed and evaluated the responses to the above question, do you believe domestic groundfish production will generally displace imports in the next 20 years?

YES _____ NO _____ Don't Know _____ (112)

COMMENTS _____

_____

_____

3.3

QUESTION FROM ROUND 1: Surimi (particularly imitation crab legs made from minced pollock flavored with King crab) are the fastest growing U.S. seafood import - 30 million pounds in 1983 vs 16 million pounds in 1982. Since most of the pollock used to make the product is caught in Alaskan waters, why isn't the domestic processing industry in the forefront of the development of the U.S. market?

GROUP EXPERTISE: High = 41% Medium = 42% Low = 17%

Please rate the validity of the following assertions:

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: The Japanese have had many years of catching and processing pollock behind them; surimi products and the technology to produce them were all developed in Japan, the markets are traditionally Japanese and Korean. _____ (113)

ASSERTION 2: Now that foreign fishing efforts are being phased out of the U.S. FCZ, there is great reluctance to allow U.S. penetration of these traditional Japanese and Korean markets. _____ (114)

ASSERTION 3: Domestic processors find it extremely difficult to raise enough capital (in an extremely capital intensive business) to produce surimi for an as yet unproven U.S. market. _____ (115)

ASSERTION 4: Domestic producers were surprised at the U.S. market's acceptance of analog products. _____ (116)

ASSERTION 5: Domestic processors are tradition bound by existing products and markets. They don't show the imagination and aggressive marketing abilities of their foreign competitors. _____ (117)

ASSERTION 6: Labor costs demand floating processors. Americans are not interested in spending six months at sea at a time in a factory ship. _____ (118)

ASSERTION 7: Domestic processors lack technical competence and quality control. These products are particularly susceptible to poor quality. Any rush of U.S. firms into the business could damage market potential. _____ (119)

ASSERTION 8: It is virtually economically impossible for the U.S. industry to invest the necessary capital to acquire surimi processing equipment, process pollock into surimi either on land or at sea, and acquire analog equipment to manufacture products to sell in competition with foreign products at today's interest rates. Domestic entry into the market requires all new equipment to compete with largely amortized and often subsidized foreign competition. _____ (120)

ASSERTION 9: There is distrust among investors about returns in "imitation" products. _____ (121)

ASSERTION 10: It takes more than a spirit of challenge. It takes time and a skilled and dedicated labor force. It takes a dedicated interest rather than a venture capital interest. It takes painstaking hard work. _____ (122)

ASSERTION 11: One problem with surimi products is that people tire of them quickly. _____ (123)

ASSERTION 12: The large domestic processing firm's parent companies are getting out of Alaska seafoods (e.g. Castle and Cook, Amfac, R.J. Reynolds, Con Agra). The remainder are small and underfinanced for the long-term investment needed to produce Kamobko-type (fish cake) products. _____ (124)

ASSERTION 13: Surimi production is relatively high tech compared to traditional processing methods of canning, freezing, etc. It requires an entrepreneur rather than an operator to push into a new production area. _____ (125)

ASSERTION 14: Many companies have a high degree of foreign ownership as a means of securing a supply of raw product. A foreign company is unlikely to encourage the development of surimi production that could hurt it in other areas. _____ (126)

ASSERTION 15: Shoreside processed surimi sells for half the price (in Japan) as processed at sea products. The substandard shoreside products could be manufactured into ham, salami, etc., all good products, but very low priced and difficult to make pay. _____ (127)

ASSERTION 16: The job will have to be done by joint ventures or by a U.S. major capable of financing a fully integrated operation. Technical expertise can be purchased. One domestic company turning a profit would do wonders for the industry. _____ (128)

3.4

PROBE QUESTION: The twelve Seattle-based American flag factory trawlers currently operating within the Alaskan FCZ add little to Alaska's economy. Over-the-side sale type joint ventures provide income for some local fishermen, but all of the value added from processing the harvested fish into its final product form escapes overseas. Processed-at-sea surimi sells for twice as much as the shore processed product in export markets. Given these facts, what can Alaska do to encourage the development of a "value added" industry around its abundant groundfish resources? Please be specific in terms of species, products, and locations.

_____

_____

_____

_____

3.5

PROBE QUESTION: Several factors inhibit the development of shore-based processing of pollock and yellowfin sole, the most abundant commercial groundfish resources in Alaska's FCZ. Chief among these are the rapid deterioration of pollock after it is caught and the relatively small average size of yellowfin sole which makes fillets unattractive to the domestic consumer. How can these limitations be overcome?

_____

_____

_____

_____

3.6

PROBE QUESTION: One option that would help capture some "value added" from groundfish production is a fleet of locally-based vessels, of smaller size than the factory trawlers, which could harvest and process their catch at sea and ship their "frozen" finished product from Alaskan ports in freezer containers. Do you think this is a viable option?

YES _____ NO _____ DON'T KNOW _____ (129)

COMMENTS: _____

_____

_____

_____

SECTION IV - MARKET ECONOMICS

This section contains one question and set of assertions from the Round 1 questionnaire. Then five probe questions are given.

INSTRUCTIONS

This section contains two questions from Round 1 with a set of assertions for each. Following this are four probe questions.

- Use the scale on the next page to evaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra pages are provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
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5	Unreliable	- great risk of being wrong - worthless as a decision basis - the converse, if it exists, is possibly VALID
6	Not Pertinent	- even is the assertion if VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

VALIDITY SCALE

Numeric Scale		
1	Valid	- low risk of being wrong - decision based upon this will not be wro because of this "fact" - most inferences drawn from this will be
2	Reliable	- some risk of being wrong - willingness to make a decision based upo this - assuming this to be true but recognizing some chance of er or - some incorrect inferences can be drawn
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6	Not Pertinent	- even is the assertion if VALID or UNRELI it has no significance for the basic i - it cannot affect the variable under ques or observable amount
Blank	No Judgment	- no knowledge to judge this item

4.1

QUESTION FROM ROUND 1: Assuming that the planned fivefold increase in Alaskan hatchery releases of salmon fry (by 1990) materializes into a long-term increase in salmon stocks, will U.S. salmon fishermen's net profit increase, decrease, or stay about the same (assume a constant level of effort and constant dollars)?

GROUP RESPONSE: Increase 49% Decrease 22% Stay about the same 29%

Several panelists couched their responses in terms of the price elasticity of demand at the ex-vessel and wholesale levels. For our purposes, demand can be said to be price elastic if the long-term increase in the supply of salmon (assumed above) resulted in a reduced price, increased quantity demanded, and increased total gross revenues. Demand is price inelastic if the reduced price in turn, reduced total gross revenues. Panelists responses follow.

Please rate the validity of the following assertions:	Validity Scale 1 Valid 4 Risky 2 Reliable 5 Unreliable 3 Not Determinable 6 Not Pertinent	
ASSERTION 1: Price will decrease, but the overall increase in harvest volume will increase fishermen's net return.	_____	(130)
ASSERTION 2: If properly managed, releases can stabilize the annual harvest, bringing stable prices and enhanced marketability.	_____	(131)
ASSERTION 3: The same level of effort with larger stocks will increase profits if we assume there is profit at current levels.	_____	(132)
ASSERTION 4: More fish will increase unit efficiency so long as limited entry is in place.	_____	(133)
ASSERTION 5: Current profitability is recession oriented and will strengthen.	_____	(134)
ASSERTION 6: Several countries are increasing production at once. Penetration may begin in the in-elastic portion of demand with only small gains in cost efficiency by producers.	_____	(135)

ASSERTION 7: Profits will decline in the long run because short-term profits will be dissipated by reinvestment in the fleet and prices will decline. _____ (136)

ASSERTION 8: Without corresponding increases in demand, current demand will be met by more efficient foreign operations including structured/fabricated products. _____ (137)

ASSERTION 9: Net profit will increase initially since demand is price elastic. _____ (138)

ASSERTION 10: Net profit will decrease later as demand becomes more price inelastic. _____ (139)

ASSERTION 11: Common property tends to erode average profitability. _____ (140)

ASSERTION 12: An increase in the catch volume will lead to greater profits for only 5 - 10% of the fleet. _____ (141)

ASSERTION 13: Profitability will vary widely from fishery to fishery, but will increase for those that catch predominately sockeye (i.e., Bristol Bay). _____ (142)

ASSERTION 14: Profitability will decline in areas where pinks and chums are the dominant species due to foreign competition. _____ (143)

4.2

Now that you have reviewed and evaluated the responses to the preceeding question, we ask that you answer the original question again.

