

ALASKA LEGISLATURE COMMITTEES 1983-1984 86/2

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(f) development of necessary measures for monitoring and enforcing compliance with the terms of this Treaty.

3. In 1983, the Parties shall enact regulations designed to ensure that:

- (a) the combined catch by all southeastern Alaskan salmon fisheries does not exceed 263,000 chinook, and of that, the catch taken by the commercial salmon fisheries does not exceed 243,000 chinook; and
- (b) the combined catch by all Canadian salmon fisheries in Georgia and Johnstone Straits and central and northern British Columbia does not exceed 868,000 chinook.

4. In 1983 and 1984, the Parties shall implement management measures for fisheries in other areas as required to ensure that chinook salmon from depressed stocks that are conserved by the imposition of harvest ceilings accrue principally to spawning escapement.

DRAFT

- 43 -

5. Following the 1983 season and prior to the development of fishery regimes for the 1984 season, the Parties shall establish a Technical Committee, representative of the Northern and Southern Panels, to evaluate the effectiveness of management actions taken in 1983 with respect to:

(a) consistency of actual catches with corresponding harvest ceilings;

(b) the effect of the management measures described in paragraph 3; and

(c) the degree to which the decline in spawning escapement levels has been affected.

6. The Technical Committee shall also re-examine, and if appropriate, propose changes to the extent of reductions in exploitation required to meet the objective specified in sub-paragraph 1(a), and contained in the Report entitled Joint United States/Canada Technical Response to the Canadian Proposal for Chinook Conservation, dated November 30, 1982 (appended to this Annex). On the basis of the findings of the Technical Committee, the Parties shall adopt measures in 1984 which will result

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in reductions in catches to achieve the objective specified in paragraph 1(a). According to present agreed scientific analysis of the status of the stocks of concern contained in the Report, this would require a reduction in catches by the affected fisheries of approximately 25 percent from the 1981-82 harvest of chinook levels (paragraph 2 of the Report).

7. The Parties agree that enhancement efforts designed to increase artificial production of chinook salmon would be beneficial to the rebuilding program. Maintenance of harvest ceilings, combined with increased availability of enhancement fish, provides the opportunity to accelerate the stock rebuilding process by significantly reducing exploitation rates of naturally spawning stocks. The United States is initiating a program under section 4h of the Northwest Power Act as a national commitment to rehabilitation of Columbia River salmon stocks and is developing additional cooperative enhancement plans for southeastern Alaska. Efforts to increase chinook stocks are also under development by the States of Idaho, Oregon, Washington and Alaska, and federal agencies of the United States. Production from Canada's Salmonid Enhancement Program

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will continue to increase its contribution to the available harvest of chinook salmon in the affected fisheries.

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Annex IV

Chapter 4

FRASER RIVER SOCKEYE AND PINK SALMON

1. In order to increase the effectiveness of the management of fisheries in the Fraser Panel Area and in fisheries outside the Area which harvest Fraser River sockeye and pink salmon and to permit effective implementation of Article III, the negotiations for the 1985 and 1986 fishery regimes shall include development of:
  - (a) agreed adjustments in the limits of the Area to simplify domestic management in the two countries; and
  - (b) formulae for providing the United States with agreed harvests of Fraser River sockeye and pink salmon in the Area which take into account:
    - (i) within the context of Article III, the implications of potential increases in the production of Fraser River sockeye and pink salmon, and of benefits provided to the United States through Canadian management actions in fisheries

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for stocks other than Fraser River sockeye and pink salmon;

(ii) the need to provide flexibility in management of fisheries outside the Area which harvest Fraser River sockeye and pink salmon; and

(iii) the total harvest of Fraser River sockeye and pink salmon wherever they occur.

2. In the interim, in 1983, on the basis of IPSFC projections regarding the abundance of the returning runs (of approximately 6.5 million sockeye and approximately 21.0 million pinks), escapement requirements (including the spawning escapement and estimates of the Native Indian food catch) and normal patterns of fishing outside the Area, it is anticipated that the Total Allowable Catches of sockeye and pink salmon within the Area will be 3.5 million and 10 million, respectively.
3. In 1983, the United States shall be provided 50 percent of the Total Allowable Catches of each species within the Area less 150,000 sockeye and 300,000 pinks.

4. In 1984, based on an expected run of 3.75 million sockeye and an Area Total Allowable Catch of approximately 1.75 million sockeye, the United States shall be provided with 50 percent of the Total Allowable Catch within the Area of sockeye less 50,000 fish.

5. The IPSFC or the Commission shall develop regulatory programs in the Area to give effect to the provisions of this Annex.

Annex IV

Chapter 5

SOUTHERN BRITISH COLUMBIA - WASHINGTON COHO AND CHUM FISHERIES

1. Anticipated returns of some natural coho and chum salmon stocks originating in Johnstone Strait, the Strait of Georgia and the Fraser River in 1983 and 1984 are expected to be weak and therefore not likely to have a harvestable surplus. Some enhanced stocks of coho and chum originating in the above areas are anticipated to have harvestable surpluses and locally directed fisheries on these enhanced stocks are expected.
2. The Parties shall meet and develop agreed fishery regimes by April 30, 1983 for the 1983 and 1984 fishing season in response to the conservation status of the resources.
3. If at a later date it is determined that harvestable surpluses of Canadian or United States coho and chum salmon exist the Parties will consult to identify and agree on fishing opportunities.

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Annex IV

Chapter 6

GENERAL OBLIGATION

With respect to intercepting fisheries not dealt with elsewhere in this Annex, the Parties shall not permit interceptions to increase above the levels of recent years, nor initiate new intercepting fisheries, except as may be agreed.

DRAFT

- 53 -

Exchange of Notes

I have the honor to refer to the discussions between representatives of our two <sup>1/14 MMS</sup> Governments and to the Treaty between the Government of the United States of America and the Government of Canada concerning Pacific salmon (the Treaty) and to confirm on behalf of the United States Government the understanding set out below that has been reached between our two Governments concerning the implementation <sup>QC JCA MMS</sup> of Article XVII, paragraph 3 of the Treaty.

A. Prior to the first anniversary of the date of entry into force of the Treaty:

1. The Fraser River Panel established pursuant to the Treaty shall assume the following responsibilities consistent with the Treaty:

(a) review and evaluate information provided by the Parties, pursuant to Article IV, paragraph 3, in order to provide recommendations to the Commission on the fishery regime to be included in Annex IV;

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- (b) on adoption by the Parties of the fishery regime, make proposals to the Commission regarding regulations for the harvest of Fraser River sockeye and pink salmon within the Fraser Panel Area (the Area);
- (c) collect in-season information on catches within the Area; review information on escapements within the Area; collate information provided by the Parties pursuant to paragraphs D, 2 and 3 for fisheries outside the Area; conduct test fishing on Fraser River sockeye and pink salmon; and collect data on up-river escapements by observation at Hell's Gate and through the conduct of a hydroacoustic program at Mission Bridge;
- (d) make orders for the adjustment of the fisheries pursuant to Article VI, paragraph 6, on the basis of information garnered under subparagraph (c); and
- (e) provide the Commission, at the end of each fishing season, with an accounting of the catches, wherever made, of Fraser

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- 55 -

River sockeye and pink salmon and with an appraisal of the extent to which the Panel achieved <sup>the</sup> objectives set by the Parties.