Assuming that the planned five-fold increase in Alaskan hatchery releases of salmon fry (by 1990) will result in a long-term increase in the supply of salmon stocks; how will net profits be affected? (Assume a constant level of effort and constant dollars.) Check one of the three options.

Will U.S. salmon fishermen's net profit:

____ - Increase
____ - Decrease
____ - Stay about the same? (144)

COMMENTS: _____

_____

_____

4.3

PROBE QUESTION: Assuming that the planned five-fold increase in Alaskan hatchery releases of salmon fry (by 1990) will result in a long-term increase of 21 to 28 million salmon in the catch; how will net profit be affected? Assume a constant level of effort and constant dollars. Check one of the three options.

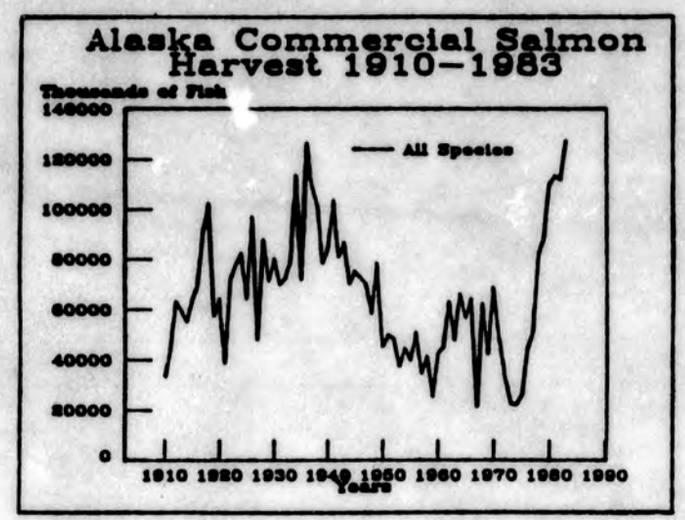
Will U.S. salmon fishermen's net profit:

____ - Increase
____ - Decrease
____ - Stay about the same? (145)

COMMENTS: _____

_____

_____



4.4

PROBE QUESTION: One of the important issues facing Alaska's fisheries economists and decisionmakers is: What benchmark or range of average salmon harvest projections do we use for the next 20 years to make judgments about further investments in salmon production and management? This issue is of importance when it comes to evaluating the costs and benefits of hatcheries, limited entry programs, and management. As you can see from the graph above, Alaska's commercial salmon harvest has fluctuated widely over the past 75 years. With this in mind, and given your perception of the future output of hatchery programs, give your best guess as to what the average

total Alaska commercial salmon harvest will be for the next 20 years. Also, give the range around the average you would use for a confidence interval. State your answers in thousands of fish.

High _____ Average _____ Low _____ (146)

COMMENTS: _____

_____

_____

_____

_____

4.5

PROBE QUESTION: Empirical research has tentatively shown that the price inelastic (ex-vessel) portions of the demand curves for Alaska pink and chum salmon occur when the harvest levels near 120-150 thousand mt. for pinks and 30-40 thousand mt. for chums. Assume these numbers are correct and total gross revenues for fishermen begin to decline when these harvest levels are reached (all other factors remaining static). Assume further that hatchery production can maintain these harvest levels.

Given the current levels of Alaskan fishing effort in those fisheries where pinks and chums are the predominant species harvested, do you believe that world salmon markets can absorb these supply levels at prices which will provide an adequate return on investment for fishermen?

YES _____ NO _____ DON'T KNOW _____ (147)

Please explain: _____

_____

_____

_____

4.6

PROBE QUESTION: In the European white tablecloth restaurant market (particularly the British portion), wild Atlantic salmon (as opposed to pen reared) enjoys a premium position. Customers apparently have some basis for this product differentiation. What do you think it is?

_____

_____

_____

4.7

PROBE QUESTION: Over time, would "wild Pacific salmon" maintain a preferred U.S. market position over pen reared Alaska or Atlantic salmon without special advertising? Assume equal prices and consistency of supply.

YES _____ NO _____ Don't Know _____ (148)

COMMENTS: _____

_____

_____

SECTION V - IMPEDIMENTS TO DEVELOPMENT

This section contains one question and set of assertions from Round 1. There are no probe questions.

INSTRUCTIONS

- Use the IMPORTANCE scale provided on the next page to evaluate the assertions.
- Some assertions in this section are very general or broad in scope, which may make them difficult to evaluate. Do the best you can, while recognizing that less useful data may come from this question.

IMPORTANCE SCALE

Score Value	Importance (Priority or Relevance)	
1	Very Important	- a most relevant point - first-order priority - has direct bearing on major issues - must be resolved, dealt with, or treated
2	Important	- is relevant to the issue - second-order priority - significant impact but not until other items are treated - does not have to be fully resolved
3	Of Minor Importance	- insignificantly relevant - third-order priority - has little importance - not a determining factor to major issue
4	Unimportant	- no priority - no relevance - no measurable effect - should be dropped as an item to consider

IMPORTANCE SCALE

Score Value	Importance (Priority or Relevance)	
1	Very Important	- a most relevant point - first-order priority - has direct bearing on major issues - must be resolved, dealt with, or treated
2	Important	- is relevant to the issue - second-order priority - significant impact but not until other items are treated - does not have to be fully resolved
3	Of Minor Importance	- insignificantly relevant - third-order priority - has little importance - not a determining factor to major issue
4	Unimportant	- no priority - no relevance - no measurable effect - should be dropped as an item to consider

5.1

QUESTION FROM ROUND 1: 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 our 20 year time horizon, the greatest opportunities for growth in seafood production appear to be in salmon, groundfish, and latent species such as mollusks.

Given this general background, what, in your opinion, are the three major impediments to the development of Alaska's fisheries potential?

Panelists responses to this question are given below. Please use the scale at the right to assign a number to each assertion.

Very Important	= 1
Important	= 2
Of Minor Importance	= 3
Unimportant	= 4

Importance

Rate the importance of each impediment according to how important you perceive it to be in relation to the development of Alaska's fishery potential.

ASSERTION 1: High cost of domestic processing. _____ (149)

ASSERTION 2: An increase in joint ventures. _____ (150)

ASSERTION 3: Inadequate domestic and foreign market development. _____ (151)

ASSERTION 4: Lack of support services and infrastructure in Alaska. _____ (152)

ASSERTION 5: The Jones Act produces grossly overpriced fishing hulls. _____ (153)

ASSERTION 6: Inadequate regulatory regime. If harvest rates and/or fishing areas are privately assigned, development will occur. _____ (154)

ASSERTION 7: High transportation cost. _____ (155)

ASSERTION 8: Low level of quality control. _____ (156)

ASSERTION 9: Finances: most processors are in financial trouble and don't have cash available to finance new ventures. _____ (157)

ASSERTION 10: Lack of commitment from the executive branch to develop fisheries. _____ (158)

ASSERTION 11: Parochialism in the industry. An "us" versus "them" attitude. Insensitivity to Alaskan development needs by the "Seattle mafia." _____ (159)

ASSERTION 12: Unwillingness of Alaska industry groups to overcome differences and think of the good of the industry as a whole. _____ (160)

ASSERTION 13: Sense of values. Continuing greed to exploit high ticket items and give low priority to mollusks and groundfish. _____ (161)

ASSERTION 14: Technology of catching, processing, and storage needs to be upgraded to be competitive with the world market. _____ (162)

ASSERTION 15: Lack of integration between market identification and promotion and production (harvesting and processing). Need to work backward from outlets, not forward from production. _____ (163)

ASSERTION 16: Fierce competition from foreign groundfish products in the domestic market. _____ (164)

ASSERTION 17: Lack of U.S. government response to infant industry status even though for foreign firms are clearly subsidized. _____ (165)

ASSERTION 18: Attempt to structure industry to perceived social demands rather than sound economic strategies. _____ (166)