2. Canada shall assume all responsibilities of the International Pacific Salmon Fisheries Commission (IPSF) except for those responsibilities specified in subparagraph 1.
  
- B. The IPSFC will continue to discharge its responsibilities in the interval between the entry into force of the Treaty <sup>of MPS 1/27</sup> and, pursuant to paragraph A, the assumption of responsibilities by Canada and the Fraser River Panel.
  
- C. Prior to the fourth anniversary of the entry into force of the Treaty, the Commission shall review the division of responsibilities set out above.
  
- D. Canada and the United States shall provide to the Commission:
  1. the information required by Article IV, paragraph 3;

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2. information on in-season catches and estimated catches of Fraser River sockeye and pink salmon by time, area, species, and gear type;
  3. post-season statistical information regarding Fraser River sockeye and pink salmon catches by area, gear type, species and time;
  4. data on spawning escapements for all sockeye and pink stocks which migrate through the Area; and
  5. information on any problems identified in achieving national goals resulting from in-season regulation of the Area fisheries.
- E. The following administrative arrangements shall apply to the transfers of staff from IPSEFC:
1. Appropriate members of the existing Fishery Management Division and of other Divisions of the IPSEFC shall be transferred to the Commission so that it shall have the capability to perform the following duties:
    - (a) the discharge of the responsibilities of the Commission and of the Fraser River Panel as specified inter alia in paragraph A 1: 1147 MRS
    - (b) interpretation of statistical and biological data and other information referred to in paragraph D;

DRAFT

- 57 -

- (c) collection and assembly of such data as may be required by the Commission and its Panels; and
  - (d) preparation of such publications as may be decided upon by the Commission.
2. The staff shall be under the direction of the Executive Director pursuant to Article II, paragraph 16.
  3. The Operations Division shall be transferred to the Department of Fisheries and Oceans (DFO), Canada, to the extent practicable, and shall continue to carry out upriver work on pink and sockeye salmon in coordination with the staff of the Fraser River Panel. While there will be some duplication of work in the spawning areas during this initial period, it is anticipated that the Operations Division will eventually be integrated into DFO's Fraser River Management and Enhancement Operations to streamline upriver operations and to avoid duplication. The close working

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relationship that now exists at the staff level between the IPSFC Fishery Management Division and Operations Division should be maintained between the Fraser River Panel staff and the appropriate DFO responsibility centers.

4. The Environment Conservation Division, Biology Division, and Engineering Division shall be transferred to DFO and integrated as practicable

5. The transfers of the Fishery Management Division and the Operations Division of the IPSFC referred to in paragraphs 1 and 2 shall occur during the period November to March. The transfer of the Environment Conservation Division, the Biology Division and the Engineering Division referred to in paragraph 3 may occur at any time within the year after the date of entry into force of the Treaty. Officials of the Parties shall consult with each other and with the IPSFC staff to seek agreement on the specific timing of these transfers, taking into account the need for continued sound management of the fishery resource and the administrative and budget cycles of the two Governments.

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F. In order to ensure continuity in the methodology of collection of upriver data required for the management of Fraser River sockeye and pink salmon:

1. Pending the entry into force of the Treaty, DFO staff shall participate with IPSFC staff in IPSFC upriver activities.
2. In the first two years following entry into force of the Treaty former IPSFC staff members whose responsibilities included upriver work and who become employees of DFO, shall participate in the carrying out of Canada's upriver responsibilities, as practicable. With respect to upstream spawning escapement work, the advice of the new Commission's staff shall be sought as appropriate.
3. On request of either Party, opportunities shall be provided for technical experts to observe the data collection operations of the Parties related to the activities of the Fraser River Panel.

G. The Parties shall consult with each other and with the IPSFC staff with a view, inter alia, to offering employment to IPSFC employees in the new Commission, the Fraser River Panel, or within government agencies of the two Parties on terms and conditions comparable, to the extent practicable, with those they enjoy in IPSFC.

H. The IPSFC Library in New Westminster, B.C., which contains irreplaceable historical records, shall be transferred to the new Commission and shall be readily accessible to the new Fraser River Panel, the Commission, and others whose professional needs require use of these library facilities.

Other IPSFC assets necessary for the work of the Commission and the Fraser River Panel shall be transferred to the Commission.

The remaining assets shall be transferred to Canada.

I have the honor to propose that if the understanding set out in this Note is acceptable to the Government of Canada, this Note and your reply to that effect, shall constitute an Agreement between the Government of the United States of America and the Government of Canada regarding the implementation of the Treaty and shall enter into force

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- 61 -

At the end of the third year after entry into force, and at any time thereafter, either Party may give notice of its intention to terminate this Agreement. The Agreement shall terminate one year after notification.

I avail myself of this opportunity to renew to you, Sir, the assurance of my highest consideration.

Subject to change by mutual agreement on receipt of views provided by IPSFC.

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LETTER OF UNDERSTANDING BETWEEN THE NEGOTIATORS  
REGARDING IMPLEMENTATION OF ARTICLE III 1(b)

In submitting our recommendations to governments, the negotiators hold the view that the principal goals of the treaty are to enable both countries, through better conservation and enhancement, to increase production of salmon and to ensure that the benefits resulting from each country's efforts accrue to that country. In this regard, we believe that research on the migratory movements of stocks subject to interception must be continued for several years. Such research is required not only to determine with more precision the extent of interceptions by both sides, but also to provide an improved basis for conservation and enhancement. The negotiators believe that resultant long term increases in production of salmon will fully justify the short term expenditures on research.

With respect of the obligation to provide each Party with benefits equivalent to the production of salmon originating in its rivers (contained in Article III, paragraph 1(b) of the Draft Treaty), it must be recognized that data on the extent of interceptions in some areas are imprecise and that it is therefore not possible to determine with certainty the total production of salmon from each country's rivers. It must also be recognized that methods of evaluating benefits accruing within each country may differ. For these reasons, it is anticipated that it will be some time before the Commission can develop programs to implement the provisions of Article III, paragraph 1(b) in a complete and comprehensive manner. Nevertheless, in the short term, it is essential that the Commission ensure that the annual fishery regimes and understandings regarding enhancement be developed in an equitable manner.

taking into account the principle outlined in Article III 1(b). In particular, the Commission's decisions should take into account changes in the benefits flowing to each of the Parties through alteration in fishing patterns, conservation actions, or as the result of changes in the abundance of the runs.

In the longer term, if it is determined that one country or the other is deriving substantially greater benefits than those provided from its rivers, it would be expected that within the Commission, the Parties would develop a phased program to eliminate the inequity within a specified time period, taking into account the provisions of Article III paragraph 3. Since correction of imbalances is a national responsibility and may involve differential fishery adjustments or enhancement projects on a regional basis within either country, it would be incumbent on the Party with the advantage to submit appropriate proposals to the Commission for consideration. The plan would be discussed within the Commission and be reflected in the agreed fishery regimes and coordinated enhancement planning in ensuing years.

EXCHANGE OF NOTES

Pending entry into force of the Treaty and the Agreement regarding the implementation of Article XVII, paragraph 3 of the Treaty, the Parties shall seek to implement the Treaty and the Agreement on a provisional basis.

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LETTER OF UNDERSTANDING BETWEEN THE NEGOTIATORS  
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The enclosed Council Document #20a, a synopsis by the Council staff of the report by Northwest Resources Analysis titled, "Limited Entry in the Halibut Fishery: The Individual Quota Option," is being mailed to all persons and organizations on the Council's mailing list who have expressed an interest in either the halibut moratorium or limited entry in the halibut fishery.

The full report has been completed and is available for public review, but since the report and its attachments are nearly 200 pages in length, the Council decided a synopsis should be prepared for public distribution. The synopsis you are receiving includes the complete "Summary and Conclusions" portion of the study; the rest of the material in the study has been summarized by the Council staff. We will send you the full report on your request.

The release of this report for public distribution should not be interpreted as Council endorsement of any statements contained herein or adoption of a particular form of limited entry for the halibut fishery.

LIMITED ENTRY IN THE PACIFIC HALIBUT FISHERY:  
THE INDIVIDUAL QUOTA OPTION

Northwest Resources Analysis

Seattle, Washington

Report to the North Pacific  
Fisheries Management Council  
Anchorage, Alaska

Summary and Conclusions  
Chapter 1 Verbatim of the Report - pp. 1-19

NPFMC Staff Synopsis  
of Chapters 2 - 6 of the Report - pp. 20-62

The North Pacific Fishery Management Council contracted with Northwest Resources Analysis of Seattle, Washington, to perform a study of limited entry in the Pacific halibut fishery. Because there was substantial information already available about other forms of fishery access limitation, the Council directed that the study should determine whether the individual quota or share system would be feasible under current conditions in the fishery. This report has been completed and is available for public review. Since the report and its attachments are nearly 200 pages in length, the Council decided a synopsis should be prepared for public distribution. Included with this synopsis is the complete, "Summary and Conclusions" portion of the study. The full report will be mailed by the Council upon request. The release of this report for public distribution should not be interpreted as Council endorsement of any statements contained herein or adoption of a particular form of limited entry for the halibut fishery.

SUMMARY AND CONCLUSIONS

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

SUMMARY AND CONCLUSIONS

This study has the broad purpose of developing limited entry alternatives for that portion of the Pacific fishery under the jurisdiction of the North Pacific Fisheries Management Council. Until recently most discussions of limited entry have focused on license limitation programs of the type currently applied to salmon and other Pacific Coast fisheries. As a result, fisheries managers now have an extensive literature and wide experience to turn to when considering new applications of license limitation. Unfortunately, license limitation has not performed well in the view of many of its practitioners. Because of the knowledge already available about license limitation and its limited success, the halibut limited entry working group of the North Pacific Fishery Management Council emphasized other alternatives when it established the objectives for this study. In particular, the group identified the individual quota, or share system, as a previously neglected approach holding considerable promise of being feasible under present circumstances and of achieving the Council's management objectives for the halibut fishery. That view is, in large measure, confirmed by the study results reported below.

Those results are summarized in Figure 1-1 and in the following discussion. We initially restate the relevant management objectives and evaluate the share system against each. Then, for each category of objectives, we compare the share system with the license limitation alternatives. The evaluation concludes with recommendations concerning future staff analysis and council decision making that, in the contractor's view, will lead to selection of the best feasible limited entry program for the Pacific halibut fishery.

INDIVIDUAL QUOTA SYSTEM

RESOURCE CONSERVATION

Maintain compatibility with IPHC objectives.

Distribute the hook-and-line halibut fishery by time and area to ensure resource conservation.

Minimize adverse biological impact of the program on related fisheries.

Rules for allocating and transferring individual quotas conform with current IPHC area quotas, and adjust easily to changes. Dividing area quotas among individuals controls catch more precisely than setting seasons. Incentives to evade catch reporting present new, but manageable, problems. Conservation is enhanced by spreading effort more uniformly over substocks, and by providing more representative catch data.

ECONOMIC EFFICIENCY

Reduce capitalization, thus encouraging development of an economically viable and efficient year-round domestic halibut hook-and-line fishery.

Provide high quality fresh and frozen fish to the consumer twelve months of the year.

Ensure that the costs of administration and enforcement do not exceed the benefits of the program.

Attainable economic benefits are similar to those realized in agriculture, mining, forestry and elsewhere, where exclusive ownership or leasing has replaced open access to primary resources. Specifically, these benefits include: reduced harvest and storage costs, increased consumer value, and better utilization of halibut by-catches in other hook-and-line fisheries. Estimated gross annual benefits are \$9.3 million. Government administration and enforcement costs may rise, and unreported catches may impose costs. Net benefits, after subtracting these costs, range from \$8.9 to \$9.2 million per year, or \$.44 to \$.46 per pound of 1982 catch.

SOCIAL CONSIDERATIONS

Minimize disruption of the present fleet by using past performance as the basis for distributing initial rights.

Insure that the fishery is made up of owner/operator rights holders.

Enable some fishermen to earn a major share of their income from hook-and-line halibut fishing.

Distribute initial rights among historic participants in an equitable manner.

Provide for development of halibut fisheries by Bering Sea residents.

The basic share concept preserves present fishing options while creating others, including fishing at preferred times and places, expanding output, and leaving the fishery without losing the economic value of past participation. An optional common property fishery permits those preferring present arrangements to continue as before without economic loss, and, when combined with transfer rules, permits new entry at approximate current entry costs. Other provisions prevent extensive absentee ownership of shares, preclude monopoly control, and allow for halibut fishery development by Bering Sea residents. The proposed allocation framework preserves the status quo for near term participation, and for receipt of income from quota sales. Effectiveness of Alaska programs to promote resident participation in fisheries is enhanced. Equitable allocation depends on choice of a fair and effective decision process for determining allocation, possibly based on principles learned in labor relations and commercial arbitration.

ADMINISTRATIVE/POLITICAL FEASIBILITY

Provide for administration and enforcement by existing agencies with minimal increases in staff and budget.

Insure that no major user group experiences a significant and uncompensated loss.

New administrative tasks include, entitlement allocation and transfer, quota accounting, and enforcement of accurate catch reporting. These tasks can be accomplished by existing agencies without significant budget increases. Implementation requires further study, including observation of a comparable program proposed for Canada's Pacific halibut fishery. Political opposition based on lifestyle issues is addressed, insofar as possible, by the common property fishery option. Opposition based on demonstrated economic loss is less evident today, but will become more significant when allocation issues are addressed, and its extent will depend, in part, on the perceived fairness of allocation decision making.