ASSERTION 19: Lack of development of effective licensing regimes which would discourage excess investment in harvesting and encourage productive investment in stock enhancement. _____ (167)

ASSERTION 20: Lack of product standards, grading, and pricing by quality grade and final product inspection. _____ (168)

ASSERTION 21: Political process. Each new governor or legislator wants to leave his mark on the industry without adequate information. _____ (169)

ASSERTION 22: Lack of State investment in research and development. _____ (170)

ASSERTION 23: 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. _____ (171)

ASSERTION 24: Lack of a far-sighted State role that avoids direct subsidies and capitalization and hence the chaos of fisheries in British Columbia, Washington, and Oregon. _____ (172)

ASSERTION 25: High dollar entry and conversion costs to enter the groundfish industry. _____ (173)

ASSERTION 26: Control by Seattle-based, Japanese-owned companies who approach the resource base with a colonial type attitude. _____ (174)

ASSERTION 27: Limited awareness and skills to use fish and seafood products in home cooking. Cooking of seafood is more precise, less flexible, bland taste often requires sauces - more work. _____ (175)

ASSERTION 28: Lack of marketing expertise. _____ (176)

ASSERTION 29: Lack of sufficiently precise stock assessment. _____ (177)

ASSERTION 30: A stagnant industry structure which has not changed over time (i.e., fishermen vs. processors). _____ (178)

ASSERTION 31: Paralytic shellfish poisoning. _____ (179)

SECTION VI - MOST IMPORTANT ISSUES OR QUESTIONS FACING THE INDUSTRY

This last section contains one question and set of items from the first questionnaire. The items have been organized into 10 categories.

Each item represents an issue that one or more panelists considered as most important to the development of the North Pacific seafood industry.

INSTRUCTIONS:

- We now request that you rate the importance of each issue according to your judgment about which important issues will become dominant in the industry in the next 20 years.
- Use the IMPORTANCE scale provided on the next page to evaluate the relative importance of each item.
- Some of the items (responses) are given in the form of a question, i.e., "will shore based processing become cost-effective?" "To what degree will foreign countries be permitted to catch in U.S. waters?" Evaluate these items no differently from the others. They refer to an issue area and should be rated according to how important you believe the issue to be in regard to its importance to the industry in the next 20 years.

IMPORTANCE SCALE

Score Value	Importance (Priority or Relevance)	
1	Very Important	- a most relevant point - first-order priority - has direct bearing on major issues - must be resolved, dealt with, or treated
2	Important	- is relevant to the issue - second-order priority - significant impact but not until other items are treated - does not have to be fully resolved
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Score Value	Importance (Priority or Relevance)	
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3	Of Minor Importance	- insignificantly relevant - third-order priority - has little importance - not a determining factor to major issue
4	Unimportant	- no priority - no relevance - no measurable effect - should be dropped as an item to consider

QUESTION FROM ROUND 1: What are the three most important questions or issues relevant to the development of the North Pacific seafood industry in the next 20 years?

Please rate the importance of the following issue items.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

A. Management Issues

Importance

Item #1 _____ (180)

Management needs to insure that stock exploitation confers economic benefits to society at large.

Item #2 _____ (181)

Poor management, due to politics at the State and federal levels negatively impact fishery development.

Item #3 _____ (182)

It is imperative that multi-species management models be developed.

Item #4 _____ (183)

We need to establish of a set of objective criteria to settle allocation disputes among various users of fishery resources.

Item #5 _____ (184)

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.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

B. Property Rights Issues

Importance

Item #1 _____ (185)

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.

Item #2 _____ (186)

Develop an aquaculture program which is controlled by a large number of individuals.

Item #3 _____ (187)

Fishing tenure with property rights should be granted to all commercial fishermen participating in a particular fishery.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

C. Harvesting and Processing Sector Efficiency

Importance

Item #1 _____ (188)

In an attempt to maintain the unique life-style apparent in Alaska, are we imposing a societal cost which will eventually exhibit itself in the form of a market share loss? Is adoption of new production/harvesting/processing technology slower to occur in Alaska than in other states/nations like Japan or Norway because of this?

Item #2 _____ (189)

We need to establish positive incentives to the processing industry to improve technology allowing market expansion and innovation.

Item #3 _____ (190)

How can products from shore-based processions be cost competitive on the world market?

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

D. Economics

Importance

Item #1 _____ (191)

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?

Item #2 _____ (192)

Long-term financing available at an interest rate that that would allow the U.S. fishing industry to compete with imports.

Item #3 _____ (193)

The exchange rate of the dollar must be dealt with.

Item #4 _____ (194)

Supply stabilization. EEC countries have a built-in system of minimum prices and stocking subsidies.

Item #5 _____ (195)

Tax benefits and low cost loans for the development of quality oriented high yield fishing and production.

Item #6 _____ (196)

Alaskan fishermen and processors aren't getting adequate prices for their products.

Item #7 _____ (197)

We need to establish of a futures market type of approach. We need to avoid boom and bust production cycles.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

E. Quality

Importance

Item #1 _____ (198)

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

Item #2 _____ (199)

The Alaskan salmon market is being challenged by the Norwegian Atlantic salmon and this will increase. Also, the public view of fish is still low. The best method of addressing these problems is to increase the quality of our products which will make marketing easier.

Item #3 _____ (200)

In spite efforts in the private and public sectors to improve product quality, the overwhelming attitude in the industry is that what we are doing now is good enough.

Item #4 _____ (201)

Quality, product development, marketing, and advertising should be encouraged in concert with each other.

Item #5 _____ (202)

Quality standards similar to the meat industry should be adopted. Product should be graded and the grading should be enforced both on fish delivery and finished product to develop a reliably high standard for U.S. products.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

F. International Issues

Importance

Item #1 _____ (203)

How can underdeveloped and foreign caught stocks be shifted to domestic fishermen without placing greater stress on already fully utilized stocks such as Pacific halibut?

Item #2 _____ (204)

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?

Item #3 _____ (205)

Real joint ventures (as opposed to over the side operations) need to be encouraged to develop and prosper.

Item #4 _____ (206)

The development of U.S. processors and the elimination of joint ventures.

Item #5 _____ (207)

There should be some sort of tariff or fish tax on foreign processed fish to put the U.S. industry on an equal footing with foreigners.

Item #6 _____ (208)

Agreement between fishing nations on the sharing of trans-boundary stocks and effective enforcement of such agreements.

Item #7 _____ (209)

The U.S. industry will not develop in a manner that we wish unless it is under the control of domestic interests. Foreign equity interests and other forms of ownership control much of the U.S. processing companies. This is not without substantial benefit to the industry. Without foreign financing, the processing industry would not have been able to grow at the rate it has. The resulting industry structure is not one which is best to further the development of the U.S. bottomfish industry.

Item #8 _____ (210)

Alaskan processors are prohibited from collectively bargaining with suppliers (fishermen) and export customers (Japanese). We suffer significantly on both fronts due to our compromised position.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

G. Salmon Aquaculture

Importance

Item #1 _____ (211)

We should promote salmon ranching efforts. We must lengthen salmon harvest seasons through development of existing early and late runs and genetic selection. The domestic market is shifting away from canned product forms to fresh, well handled products.

Item #2 _____ (212)

What will be the impact of worldwide salmon farming and ranching on the Alaskan salmon industry.

Item #3 _____ (213)

We should give serious thought to profit oriented ranching and farming in Alaska.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

H. Marketing

Importance

Item #1 _____ (214)

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?

Item #2 _____ (215)

An aggressive, fully funded marketing and promotion program for Alaska seafood products must be adopted for the next ten years.

Item #3 _____ (216)

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.

Item #4 _____ (217)

Access to foreign markets other than price competition. We need to use a trade policy to negotiate removal of tariffs and other trade barriers to our exports of semi-processed and processed products.

Item #5 _____ (218)

Development of marketing oriented rather than production oriented attitudes by domestic seafood companies.

Item #6 _____ (219)

U.S. Companies must further develop U.S. and world wide marketing staffs or they will remain a relatively unimportant and captive part of the industry.

Item #7 _____ (220)

"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.

Item #8 _____ (221)

To raise the per capita consumption of fish by influencing children and adults on the merits of eating seafood. Develop seafood eating habits.

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

I. Research Areas/Stock Assessments/Education

Importance

Item #1 _____ (222)

Through research, identify the relationship between price and volume for Pacific salmon produced in Alaska.

Item #2 _____ (223)

We especially need reliable information on the effect of the present moratorium on marine mammals on the ecosystem as a whole and on the natural mortality rate, etc., of our commercially important fish. (We know for example, that Beluga whales are heavy predators of young salmon as they emerge from the fresh water streams.)

Item #3 _____ (224)

How much development stands in jeopardy to changes in the physical environment? Especially how much credit for recent high salmon landings is due to a series of favorable (in terms of climate) years?

Item #4 _____ (225)

Continuing failure to fund fishery research needs (i.e., stock assessments, population dynamics, etc.) so that fishery management becomes capricious and/or inaccurate in fishery planning.

Item #5 _____ (226)

Effective monitoring of domestic catcher/processors by on-board observers paid for by the catcher/processor. Until this is accomplished, cheating such as processing undersized and female King crab will have an adverse impact on North Pacific stocks.

Item #6 _____ (227)

Supporting and maintaining university and federal educational and research facilities and staffs.

Item #7 _____ (228)

There is an increasing need for adequate information systems (particularly as international trade increases) so that entrepreneurial abilities can exploit market opportunities.

Item #8 _____ (229)

Will shellfish stocks (particularly King crab) remain depressed so that the crabber-trawler fleet will remain available for year-round production of groundfish?

Very Important = 1
Important = 2
Of Minor Importance = 3
Unimportant = 4

K. Remaining Issues

Importance

Item #1 _____ (230)

Develop transportation/storage/labor infrastructure to reduce the cost of U.S. processing and access to U.S. market.

Item #2 _____ (231)

Work at long-term planning rather than quick fixes.

Item #3 _____ (232)

Inertial inflexibility hinders creative innovation and ability to adjust to foreseeable industry changes as a matter of course. Technological advantages are not necessarily adopted.

Item #4 _____ (233)

To make an industry out of a highly segmented and scattered number of operating companies which need integration and rationalization.

Item #5 _____ (234)

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.

Item #6 _____ (235)

Better and more general solutions to the common property problem particularly in groundfish and shellfish operations.

Item #7 _____ (236)

Education and training in fisheries technology.

Item #8 _____ (237)

Education of a new generation of managers for groundfish operations.

GENERAL COMMENTS

Please feel free to comment on the questionnaire in general. For comments that refer to specific questions, please give the question number and page number to which the comment refers.

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APPENDIX

THE DELPHI METHODOLOGY

The Delphi method (named for the oracle at Delphi in ancient Greece) was first developed by the Rand Corporation in the 1950s as a method of systematically combining expert opinions in a procedure free from some of the serious limitations of face-to-face meetings. For example, the delphi process allows experts adequate time for examining and responding to the issues without the wasted travel time and inefficiencies of large meetings.

The basic Delphi method is a technique for systematically combining individual expert opinions elicited from members of a carefully selected panel. The method utilizes a series of structured questionnaires mailed to panelists, combined with feedback of interim results to panel members. Panelists are thus made aware of emerging panel positions, including areas of significant consensus or polarity.

The process is administered by a research team, whose members are responsible for translating the problem(s) that the sponsor of the study wants investigated into an initial set of questions, identifying and inviting experts to serve on the panel, developing the first and the follow-up questionnaires, distributing and collecting the questionnaires, interpreting the interim results in summarizing these results for feedback, and preparing the final report. The research team for this investigation are research staff members of the Division of Finance and Economics, Alaska State Department of Commerce and Economic Development.

Delphi panelists do not meet face-to-face and normally are not aware of the complete membership of the panel; panelists respond to questionnaires sent to their own individual offices. Anonymity of specific responses is preserved, and neither other panelists nor the sponsor are able to identify the specific source of an opinion. Thus, panelists are influenced by the opinion and its reasoning, and not by its source.

A typical Delphi research project consists of three to five questionnaire rounds, which are usually conducted by mail. Because of the time required to analyze previous round results and to design the next round questionnaire, lengthy panel member response times (panel expert typically have busy work schedules), and the inherent slowness of the mails, each of these Delphi rounds usually takes over two months to complete.

Once the research team and the sponsor are convinced that the significant issues and questions have been identified, successive rounds tend to focus on the clarification and refinement of the panelists' opinions. The inclusion of feedback from previous rounds in the questionnaire for the following rounds allows individual panel members to be aware of emerging panel positions and to evaluate their own position in relation to the views

of the complete panel. The feedback is usually limited to panel positions as a whole, but it may include the individual panelist's previous responses. In any case, panelists reconsider their position, provide new predictions or estimates, and explain the basis of major differences between their opinion and those of the complete panel.

Typically, this produces some degree of consensus, with narrower ranges for the estimated quantities, although several distinct positions may emerge. Consensus is not automatic, however; the panel may be split on a specific issue or prediction, and two or more clearly distinct positions may be revealed by further Delphi rounds.

When compared to other forecasting methods and, in particular, to those utilizing expert opinion, Delphi seems to have the following advantages:

- It can make effective use of expert opinions in a group process.
- Large panels are possible and relatively inexpensive.
- Logistic and cost problems associated with the panelists' travel are eliminated.
- Follow-up questions can be designed with great care.
- Anonymity eliminates status and ego problems on the part of the panelists which could bias predictions.
- Because informed opinion rather than mathematical modeling is the basis for prediction, Delphi can deal with breakthroughs and discontinuities.

Delphi is not without limitations, however:

- The process tends to be slow and thus influenced by changing events and trends.
- High degrees of quantitative precision generally cannot be expected.
- Problems can arise in maintaining panel membership, as panel attrition rates can be quite high.
- A consensus could be manipulated by the research team, or their biases may affect the results.
- Finally, simply having a consensus does not in itself make the prediction more accurate.

Despite these limitations, Delphi has gained widespread acceptance as a long-range forecasting method. More recently, a variation known as Policy Delphi has emerged; in Policy Delphi, the emphasis is on panel evaluation

of the desirability of alternatives and the importance of issues, and not just on prediction of events.

There is a temptation to consider Delphi as another survey technique, and to evaluate it and its results according to standard survey method criteria. However, Delphi is really a group communication process and not statistical sampling; the panel is chosen for expertise and is in no sense a random sample. In a leading book on Delphi, Linstone and Turoff describe Delphi as follows:

> "Delphi may be characterized 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."

LH/wfs0754Wh11584

DELPHI QUESTIONNAIRE #3

Department of Commerce and Economic Development

Office of Commercial Fisheries Development

Please return completed questionnaire to:

Department of Commerce and
Economic Development
Pouch D
Juneau, Alaska 99811

Lynn Hutton, Project Director
(907) 465-2079

Geoff Whistler
Research Assistant
(907) 465-2079

March 1985

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INTRODUCTION

This is the third and last Delphi questionnaire you will receive on future developments in the North Pacific seafood industry.

The response rate to the second questionnaire is 77%. That is, out of the 101 questionnaires that were returned from the first round, 78 were returned from the second round.

In the last questionnaire we asked you to evaluate the validity of the assertions provided by panel members and to respond to some open-ended probe questions. In this questionnaire, we request that you again evaluate the validity of the assertions provided by the panel members.

The questionnaire is organized into two broad sections which correspond to whether the set of assertions receive a one-time assessment, or a second reassessment. The first section deals with the latter, i.e., reassessment of previously evaluated assertions. Three questions with a total of 64 assertions are reported along with the frequency distribution of the panel's responses for each assertion.

Of the 64 assertions included here, 23 (36%) are reported for your feedback information only. That is, the "feedback" assertions are not to be reevaluated. These assertions were selected for no additional assessment because a large majority of the panel agreed on the validity of the assertions. Specifically, at least 66% of the panel indicated that these assertions were either "valid" or "reliable."

The remaining assertions in this section are presented for your reassessment. The selection of these assertions is based on the criteria of having received at least 40% support by the panel. Specifically, from 65% to 40% of the panel indicated that these assertions were either "valid" or "reliable."