OTHER OBJECTIVES

Provide that royalties from the fishery are at sufficient to cover the program costs may be recoverable at some point in the future.

Let the market govern transfer of fishing rights after initial distribution.

Equally achievable under all limited entry options considered.

Figure 1-1. Evaluation of the Individual Quota Alternative

NOTE: This figure has been duplicated from the full Northwest Resources Analysis report.

LICENSE LIMITATION OF THE CURRENT FLEET, OR CONTINUED OPEN ACCESS

Current fisheries management and economics literature and experience generally support the conclusion that license limitation, without significant fleet reduction, will slow, but not stop, growth in the halibut fleet. Thus, the consequences of fleet growth can be expected to continue at different rates, depending on whether license limitation or open access is chosen. From a conservation standpoint these consequences include: sharper focusing of effort on vulnerable substocks, declining reliability of catch and effort data, and greater difficulty in determining when seasons must be closed to achieve area quotas. The incentive to underreport catch will not be present, but other enforcement problems present in today's halibut and salmon fisheries will continue. A question not resolved by this study is the possibility of mitigating these consequences by "fine tuning" the license limitation approach, as was done here with the individual quota concept. Further work is required to determine if such an effort could produce results which are superior, from a conservation standpoint, to those prevailing today, or under the individual quota system.

The economic performance of a nonfleet reducing license limitation program would be similar to its effects on resource conservation. Current experience indicates that net economic value will decline, although at a lower rate than without any limited entry programs. "Fine tuning" would be required to preserve the halibut fisheries' current net economic value, or achieve gains of the type and scale credited here to the individual quota system.

The social consequences of license limitation without fleet reduction will be different from those expected under the share system, or those prevailing today. Geographic, size class and other sectors of the fleet will gain or lose position under open access competition just as they will within the transfer mechanism set up by the share system. But one cannot say in advance what pattern will emerge in either one.

LICENSE LIMITATION AND SIGNIFICANT FLEET REDUCTION

Depending on the level of fleet reduction, such a program would be capable of achieving conservation and economic efficiency results comparable to those credited to the individual quota system.

GOVERNMENT BUY BACK

Similar in some respects to the individual quota system. Actual consequences would depend on specific buy back rules and criteria.

UNCOMPENSATED REMOVAL

Significantly negative social consequences would undoubtedly result from evicting large numbers of fishermen from their established occupation.

CONTINUED OPEN ACCESS

Administratively feasible. Political feasibility depends on Council willingness to reverse its recent moratorium decision, and public hearings evidence of substantial halibut industry support for some form of limited entry.

NON-FLEET REDUCING LICENSE LIMITATION

Administratively and politically feasible, all evidenced by numerous other Pacific Coast fisheries.

Public costs would undoubtedly exceed feasible general revenue appropriations. Self financed programs would conflict with Office of Management and Budget Policy.

Uncompensated eviction would create substantial and most likely unsurmountable, political opposition.

Figure 1-1. Evaluation of the Individual Quota Alternative (continued from previous page)

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

1.1 MANAGEMENT OBJECTIVES

The objectives governing design of a halibut limited entry program (Column 1 of Figure 1-1) are described in general in the Magnuson Fisheries Conservation and Management Act (MFCMA) and in the North Pacific Halibut Act of 1982. Other more specific statements of objectives either were included in the Council's request for proposals initiating this study or became evident as the study proceeded.

Resource conservation

Resource conservation (achievement of maximum sustained yield on a long run average basis) is implemented by the International Pacific Halibut Commission (IPHC) for the halibut fishery and by Alaska and federal agencies for related fisheries. Conservation is a limited entry objective in the sense that proposed measures should not impede and where possible should support, those conservation programs. In the first instance, limited entry measures should either provide economic incentives for accurate catch reporting by fishermen or, where this is not possible, should provide enforcement measures to minimize the extent of illegal unreported catch. They should also distribute the catch by time and area, both to place equal pressure on all substocks and to produce catch statistics from which stock abundance can be accurately inferred. Finally, measures should insure that, regardless of allocation and transfer provisions, total catch equals current conservation quotas, and that catches can be easily adjusted when conservation considerations dictate changes in either annual quotas or area designations.

Economic efficiency

MFCMA's mandate to recognize economic consideration is interpreted in this instance as calling for the evaluation of limited entry alternatives from the standpoint of their effect on economic efficiency, or the net economic

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

value of the halibut resource. Net economic value, as defined in economic theory, includes profits to fishermen, processors, and distributors, as well as "consumer surplus," the net value of halibut to consumers.

Net economic value can be increased in several ways through limited entry. Fishing costs can be lowered by reducing the number of vessels and increasing the ability of remaining fishermen to choose times, places, and methods of fishing without regulatory restraint. Processing and distribution costs can be reduced by relaxing regulations that prevent fishermen and processors from arranging the time and place of delivery to their mutual advantage. Net value to consumers is increased when producers are free to market halibut at times, places, and in forms (fresh or frozen) dictated by market demand rather than by fisheries regulations.

From the standpoint of this study, the economic efficiency objective dictates a benefit/cost analysis of the proposed individual quota program to determine, insofar as possible in monetary terms, whether total benefits exceed total costs inclusive of government costs of administration and enforcement.

Social considerations

The mandate to recognize social considerations in the design of limited entry programs is the least well understood of MFCMA's general objectives. In this case, though, prior council guidance gives more specific meaning to that mandate. The status quo distribution of effort by area, vessel size, and user group is to be preserved by basing initial allocations on historic catch. Allocation, transfer, and other measures are to insure, after transfers occur, that the fishery consists primarily of owner-operators rather than absentee rights holders; that a core of fishermen remains who earn most of their

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

annual income from halibut fishing; that monopoly does not result from concentration of rights; and that special consideration is given to the development efforts of certain Bering Sea residents.

Two other social objectives deserve consideration, even though not explicitly mentioned in prior legislative and Council guidance. The first is the recognition of the autonomy of individual fishermen. We know less about the noneconomic purposes of fishermen than about any other dimension of fisheries management. Past and ongoing studies of the social dimension should bring new information. However, in the meantime our current ignorance, as well as general principles of democratic government, dictate a strong preference for measures which relax regulatory restraints on individual action, and an aversion to new restraints on individual choice.

Finding a method for equitably allocating fishing rights will be essential to the success of any limited entry program. While limited entry is not the only management measure with allocative effect, it does involve government more directly than other measures in the allocation of fishing rights and resulting incomes. Hence a commitment to adopt limited entry implies an equal commitment to solve the resulting allocation problem.

Unfortunately, there is no objective way of identifying "fair and equitable" allocation rules. Each fisherman has his own concept of equity, usually one that favors himself and his group over others. We can, however, go further in defining an equitable allocation process than we can an equitable result. Such an equitable process would, if at all possible, involve negotiation among affected parties rather than imposed decisions. But if, as is likely, such negotiations fail to yield agreement, a decision must be made. That decision ought to be made after all parties have had a full hearing and should be made by individuals who are, and are perceived to be,

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

well informed about the circumstances of the fishery but who have no individual or group interest in the allocation itself.

Administrative/political feasibility

The meaning of administrative and political feasibility, apart from the above considerations, would include at least the following. Administrative feasibility, in this instance, requires that limited entry measures be implementable by existing agencies with minimal additions to staff and budget. In the current fiscal climate, new appropriations are unlikely, regardless of the public benefits they might produce. And, as the halibut fishery is small in terms of catch and value (the 1982 catch of 23.4 million pounds had a landed value of \$25.4 million), the economic benefits of even an extremely attractive limited entry program could easily be consumed by the cost of any substantial additions to management responsibilities.

Political feasibility is an issue whose resolution lies beyond the purview of this study. However, it would seem impossible to achieve that feasibility if either of two cases held true: the first would be substantial opposition by political groups; the second would be any regulation resulting in uncompensated economic losses to a major sector of the industry. However such a provision might be viewed initially, the resultant losses would inevitably arouse sufficient opposition to impede the adoption and implementation of the overall program.

Two final objectives are taxability and transferability of participation rights. Taxability is unlikely to be a factor in choice among limited entry measures. While the Council has no taxing authority, gross and net halibut revenues will be taxable by state and federal governments under any circumstances. While market transferability provisions need not be an inherent element of limited entry, they are a part of most existing programs and have

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

been included in all the measures considered here. However, market transferability is a social and political issue which will stimulate further discussion as the share system and its alternatives are debated.

1.2 EVALUATION OF THE INDIVIDUAL QUOTA SYSTEM

We now evaluate the proposed individual quota system, including its various options, from the standpoint of resource conservation, economic efficiency, social considerations, and administrative/political feasibility.

Resource conservation

Under the individual quota system described in Chapters 3 to 6, the IPHC's annual area quotas would be assigned to fishermen as transferable individual quotas, based on initial entitlements established when the program is initiated. Transfer provisions and the framework for allocation (specific allocation rules yet to be selected) were designed to insure that legal catches could not exceed the area quotas from which they were calculated. Annual changes in area quotas would be automatically apportioned among permanent entitlement holders. However, management area adjustments would require reapportionment of permanent entitlements according to rules best devised at the time such adjustments are adopted.

Under the current regulatory system the Halibut Commission initially announces a tentative list of season openings along with its area quotas. As the season progresses the Commission determines how many of those openings will actually be permitted, based on daily catch information provided by Commission port samplers. While this system generally keeps the actual catch within conservation quotas, mistakes are inevitable because the daily catch of today's large halibut fleet is so difficult to project. The share system would provide more precise control over harvests. Once an area quota was apportioned, it could not be legally exceeded. With the total thus

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

controlled, the Commission's conservation objectives would not be adversely affected by the time that actual catches occur during the suggested March to October season or by whom halibut are caught, as determined by allocation and transfer.

As individual fishermen chose their fishing periods within the eight-month season, total catch would be distributed over a longer period, regardless of ultimate fleet size. This spreading of the catch would continue as long as transactions among fishermen consolidate the fleet into fewer, but longer running, fishing operations. Also with more fishing time, fishermen would be in a better position to explore new areas. All of these changes would benefit resource conservation. Taking the same catch over a longer period and from more areas puts more uniform pressure on all substocks and provides the Halibut Commission with catch data that better reflect overall stock abundance.

This conclusion that the share system would enhance resource conservation must be qualified with respect to unreported, and therefore illegal, catches. Assignment of individual quotas gives fishermen an incentive to underreport their catch so they can continue fishing. This need not be a problem if preventative enforcement is adequate or even if the amount of cheating can be determined. In the latter case the IPHC could, as a last resort, adjust its quotas to account for cheating. Enforcement and Halibut Commission personnel are confident that such cheating would not create conservation problems much more significant than those caused by current out-of-season poaching; that practice, in turn, would be reduced by keeping the season open for most of the year. A further offsetting factor would be provisions enabling other longline fishermen to legally land, and therefore report, catches of halibut that are now discarded.

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Economic efficiency

There can be little doubt that the individual quota system would increase the net economic value of the halibut resource, defined to include fishermen, processor and distributor profits, and net value to consumers. In a general sense the nature of these economic benefits can be seen by comparing the economic performance of common property fisheries with agriculture, forestry, mining, and many other extractive industries in which primary producers own the basic resource or lease it on an exclusive basis. Many, if not most, of the problems confronted by fisheries managers originate in the "tragedy of the commons" that results from the absence of similar exclusive rights in the fishery.

This study has identified and, within the limits of available data, quantified the economic benefits likely to result from establishing a comparable exclusive rights system in the halibut fishery by adoption of the quota system. These benefits include reduced fishing and cold storage holding costs, improved utilization of bycatches in other hook and line fisheries, and consumer benefits from the increased availability of fresh halibut. Using a methodology explained in Chapter 5, gross annual economic benefits were found to have an expected value of \$9.3 million. Other summary values are reported, first with and then without, inclusion of a factor that evaluates the costs of a significant enforcement problem. The resulting values are: net benefits, \$8.9 to \$9.2 million; ratio of total benefits per pound of 1982 harvest, \$.44 to \$.46. Other calculations which impose more severe tests of confidence yield lower but still positive economic gains out to the 95 percent confidence level.

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Social considerations

Given the variety and complexity of social concerns at issue, it is not possible to defend any overall social comparison of the share system with the status quo or (with one exception noted later) with other limited entry alternatives. However, many of the specific social objectives mentioned earlier can be effectively addressed, either by the share concept itself or by modifications designed for that purpose.

Even without modification to achieve specific social goals the share system reflects the general preference for minimum interference in individual choice by preserving most of the halibut fishermen's present options. With initial allocations based on historic catch, most current fishermen would, depending on the allocation rule, be able to take approximately what they have in past years and, on average, more than they will be permitted to take if open access continues to shorten seasons. They could take those quantities by fishing exactly as they have in the past, or by fishing at times, places, and in ways not currently permitted. Those who wish to increase their catch could still do so, provided they were willing and able to buy the necessary quotas and to make the other capital expenditures required under any system. Others could reduce their catch or sell out their quotas entirely. For those leaving the industry, the only difference would be that under the quota system they would take with them a gain from the sale of their quotas. Many might consider this a fair reward for past efforts; and for now making a decision which would benefit the remaining fishermen and society at large.

Still greater flexibility could be permitted by retaining an optional common property fishery. Under this option, those disliking the process of allocation and exchange established by the share system could elect to refrain entirely from active participation. Instead, they could continue to compete

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

among themselves under common property conditions in a fishery that would guarantee them, in aggregate, what they would have received under the share system: that is, an amount which approximately equals their historic catch, and exceeds what they will get under continued open access.