Assertions which received less than 40% support by the panel have not been included in this questionnaire.

The second section of the questionnaire contains panelist's responses to some of the open-ended probe questions contained in the previous questionnaire. Since these responses (referred to as "assertions" here) have not been evaluated by the complete panel, we ask that you do so in this second section.

MAY WE INCLUDE YOUR NAME IN THE ACKNOWLEDGEMENT SECTION OF THE FINAL REPORT?

YES _____ NO _____

SECTION I - REASSESSMENT

This section contains three questions from the previous two rounds with a set of assertions related to each question. You performed an initial assessment of these assertions in Round 2.

You are requested to reassess the validity of each assertion in the reevaluation sections. The rationale for this seemingly redundant exercise is to gain greater group consensus or polarity on each assertion. By evaluating an assertion twice, the validity and reliability of the product will be enhanced.

INSTRUCTIONS

- This section requires that you give your response in the form of a check mark (✓). Put one check mark in the row of six empty cells found directly beneath the row of group frequency responses.
- Use the Validity Scale (on colored pages) to reevaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra space is provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.
- The numbers in parentheses are for coding purposes and should be ignored.
- For your information, the data in Section I is based on an average number of 66 respondants. The average number of missing cases for the set of accertions is 12. The range is from a minimum of 4 missing cases to a maximum of 26 missing cases.

EXAMPLE QUESTION:

Original question is repeated here so that you may compare the assertions with the question to which they refer.

1.1 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. 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. What are the biological, political and economic implications of these projected releases?

A. BIOLOGICAL IMPLICATIONS

Report of group response where combined categories of Valid and Reliable are greater than or equal to 66%. No response requested.

FEEDBACK ONLY

ASSERTION 1: 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.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
46.7	37.1	5.7	5.7	2.9	2.9

•
•
•

Report of group response where combined categories of Valid and Reliable are greater than or equal to 40%, and less than 66%. Your reassessment is requested.

REEVALUATION

ASSERTION 4: Effect will be minimal. Hatchery stocks would occupy only a small fraction of the ecosystem compared to natural stocks. (240)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
10.8	36.9	21.5	23.1	6.2	1.5

PUT A CHECK MARK IN THE CELL YOU CHOOSE

VALIDITY SCALE

Numeric Scale		
1	VALID	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	RELIABLE	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	NOT DETERMINABLE	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	RISKY	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn
5	UNRELIABLE	- great risk of being wrong - worthless as a decision basis
6	NOT PERTINENT	- even if the assertion is VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

1.1

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. 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. What are the biological, political and economic implications of these projected releases?

A. BIOLOGICAL IMPLICATIONS

FEEDBACK ONLY

ASSERTION 1: 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.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
45.7	37.1	5.7	5.7	2.9	2.9

ASSERTION 2: Localized areas (e.g. estuaries, near shore feeding grounds) will be stressed before the carrying capacity of the open ocean is reached.

26.2	41.0	19.7	9.8	1.6	1.6

ASSERTION 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).

34.3	37.5	14.1	12.5	1.6	0

REEVALUATION - Your response is requested for this subsection.

ASSERTION 4: Effect will be minimal. Hatchery stocks would occupy only a small fraction of the ecosystem compared to natural stocks. (240)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
10.8	36.9	21.5	23.1	6.2	1.5

PUT A CHECK MARK IN THE CELL YOU CHOOSE. →

ASSERTION 5: Salmon stocks will not increase proportionately to projected releases. (241)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
22.7	39.4	7.6	13.7	15.1	1.5

ASSERTION 6: Juvenile rearing grounds have a finite holding capacity and will result in increased competitive pressure on other species (e.g. herring). (242)

12.1	48.5	24.2	9.1	6.1	0

ASSERTION 7: The gene pool will become more homogenous and thus more susceptible to disease and environmental changes. (243)

7.7	32.3	27.7	20.0	12.3	0

ASSERTION 8: The overall size average will become smaller with larger returns. (244)

17.5	30.2	28.6	14.3	9.5	0

ASSERTION 9: The timing and species of hatchery releases need to be coordinated internationally to avoid overburdening the seasonal carrying capacity of feeding grounds. (245)

12.1	31.8	25.8	9.1	15.2	6.1

ASSERTION 10: There will be increased concentration on the most cheaply raised species (i.e., pinks and chums). (246)

12.1	33.3	18.2	21.2	7.6	7.6

B. POLITICAL IMPLICATIONS

FEEDBACK ONLY

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
27.6	63.0	3.1	3.1	3.1	3.1

ASSERTION 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.

51.4	30.6	6.9	8.3	1.4	1.4

ASSERTION 2: If disputes between nations do arise, they will first involve conflict over high seas and nonterminal interceptions.

26.0	53.6	4.4	11.6	1.4	2.9

ASSERTION 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 negotiations 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.

REEVALUATION - Your response is requested for this subsection.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
15.1	37.9	18.2	9.1	12.1	7.6

ASSERTION 4: 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. (247)

PUT A CHECK MARK IN THE CELL YOU CHOOSE.

17.9	31.5	12.3	15.1	9.6	13.7

ASSERTION 5: The danger is that certain elements in the industry will want hatchery production curtailed in order to boost the market price. (248)

12.3	30.8	10.8	35.4	9.2	1.5

ASSERTION 6: 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. (249)

C. ECONOMIC IMPLICATIONS

FEEDBACK ONLY

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
39.2	47.3	6.8	5.4	1.3	0

ASSERTION 1: There will be a long term increase in the supply of salmon, particularly chums and pinks.

19.1	48.5	2.9	16.2	5.9	7.4

ASSERTION 2: This could be a tremendous marketing opportunity. There is a need for a lower ex-vessel price, lower processing costs, and lower consumer price.

20.5	56.2	6.8	5.8	5.5	4.1

ASSERTION 3: 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.

22.5	43.7	9.9	9.9	5.6	8.4

ASSERTION 4: 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.

REEVALUATION - Your response is requested for this subsection.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
21.6	43.2	17.6	12.2	5.4	0

ASSERTION 5: If the U.S.S.R. carries through with its projected releases (5 billion by 2000), the U.S., Canada, and Japan would lose some of their European market shares. (250)

PUT A CHECK MARK IN THE CELL YOU CHOOSE.

21.9	43.8	13.7	16.4	1.4	2.7

ASSERTION 6: High volume production which could lead to increased profits at a lower price if accomplished effectively. (251)

ASSERTION 7: 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. (252)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
16.7	38.3	9.1	27.3	16.2	1.5

ASSERTION 8: 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. (253)

6.8	36.6	16.4	30.1	9.2	2.7

ASSERTION 9: Prices will decline as supply increases. As this happens, there will be a demand for curtailing the ocean rearing programs. (254)

9.7	30.6	18.1	27.8	13.8	0

ASSERTION 10: There will be decline in price for Alaskan salmon if current marketing strategies are followed. (255)

18.1	38.9	19.4	19.4	4.2	0

ASSERTION 11: Export demand will decline. (256)

16.2	29.7	17.6	28.7	8.1	2.7

ASSERTION 12: Price will decline as salmon returns to being a staple cheap protein commodity as pre-WWII. (257)

5.6	37.5	18.1	26.4	11.1	1.4

ASSERTION 13: 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. (258)

32.3	29.4	13.2	20.6	2.9	1.5

ASSERTION 14: Most of the effect will be on the pink and chum markets since these are the cheapest species to raise. (259)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
23.2	36.2	14.5	17.4	8.7	0

ASSERTION 15: Fishermen can increase their CPUE (catch per unit of effort) and thus make as much or more at a lower ex-vessel price. (260)

7.4	41.2	14.7	29.4	7.4	0

ASSERTION 16: Processors will have a more stable supply and therefore, a more efficient operation. (261)

19.2	35.6	13.7	30.1	0	1.4

ASSERTION 17: The market price will be lower causing demand to increase. (262)

22.9	44.3	12.9	12.9	7.1	0

1.2

The high seas salmon catch has decreased significantly since the early 1970's, due mainly to international agreements to restrict the high seas harvest (Japan accounted for 61% of all U.S. fishery exports in 1983). During the same period, the Japanese coastal catch (consisting mainly of hatchery raised adult chum salmon) has increased enough to equal the previous 15 year average. What are the implications of this trend (i.e., increasing Japanese coastal catch) for the U.S. salmon industry in the next 20 years?