New participants could still enter under the individual quota system. Those wishing to buy permanent entitlements would, to be sure, have to make a substantial front-end investment. But entrants could also lease quotas annually from other fishermen in order to reduce costs during their start-up years. The lowest possible entry cost would result from leasing the shares required to buy into the optional common property fishery. The fisherman willing to do so, and to bear the same risks he would currently face, could start halibut fishing for about what it now costs and, once in the fishery, could catch a quantity determined entirely by his luck and fishing ability.

Other provisions are designed to preserve favored patterns of ownership. These include a ceiling on the cumulative total quotas any fisherman can lease, which prevents long run absentee ownership or the control of several fishermen through leasing arrangements; a ceiling on the size of any single quota ownership which precludes monopoly control; and a three-year exemption for Bering Sea residents which permits that group to continue its current fisheries development initiative.

It is possible that voluntary transfers might eventually lead to changes in the distribution of participation both by vessel size and by geographic area. As proposed here, the share system contains no special provisions to preclude such change. However, since current data are used in determining initial allocations, the present distribution should be protected both for near-term participation and for the receipt of income from initial quota sales.

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

While there is no stated federal interest in a particular geographic distribution, the State of Alaska has frequently declared its interest in increasing participation by Alaska residents in Alaska fisheries. Moving from open access to the individual quota system would, if anything, facilitate efforts to achieve this end. Funds received under current or newly devised state financial assistance programs could now be used to help Alaska residents buy into a larger share of the fishery. Gains from such programs would no longer be subject to dissipation due to competition from other fishermen, including those from out of state.

The question of equitable allocation is only partly addressed in this report. The format for allocation described in Chapter 6 has been designed to acknowledge historic catch as the basis for allocation and to conform with IPHC management practices. It provides that quotas be assigned on a management area (2c, 3, 4) basis. Historic (1978-1982) catch would determine, for each management area, who qualifies and the permanent poundage entitlement to be assigned to each qualifying fisherman. Annual quotas would be the product of those individual permanent entitlements and an adjustment factor equal to the IPHC area quota divided by the sum of each area's entitlements. A number of candidate allocation rules set in this format are examined from the standpoint of how they would distribute initial rights by region and by vessel size class.

What remains is to select a single formula relating historic catch to permanent entitlement, and also to deal with other allocation issues such as the current debate over assigning rights to vessel owners or to operators. Historically, making such allocation decisions has been the most difficult of all fisheries management tasks, because they vitally affect the interests of each fisherman and because there is no objective way of resolving them. The

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

list of otherwise desirable programs that have faltered for want of an acceptable allocation of benefits is too long (and too familiar to this audience) to require reciting, the most immediate example being the U.S.-Canada salmon negotiations.

What is recommended here is that the Council recognize the crucial nature of its allocation decisions by separating them entirely from the rest of the process for devising and reviewing a limited entry plan. Experience in other policy areas shows that special bodies can be designed to accomplish the essential negotiation, mediation, or arbitration. Valuable guidelines can be found in the experience-tested methods used by government and private groups in commercial arbitration, labor-management relations, and elsewhere.

Administrative and political feasibility

The new administrative functions required to implement the individual quota system can be grouped into categories: entitlement allocation and transfer; quota accounting; and enforcement of catch reporting. Chapters 4, 5, and 6 discuss each in more detail and make tentative recommendations concerning agency responsibilities. Initial discussion with the affected agencies (IPHC, Alaska Commercial Fisheries Entry Commission, and enforcement agencies) indicates that these functions could be carried out with minimal additions to staff and budget. The subjects would, of course, have to be more fully discussed during subsequent phases of limited entry planning. If and when it occurs, implementation of an individual quota system for the Canadian halibut fishery will provide additional information on administrative feasibility and costs.

Political feasibility--the relative freedom from voiced opposition or uncompensated economic losses likely to generate it--is another matter. There is considerable opposition as well as support for halibut limited entry in

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

general and for the share system in particular. Opposition to the share system, as judged from press and public statements, appears to involve lifestyle rather than what income it produces and who gets it. More specifically, many opponents have declared that current open access arrangements, including short seasons, provide a work and lifestyle they prefer to what they expect would prevail under the share system.

The optional common property arrangement has been proposed here as a response to this lifestyle argument against the share system. It is hoped this measure provides a way to avoid the socially undesirable, and politically difficult, step of forcing all halibut fishermen to take part in a system that some quite evidently dislike. Given the option, fishermen could make their own choice: to participate in the share system or to follow their preference for the present common property competition.

The question of potential economic loss has not, as yet, roused much opposition, nor would one expect it to appear until the issues of allocation are more definitively stated. There may be some merit to deferring choice of allocation rules and the inevitable conflict over "dividing the pie" until other biological, economic, and social goals of this program have been widely discussed and generally understood within the industry.

### 1.3 ALTERNATIVES

The above discussion indicates that, with further development, a limited entry program based on the individual quota concept could advance, in varying degrees, all of the Council's limited entry objectives as they are stated in Figure 1-1. More to the point, though, is how such a program would compare with license limitation and other limited entry methods that have been applied elsewhere or proposed in the fisheries economic literature. While no in-depth analysis of these alternatives has been attempted in this study, a general

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

understanding of the limited entry literature and experience permits the following tentative comparison, again on the basis of resource conservation, economic efficiency, social considerations, and administrative/political feasibility.

To compare the many types of license limitation with the individual quota system we group them into programs which do not reduce the fleet, and those which do so through government purchase (buy-back) or through uncompensated exclusion.\* For reasons discussed below we treat the case of no fleet reduction as being similar to continued open access, at least under the circumstances prevailing in today's halibut fishery.

1.3.1 License limitation without fleet reduction

The limited entry programs that now cover the salmon fisheries of Alaska, British Columbia, Washington, Oregon, and California, typify the situation where license limitation is implemented without fleet reductions. This is not precisely accurate, as Alaska and British Columbia excluded (without compensation) some casual participants, and British Columbia and Washington initially experimented with government buy-back. However, fleet reductions were so small that the experience of these fisheries is comparable to the effects to be expected if a limited entry program were to admit virtually all present fishermen via license limitation under a grandfather clause.

Changes in the composition of the Pacific Coast salmon fleet following limited entry also illustrate why license limitation without fleet reduction can be considered equivalent to continued open access, at least from the standpoint of probable future trends in the halibut fishery. With total but not individual catch controlled, license fishermen continued to compete among

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\*For completeness it should be noted that heavy taxation of fishermen or assignment of the entire resource to a single owner have also been suggested as methods of limiting effort. However, neither would appear to be a viable option under present conditions. -14-

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

themselves as before. In the early British Columbia program, where a unit of gear was loosely defined, fishermen simply transferred their licenses from small to large vessels. Tighter rules prevented that practice, but not the alternative increases in fishing power that resulted from upgrading engines, gear, electronics, and the like. Nor did those rules prevent casual and intermittent fishermen from going full time or selling their licenses to those better able to do so. The result has been control over the number of license vessels or fishermen, and perhaps a somewhat restrained growth in fishing power, but there is general agreement that effective fishing power now substantially exceeds its pre-license limitation levels and that biological, economic, and other problems created by increased effort have worsened as a result.