FEEDBACK ONLY

ASSERTION 1: The Japanese coastal catch consists mainly of chums and pinks while the high seas catch concentrates on reds. Therefore, there would be negative effects on U.S. export markets for the low value species while the higher valued species would only be marginally affected, if at all.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
20.9	52.2	4.5	19.4	1.5	1.5

ASSERTION 2: The more significant trend for U.S. exports to Japan is the decreasing Japanese distant water catch.

32.3	50.0	0	13.8	3.1	0

ASSERTION 3: Chums and reds aren't good substitutes for one another in the Japanese market.

VALID	RELIABLE	NOT DETERMINABLE	RISKY	UNRELIABLE	NOT PERTINENT
29.0	53.2	4.8	0.1	1.6	3.2

ASSERTION 4: Japanese salmon imports are 70 - 75% reds. With a decreasing high seas catch, demand for reds will increase.

26.8	63.4	4.2	5.6	0	0

ASSERTION 5: These trends will force U.S. producers to market fish elsewhere. European demand will be met by Norway and the U.S.S.R. One alternative will be the Third World which cannot absorb much at today's prices. The king and coho market will continue to be strong in the U.S. at reduced prices. Sockeye looks good in the frozen domestic market. Also, there will be increased domestic consumption at lower prices for pinks and chums.

14.9	56.7	11.9	11.9	4.5	0

ASSERTION 6: The number one implication is to develop the U.S. salmon market.

38.4	38.4	6.8	11.0	2.7	2.7

ASSERTION 7: Alternative markets for salmon roe must be found.

25.8	43.5	6.4	4.8	11.3	8.1

ASSERTION 8: There will be a decline in export markets for chums.

14.9	52.2	14.9	13.4	4.5	0

REEVALUATION - Your response is requested for this subsection.

ASSERTION 9: The overall Japanese salmon market has increased over the last 20 years and will continue to do so. (263)

VALID	RELIABLE	NOT DETERMINABLE	RISKY	UNRELIABLE	NOT PERTINENT
9.7	49.1	19.4	11.2	4.8	0

PUT YOUR CHECK MARK IN THE CELL YOU CHOOSE.

ASSERTION 10: The greatest detrimental effect will be on sujiko (salmon roe) exports and not on the export of fish. (264)

VALID	RELIABLE	NOT DETERMINABLE	RISKY	UNRELIABLE	NOT PERTINENT
6.7	45.0	31.7	31.7	3.3	1.7

ASSERTION 11: These trends suggest a continuing shakeout of the U.S. industry with only those having a special market niche, financial strength, and sustained profits remaining. (265)

14.7	45.6	14.7	17.6	4.4	2.9

ASSERTION 12: The Japanese per capita demand for all fish products will decline in the next 20 years due to changes in tastes and preferences among the younger generation. (266)

15.5	42.2	11.3	19.7	11.3	0

ASSERTION 13: The Japanese success with hatchery production provides a model to predict economic success of hatchery production. (267)

5.7	47.1	12.9	20.0	11.4	2.9

ASSERTION 14: Another implication is to develop the overseas market (especially for canned products) in anticipation of a declining U.S. dollar. (268)

10.4	41.8	14.9	19.4	7.5	6.0

ASSERTION 15: There will be a decline in the export markets for pinks. (269)

8.9	38.8	17.9	28.4	6.0	0

ASSERTION 16: This implies that we must solve institutional questions related to salmon ranching if the U.S. is to compete effectively with Japan. (270)

21.9	42.2	10.9	9.4	9.4	6.2

1.3

In 1982, approximately 50% of the salmon eggs taken in Alaska were handled by private, nonprofit hatcheries. At the present time private-for-profit hatcheries are not allowed in Alaska. Currently three types of hatcheries exist in the State: public hatcheries (funded by tax dollars), private nonprofit hatcheries (started by State loans and/or grants and funded by an aquaculture assessment on the commercial catch within their region and the sale of surplus salmon), and so called "Mom and Pop" operations (started with State money and funded by the sale of surplus fish). (Surplus fish are defined as fish which have passed through the common property fishery and returned to the terminal area over and above the numbers needed for cohort recruitment.) Currently all of these programs are coordinated by the Alaska Department of Fish and Game.

FEEDBACK ONLY

ASSERTION 1: Salmon stocks should be managed to protect natural runs.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
41.5	41.5	6.2	6.2	1.6	3.1

ASSERTION 2: Pen culture which should be encouraged and can be controlled in its entirety.

17.6	49.1	10.5	10.5	12.3	0

ASSERTION 3: Costs should be carefully evaluated to assure 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 enhancement.

40.0	46.2	6.2	6.2	0	1.6

ASSERTION 4: Private For Profit hatcheries that can make some level of profit and still contribute to the common property fishery should be encouraged.

22.2	49.2	6.4	12.7	9.5	0

ASSERTION 5: ADF&G should continue to manage hatchery runs and perform their regulatory role.

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
27.1	52.5	6.8	8.5	5.1	0

REEVALUATION - Your response is requested for this subsection.

ASSERTION 6: "Private nonprofits" should concentrate on commercial fish production and enhancement of early and late stocks to extend seasons. (271)

VALID	RE-LIABLE	NOT DETER-MINABLE	RISKY	UNRE-LIABLE	NOT PER-TINENT
10.7	44.6	10.7	21.4	7.1	5.4

PUT A CHECK MARK IN THE CELL YOU CHOOSE.

ASSERTION 7: The nonprofit concept doesn't promote efficiency and innovation that the profit motive generates. Alaska should introduce profit at a deliberate pace or State interests will fall behind more efficient foreign competition. (272)

15.9	42.9	3.2	23.8	11.1	3.2

ASSERTION 8: Private Non Profit (PNP) hatchery corporations, both local and regional, are stifled by overregulation from the Alaska Department of Fish and Game (ADF&G). The primary cause is the Fisheries Research and Enhancement Division (F.R.E.D.) playing a dual role as competitor and regulator. (273)

15.1	32.1	13.2	28.3	7.6	3.8

ASSERTION 9: Transfer of stocks, providing they are disease free, should be allowed between regions. (274)

14.0	31.6	8.8	24.6	17.5	3.5

ASSERTION 10: The primary role of ADF&G should be research and development and disease control. (275)

15.5	29.3	8.6	24.1	19.0	3.4

ASSERTION 11: Exclusive area rights with no restriction on how the catch is taken. Should be in the form of fisherman/processor cooperatives. Offshore interceptions should be kept at a minimum through individual quota licensing arrangements. (276)

VALID	RE-LIABLE	NOT DETER-MINABLE	DIRECT	UNRE-LIABLE	NOT PER-TINENT
16.3	28.6	10.7	28.6	17.9	0

ASSERTION 12: The State should allow a pen farming network of size, scope and marketing operations similar to Norway. (277)

12.7	41.8	16.4	12.7	14.5	1.8

ASSERTION 13: The State should fund a smolt operation for the purpose of getting the farming network started and maintaining a genetically strong strain. (278)

16.4	28.2	14.5	28.0	7.3	3.6

ASSERTION 14: The present institutional arrangement is practical in terms of political support and is functional. (279)

5.8	30.5	11.6	42.3	1.9	0

SECTION II - EVALUATION

This section contains seven questions from the second questionnaire with a set of assertions related to each question. These assertions were obtained from the responses that individual panelists submitted in the previous questionnaire.

INSTRUCTIONS

- You are requested to evaluate the assertions by writing a number from 1 to 6 on the lines provided at the right of each assertion.
- Use the Validity Scale (on the colored pages) to evaluate the assertions.
- In making your judgment about the relative validity of an assertion, take into consideration the meaning of the original question and the definitions used in the validity scale.
- You may make comments either in the margins or at the end of the questionnaire. Extra space is provided for comments at the end. Please remember to indicate the question and page numbers to which you refer.
- The numbers in parentheses are for coding purposes and should be ignored.

EXAMPLE QUESTION:

Original question is repeated here so that you may compare the assertions with the question to which they refer.