For several reasons, the same trends would be likely to occur in the halibut fishery. One is simply the large number of participants--6,264 fishermen (Alaska interim-use permit holders) in 1982. The wide variety of vessel types now in use would also complicate efforts to control upgrading. Also, in recent years the discussion of limited entry has brought in many casual participants eager to establish speculative grandfather rights.

Resource conservation

From a conservation standpoint we can therefore expect the unfortunate trends of the last few years to continue, although at a slower rate than has occurred recently and than can be expected under continued open access. Ever shorter seasons will be set and catches will be more concentrated by time and area, thus focusing effort more sharply on certain substocks and making the Halibut Commission's data base less representative. The projecting of daily catches will also become more difficult leading to more serious errors in setting seasons lengths.

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

There will be no incentive to underreport catches (as with the share system), but today's incentive to fish out of season will still be present. Also, as Alaska's salmon programs have illustrated, there will be new problems of license fishermen "sharing" their licenses with unlicensed fishermen, thus possibly biasing the effort component of the biological data base.

Since the current halibut conservation program copes with these conditions today, it can presumably do so in the future as well. And some of the problems might be mitigated by fine-tuning a license limitation program, as this report has done with the share concept. Additional regulation might include further season splitting, trip limits, layups, or other catch-spreading techniques. It might also be possible to divide the fleet into subgroups to fish at staggered intervals. Further analysis is required to determine if such measures could reverse the tentative conclusion reached here, that license limitation would make resource conservation more difficult than today, and more difficult than it would be under the share system.

Economic efficiency

A program of license limitation cannot be expected to produce economic gains due to fleet and harvest cost reductions. Instead, fishermen's profits would decline further as the application of greater fishing power to fixed area quotas increases aggregate costs but not revenues. The same would be true of shorter seasons which further restrict the fisherman's flexibility of operation.

Unless fine-tuning could produce better outcomes, other economic consequences would be equally unfavorable. Shorter seasons would mean higher cold storage costs, reduced fresh market sales, and more discards of halibut not legal for landing by other longline fishermen. To a degree, storage and fresh marketing problems could be addressed by the various season-stretching

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

devices discussed above. Only further analysis can determine whether such measures could yield economic benefits commensurate with those attainable under the quota system or could keep the halibut fishery's net economic value at current levels in the face of increasing effective effort.

Social consideration

The social consequences of license limitation without fleet reduction will differ both from those expected under the share system, and from those prevailing today. Sectors of the fleet categorized by area, size class, etc., would gain or lose position under the transfer mechanism set up by the share system just as they do under today's open access competition. But one cannot say in advance what pattern would emerge in either event.

Political/administrative feasibility

As to administrative/political feasibility, recent events make it imperative to distinguish again between open access and license limitation without fleet reduction. Both would seem administratively feasible, as open access in the halibut fishery (pending establishment of the moratorium) exists now and license limitation is well represented in other Pacific Coast fisheries. From the standpoint of political feasibility, neither course requires government to directly inflict economic losses on important user groups.

But the Council has already committed itself to some form of limited entry, at least for the duration of the proposed moratorium. And recent hearings indicate, with the exception of Kodiak, overwhelming support for that commitment, albeit with predictable disagreement on the way allocations are to be set, specifically the boat-versus-man issue. To return to open access, the

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Council would have to reverse itself and ignore the now fairly clear message from industry which calls for some form of limited entry, regardless of differences over exactly where to go next.

1.3.2 License limitation with fleet reduction

If it were possible, in addition to adopting a license limitation program, to significantly reduce fleet size by either government buy-back or uncompensated exclusion, then many of the conservation and economic gains previously attributed to the share system could be achieved. Reductions in fishing power, however accomplished, would lengthen seasons, increase the profits of remaining fishermen, provide for more uniform harvests of substocks, improve market flexibility, and so on.

However, as one moves to the objectives of social concern and administrative/political feasibility that picture fades. A vessel buy-back program large enough to have any significant effect on seasons would require far more funding than could realistically be expected in the present fiscal climate, and financing such a program by taxing the remaining fishermen would undoubtedly meet with vigorous resistance from the industry. A self-financing buy-back program would also involve the special earmarking of federal revenues, a procedure requiring new legislation of a type historically opposed by the Office of Management and Budget.

The other alternative, evicting large numbers of fishermen without compensation, would seem unacceptable from a social standpoint, and politically at least as unlikely as raising enough money for a major buy-back program. Thus it would appear that, barring invention of some entirely new management techniques, the Council has essentially three feasible alternatives: continue with development of the share system; begin devising,

Summary and Conclusions  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

from past experience, a license limitation program without fleet reduction; or proceed with the parallel development of both. Regardless of how effective this study may have been in building a case for the share system's overall superiority, it would seem that it makes a convincing argument for including the share system among whatever options the Council decides to pursue further.

STAFF SYNOPSIS

History and Description of the Northeast Halibut Fishery

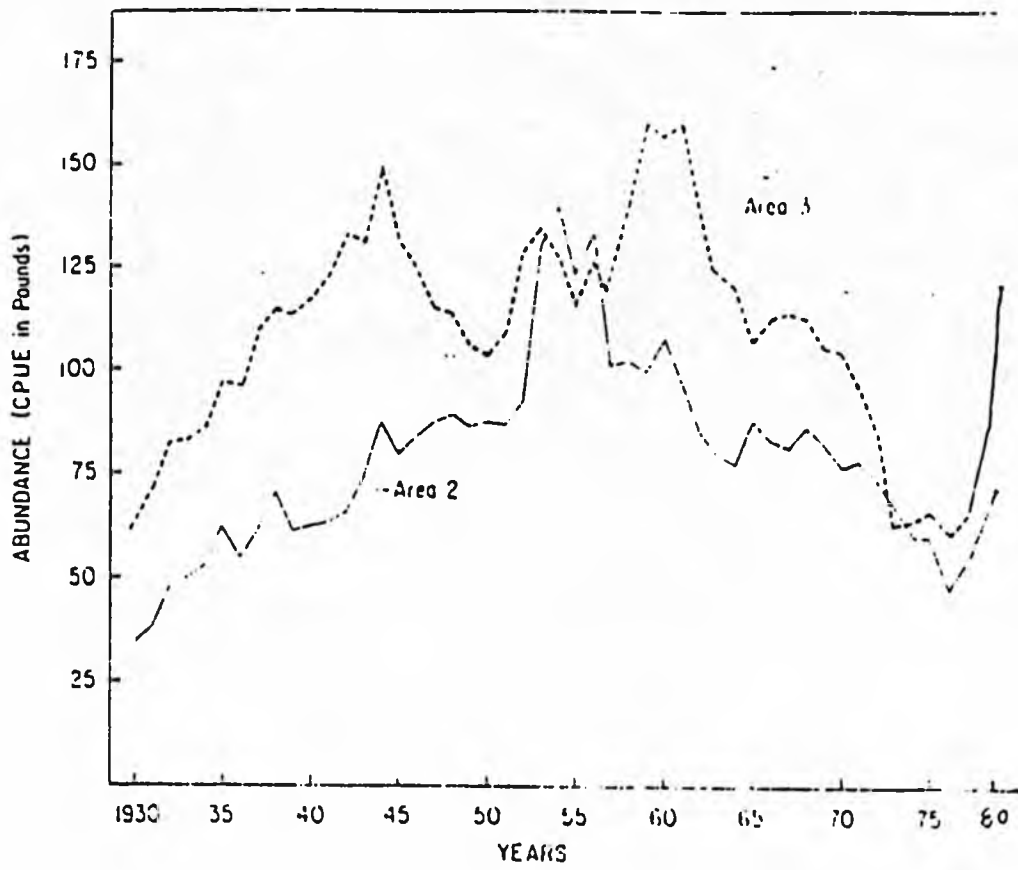
Most of the world harvest of halibut occurs on the eastern side of the Pacific Ocean, in waters now controlled by the U.S. and Canada. Asiatic halibut make modest contributions to world production. Atlantic halibut were once a significant resource that supported fisheries in both Europe and North America; as late as 1940 there was a directed halibut fishery on the U.S. Atlantic coast as far south as Virginia. Overfishing has, however, considerably diminished Atlantic halibut production in recent years.