2.5

If there is partial or no cost recovery from returning adults, what means should be used to finance nonprofit, private, hatcheries?

Validity Scale

1 Valid	4 Risky
2 Reliable	5 Unreliable
3 Not Determinable	6 Not Pertinent

Please rate the validity of the following assertions:

ASSERTION 1 Tax those who benefit, fishermen or processors. In any case, the cost will be passed on to the final consumer, tacked onto the price paid for the fish. ——— (341)

ASSERTION 2 The present system is fine. PMP's must learn to live within what is provided by assessments. ——— (342)

Response given by a panelist in the second questionnaire presented here for you to evaluate.

You evaluate the assertions by putting a number (1-6) on the line to represent the relative validity of the question.

VALIDITY SCALE

Numeric Scale		
1	VALID	- low risk of being wrong - decision based upon this will not be wrong because of this "fact" - most inferences drawn from this will be true
2	RELIABLE	- some risk of being wrong - willingness to make a decision based upon this - assuming this to be true but recognizing some chance of error - some incorrect inferences can be drawn
3	NOT DETERMINABLE	- the information or knowledge to evaluate the validity of this assertion is not available to anyone - expert or decisionmaker
4	RISKY	- substantial risk of being wrong - not willing to make a decision based upon this alone - many incorrect inferences can be drawn
5	UNRELIABLE	- great risk of being wrong - worthless as a decision basis
6	NOT PERTINENT	- even if the assertion is VALID or UNRELIABLE it has no significance for the basic issue - it cannot affect the variable under question or observable amount
Blank	No Judgment	- no knowledge to judge this item

2.1

Norway has been developing a successful salmon farm industry. Production of pen-reared salmon exceeded 40 million pounds in 1984 and is expected to at least double by 1986. Other European countries are also entering this industry. Alaska salmon could largely be displaced from European markets for fresh and fresh frozen salmon by 1990, and competition for U.S. markets will intensify.

Given these developments, what role do you foresee for pen-reared salmon in Alaska's future? Please be specific in terms of species and relative importance compared to natural and hatchery (ranched) production.

Validity Scale
1 Valid — 4 Risky
2 Reliable — 5 Unreliable
3 Not Determinable — 6 Not Pertinent

Please rate the validity of the following assertions:

ASSERTION 1: The development of pen reared salmon farming in Alaska is biologically feasible, but its economic feasibility is doubtful. High production and transportation costs will limit potential. _____ (300)

ASSERTION 2: There are very few places in Alaska where the temperature conditions would be warm enough year round to compete with the growing conditions in Norway. _____ (301)

ASSERTION 3: Alaska needs salmon farming to open up year round markets for high quality fresh fish. Farmed fish may actually increase the demand for high quality fresh and fresh frozen kings and cohos by assuring a steady supply. _____ (302)

ASSERTION 4: Pen rearing would open up markets for fish wastes and by-products. _____ (303)

Validity Scale
1 Valid — 4 Risky
2 Reliable — 5 Unreliable
3 Not Determinable — 6 Not Pertinent

ASSERTION 5: Alaska should get into pen rearing. It has the great advantage of site availability at least in Southeast and Southcentral. _____ (304)

ASSERTION 6: For the near future (10-20 years), Alaska should stick to what she does best: harvesting salmon in her waters, not pen raising them. _____ (305)

ASSERTION 7: No, I don't think Alaska should divert public funds into pen raising and I don't think private industry will find it profitable either. _____ (306)

ASSERTION 8: Assuming that pen rearing in Alaska is technically and economically feasible, the market effect of competition between farmed and troll caught kings and cohos needs to be better understood. _____ (307)

ASSERTION 9: I see pen rearing by cooperatives of small producers as an adjunct to total market development by industry and fishermen. Pen rearing of Alaskan chinook could potentially exceed or replace troll production. _____ (308)

ASSERTION 10: Pen rearing in Alaska will be of very little importance compared to natural and hatchery production. _____ (309)

ASSERTION 11: Coho, chinook and steelhead are the only species which should be considered for pen rearing. _____ (310)

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 12: One problem is high production costs for desired species, i.e., chinook and coho. Seasonability of production plus brood stock problems also limit present potential. Atlantic salmon may be Alaska's best bet for pen rearing at present. _____ (311)

ASSERTION 13: Depends on government stance concerning leases, culture of Atlantic salmon, and financing of support facilities (i.e., brood stock and disease control). _____ (312)

ASSERTION 14: The State should offer experimental permits to fishermen to conduct a pilot program and develop a system of individually owned small farms such as Norway has. _____ (313)

ASSERTION 15: There is absolutely no comparative advantage in North American pen rearing for European markets. _____ (314)

ASSERTION 16: Southeast Alaska enjoys a comparative advantage in shipping costs to the Lower 48 ($.22/lb from Southeast vs. $1.10/lb from Norway). Therefore, we should concentrate on pen rearing salmon for the domestic market. _____ (315)

ASSERTION 17: Pen rearing should be developed along the lines of the "mom and pop" hatcheries in rural areas. _____ (316)

2.2

Salmon aquaculture will create a new interest group in Alaska salmon fisheries. This new group will possess a farming philosophy which can contribute to conflict with a traditional industry which is based on hunting. Legal and institutional structures for farming and hunting economics are quite different. What are the political implications arising from farming versus hunting in Alaska salmon fisheries?

Can a salmon industry based on hunting survive in competition with one based on farming? Can the two be successfully integrated?

Responses to these three questions have been combined into one set of assertions.

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: There is no reason why hunting and farming cannot be integrated into a single industry. Salmon farming will dominate the high priced fresh market particularly in the off season while hunting and ranching interests will hold the lower priced, high volume end of the market. _____ (317)

ASSERTION 2: The interests may not necessarily be different. This has not been the case in Norway. Limit the farm size and limit farming to individuals by amending the limited entry permit to allow farming by a permit holder. _____ (318)

ASSERTION 3: We would not see any basic conflict for years, as Alaska's largest political group is made up of its fishermen. The big problem of DomSea in Puget Sound came from real estate, anti-pollution forces, and other directions -- little opposition from fishermen. _____ (319)

ASSERTION 4: Salmon pen rearing must be profit motivated to attract investors. Fishermen view pen-reared salmon as competition and resist aquaculture for profit. This strong fishing lobby will keep political pressure on the Legislature to prevent private for profit pen rearing. _____ (320)

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 5: Only some type of fishermen's cooperative approach, where fishermen could fish during part of the year and farm during the remainder (as in Japan), would be politically acceptable. _____ (321)

ASSERTION 6: You must be able to demonstrate some definite advantages to the "hunters" and to the State's economy as a whole. I think you can argue that the two products aren't all that competitive - they serve different market niches so far as pen reared versus wild/ranched fish are concerned. _____ (322)

ASSERTION 7: Only large corporations such as Weyerhaeuser or possibly Native corporations can afford the capital costs of pen rearing. _____ (323)

ASSERTION 8: A salmon industry based on hunting can survive with one based on ocean ranching because the benefits of increased adult production are being realized by fishermen. Strict pen rearing will be incompatible unless it can somehow be integrated into the existing institutional structure possibly via fishermen's cooperatives or by allowing private nonprofit aquaculture associations to participate. _____ (324)

ASSERTION 9: An integration of the processing and farming sectors seems inevitable. Fishermen must be included to make this politically viable. _____ (325)

2.3

While there appears to be a wide range in the types of panelists' answers to the question of what institutional form hatchery production should take, there is a fair agreement that salmon stocks should be managed to protect natural returns, and that a profit incentive should be introduced slowly to the private nonprofit hatcheries.

Aside from the current aquaculture assessment, do you believe fishermen and processors should share in the costs and/or profits of privately held hatcheries?

Yes 47.6% No 36.1% Don't Know 14.3%

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: The current assessment is a good means for providing capital and operating costs on a user pays basis. The profit side should be covered by the availability of more fish to benefit the greatest number of people. _____ (326)

ASSERTION 2: Private for profit hatcheries should carry their own costs and/or profits. _____ (327)

ASSERTION 3: There should be no private for profit hatcheries. The only private for profit operations that should be allowed are pen rearing salmon farms. These should buy their smolts from ADF&G controlled hatcheries. _____ (328)

ASSERTION 4: The public is precluded from commercial fishing by the limited entry system. Therefore, all of the costs and benefits of private hatcheries should be borne by those who are directly involved - fishermen, processors, and hatchery owners. _____ (329)

ASSERTION 5: In localized areas where fishermen can derive determinable benefits in increased catch, and where the major return is to hatcheries, fishermen should be assessed to fish. _____ (330)

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 6: The answer depends on identification of increases on production due to such hatcheries. The simplest mechanism is to allow an adequate escapement to hatcheries and assess no costs. If catch (interception) rates are set high, a cost-sharing arrangement may be in order. _____ (331)

ASSERTION 7: Yes. Vertical integration and a better definition of property rights are necessary for Alaska to maintain its competitiveness. _____ (332)

ASSERTION 8: I believe the ideal arrangement would be a joint stock company or limited partnership arrangement with fishermen as stockholders. The hatcheries should be private for profit complete with a manager and a board of directors. _____ (333)

2.4

Private nonprofit hatcheries are allowed to sell surplus adults as a means to generate funds for operations and debt repayment. Should the State (ADF&G) manage common property fisheries to allow sufficient escapement for total cost recovery, partial cost recovery, no cost recovery?

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: Partial recovery should be allowed. Terminal fisheries necessary for total recovery equal poor quality and are therefore economically inefficient. _____ (334)

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 2: No cost recovery. Surplus fish at the hatchery are of poor quality and should be used only for breeding stock. _____ (335)

ASSERTION 3: Management costs should not be tied or limited to the actual year-by-year production of a fishery that is periodically depressed. _____ (336)

ASSERTION 4: 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. _____ (337)

ASSERTION 5: Partial cost recovery should be used to cover development costs. Assistance should be phased out eventually to convert nonprofits to profit status. _____ (338)

ASSERTION 6: Total cost recovery should be required of all hatcheries including State operated hatcheries. _____ (339)

ASSERTION 7: The present system for private nonprofit partial cost recovery is working well. _____ (340)

2.5

If there is partial or no cost recovery from returning adults, what means should be used to finance nonprofit, private, hatcheries?

Validity Scale
1 Valid — 4 Risky
2 Reliable — 5 Unreliable
3 Not Determinable — 6 Not Pertinent

Please rate the validity of the following assertions:

ASSERTION 1 Tax those who benefit, fishermen or processors. In any case, the cost will be passed on to the final consumer, tacked onto the price paid for the fish. _____ (341)

ASSERTION 2 The present system is fine. PNP's must learn to live within what is provided by assessments. _____ (342)

ASSERTION 3: A balance between an enhancement assessment and partial cost recovery from fish sales is a good financial arrangement. _____ (343)

ASSERTION 4: There should be no private for profit hatcheries. The only private for profit operations that should be allowed are pen rearing salmon farms. These should buy their smolts from ADF&G controlled hatcheries. _____ (344)

ASSERTION 5: The simplest mechanism is to allow an adequate escapement to hatcheries and assess no costs. _____ (345)

ASSERTION 6: Private for profit hatcheries should probably remain independent - to make their own profit or suffer loss, and they have to be assured of sufficient profit to encourage investment. _____ (346)

2.6

The twelve Seattle-based American flag factory trawlers currently operating within the Alaskan FCZ add little to Alaska's economy. Over-the-side sale type joint ventures provide income for some local fishermen, but all of the value added from processing the harvested fish into its final product form escapes overseas. Processed-at-sea surimi sells for twice as much as the shore processed product in export markets.

Given these facts, what can Alaska do to encourage the development of a "value added" industry around its abundant groundfish resources? Please be specific in terms of species, products, and locations.

Validity Scale
1 Valid — 4 Risky
2 Reliable — 5 Unreliable
3 Not Determinable — 6 Not Pertinent

ASSERTION 1: I'm not sure it would be wise to pursue any development policy other than providing a stable regulatory environment - using State funds to develop a fishery merely transfers wealth from the State as a whole to the relatively few individuals who would benefit. _____ (347)

ASSERTION 2: To be competitive, the U.S. industry must develop around factory trawlers. Alaska can benefit by providing support facilities and support services. _____ (348)

ASSERTION 3: Shore based processors have to process pollock into surimi for the domestic market. The domestic market doesn't recognize the quality difference between at sea or shore based processing. Subsidies and/or proof of profitability will stimulate processors into the bottomfish industry. _____ (349)

ASSERTION 4: Encourage steady improvement in infrastructure. Stay away from subsidies. _____ (350)

ASSERTION 5: Restructure the raw fish tax; graduate it from tax credit to actual tax determined on the extent to which a product is locally processed. _____ (351)

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 6: Employ tax incentive schemes to generate modernization of plants and vessels. _____ (352)

ASSERTION 7: Surimi is the bottleneck at the present time and the reasons are pretty well outlined here. Under present restrictions, surimi processing is hard to put together economically. I would suggest that we forget surimi and turn to production of surimi products to take advantage of the growing U.S. market now. _____ (353)

ASSERTION 8: Allow the landing of Japanese produced product, restricted to U.S.-Japan joint operation produced product if necessary, directly into Alaska ports. _____ (354)

ASSERTION 9: Concentrate efforts on higher value species, i.e., rock fish, flounder, cod. Pollock can follow at a much later date. Provide information on direct marketing of higher value species. _____ (355)

ASSERTION 10: Alaska should take a hard look at "in State waters" joint ventures and take advantage of them for a while. _____ (356)

ASSERTION 11: Provide long-term, low interest loans for infrastructure development in Alaskan coastal communities and most important, low cost electrical energy and tax incentives. _____ (357)

2.7
One option that would help capture some "value added" from groundfish production is a fleet of locally-based vessels of smaller size than the factory trawlers which could harvest and process their catch at sea and ship their fresh "frozen" finished product from Alaskan ports in freezer containers. Do you think this is a viable option?

Validity Scale
1 Valid 4 Risky
2 Reliable 5 Unreliable
3 Not Determinable 6 Not Pertinent

ASSERTION 1: We see some of it already, especially in higher value fish, sablefish, cod, turbot, but must have storage and shipping facilities greatly improved. _____ (358)

ASSERTION 2: Shipping costs are too great and the dollars going into Alaska's economy would be negligible. _____ (359)

ASSERTION 3: Absolutely not. Pollock and yellowfin sole are caught in such tremendous quantities and are of so low value that it dictates a large boat, large volume fishery. _____ (360)

ASSERTION 4: The fact that there is little movement in this direction indicates that it is probably not "viable," i.e., profitable. _____ (361)

ASSERTION 5: The focus of smaller sized vessels must be on higher valued species and high quality markets. _____ (362)

ASSERTION 6: Because of Alaska's transportation cost advantage to the Orient, offloading in Alaskan ports for trans-shipment should be encouraged. _____ (363)

ASSERTION 7: Locally based vessels would tend to contribute more to the local economies. However, if high wages are required for Alaskan crews and smaller boats are inherently less efficient, such boats may be marginal operations at best. _____ (364)

Validity Scale

1 Valid	4 Risky
2 Reliable	5 Unreliable
3 Not Determinable	6 Not Pertinent

ASSERTION 8: Shore based processing companies simply must get out of the mind-set that they are adversaries to floating processors or else they will die on the vine. I dare say that had there been some innovative thinkers among the shore based processors, the new larger class of factory trawlers would never have been built in the U.S. Someone still has to do the groundwork for vessels once they land their catch. Why not break into this? _____ (365)

ASSERTION 9: Lower priced imports from Korea, Canada and other countries seeking hard currencies will probably make it difficult. Specialized market niches, especially with high quality/value products are a viable option, however. _____ (366)

ASSERTION 10: Some studies I have seen indicate that the most efficient processors are of medium size and the size of boat has to be carefully matched with efficiency of production. I don't know at the moment what the optimum size is. Otherwise, a viable option I think. _____ (367)

ASSERTION 11: If government leadership is provided for R & D, grants for production equipment and extension and marketing help, this could be accomplished. _____ (368)

GENERAL COMMENTS

Please feel free to comment on the questionnaire in general. For comments that refer to specific questions, please give the question number and page number to which the comment refers.