The halibut stocks in the eastern Pacific have also varied in abundance. The unregulated period prior to the 1930s saw a substantial decline, particularly in the more accessible fishing grounds off Oregon, Washington, and British Columbia. A U.S.-Canadian management program initiated in 1923 restored halibut stocks to the mid-50s, early-60s peaks reported in Figure 2-4, but thereafter abundance again declined. This time the primary cause was uncontrolled incidental catches by Japanese and Russian groundfish trawlers. The past few years (1975 to the present) give some hope this decline has again been reversed.

THE EASTERN PACIFIC HALIBUT FISHERY

The commercial fishery for Pacific halibut began in earnest in the late 1880s. The earliest halibut vessels were small two-man dories carried to the fishing grounds on larger sailing vessels. Catches were delivered to Seattle, Washington, Vancouver, British Columbia, and later to Prince Rupert, British Columbia.

The major technological change of the early 20th century was development of the diesel powered halibut schooner ranging from 50 to 80 feet in length.



Figur 2-4,

Abundance indicated by setline CPUE in Areas 2 and 3

NOTE: This Figure has been duplicated from the full Northwest Resources Analysis report.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

These vessels were capable of mechanically hauling longline gear directly from the deck, as well as independently running between the fishing grounds and port.

Vessel technology since the 1930s has emphasized diversity. Vessels recently entering the fishery are capable of seining or gillnetting salmon, as well as participating in several other fisheries.

In 1981 the U.S. fleet's 3,210 vessels harvested 20.078 million pounds of halibut. The Canadian fleet's 360 vessels harvested 5.654 million pounds. The number of Canadian vessels is controlled by a license limitation program instituted in 1979. As of this writing, entry into the U.S. fishery is still open, subject only to nominal licensing requirements imposed by IPHC and the State of Alaska. However, the North Pacific Fisheries Management Council has recommended a moratorium on entry with implementation still pending as of the date of this report.

The standard unit of gear in the setline fishery is the "skate," an 1,800-foot section of ground line. Two to ten of these are connected together, anchored at both ends and marked at the surface with buoys, flags, lights or radar detectors. Typically there are one hundred gangions (4 to 5 foot branch lines) per skate, each holding hooks baited with fresh or frozen bait. The groundline is generally left to "soak" for about 12 hours, after which it is retrieved and the catch of halibut gilled, gutted, and iced for delivery to port.

The recent development of snap-on gear means that the gangions can now be removed each time the gear is retrieved, allowing the groundline to be conveniently stored on a drum. This procedure is of considerable advantage to the operators of smaller vessels because it eliminates the need for a crewman

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

to coil the line. Snap-on gear also permits the easy adaptation of salmon gillnet vessels to the halibut fishery. Because the gillnetter already has the required drum, he need only replace the gillnet used during the salmon season with groundline for the halibut fishing.

Vessel crews range from one on the smaller boats using snap-on gear to as many as eight on the larger schooners. Many fishermen with the longest history in the halibut fishery are Norwegians whose ancestors moved directly from Norway's Atlantic halibut fishery to the developing Pacific Coast halibut fishery. Recent entrants come from a variety of social, ethnic, and occupational backgrounds and include many "part timers" whose primary income is from other fisheries or shoreside employment.

Halibut fishermen are paid according to a crew share system similar to that in other commercial fisheries. The crew share formula divides gross revenue between expenses, and payments to owners, masters, and crewmen. For the larger boats the crew share formula is established by collective bargaining between fishermen's unions and associations of vessel owners.

Record high halibut catches occurred in 1915 (69 million pounds) and 1962 (75 million pounds). The former was the best of many early years during which the original halibut stocks were being "mined" down by the developing fishery. The latter was the best annual catch produced by the IPHC conservation program. The low points in 1931 (44 million pounds) and 1974 (21.3 million pounds) were the result of prior overfishing. Recent combined U.S. and Canadian catches have been 25.7 million pounds in 1981 and 28.7 million in 1982. Historic annual catches are plotted in Fig. 2-7, along with an IPHC projection of possible future catches by the hook and line fishery. The IPHC

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

estimates that the hook and line halibut catch by the year 2000 could be between 35 and 44 million pounds, depending on the incidental catch in other fisheries.

By area, the largest current catches occur off central Alaska (IPHC Area 3, 1981 catch equals 57 percent of U.S.-Canadian total). The second most important area is British Columbia (Area 2B, 22 percent), followed by southeast Alaska (Area 2C, 16 percent). The Bering Sea (Area 4, 5 percent), and finally Washington/Oregon (Area 2A, 1 percent). By country, the U.S. catch dominates (78 percent in 1981).

The major ports for halibut landings are: Prince Rupert and Vancouver, British Columbia; Kodiak, Seward, and Ketchikan, Alaska; and Seattle, Washington. Through a reciprocal landing agreement U.S. and Canadian fishermen are free to land halibut in the ports of both countries. They choose their port by balancing the higher prices ordinarily paid in southern ports against the added time and dollar costs required to get to them. Recent short seasons have made the time factor more important, to the disadvantage of southern ports. For this and other reasons Seward, Kodiak, and Petersburg have gained in volume, with Kodiak leading all ports in 1981, while landings at Seattle and Ketchikan have declined.

The historically modest halibut sport fishery has been gaining ground recently, particularly off central Alaska. Over the period 1977-1981, British Columbia and Washington sport catches were relatively stable, ranging from 17 to 12 and from 17 to 20 thousand pounds respectively. By contrast, Alaska has seen considerable growth, from 437 to 1104 thousand pounds. The sport catch in the Kenai Peninsula/Cook Inlet area alone went from 285 to 517 thousand pounds.

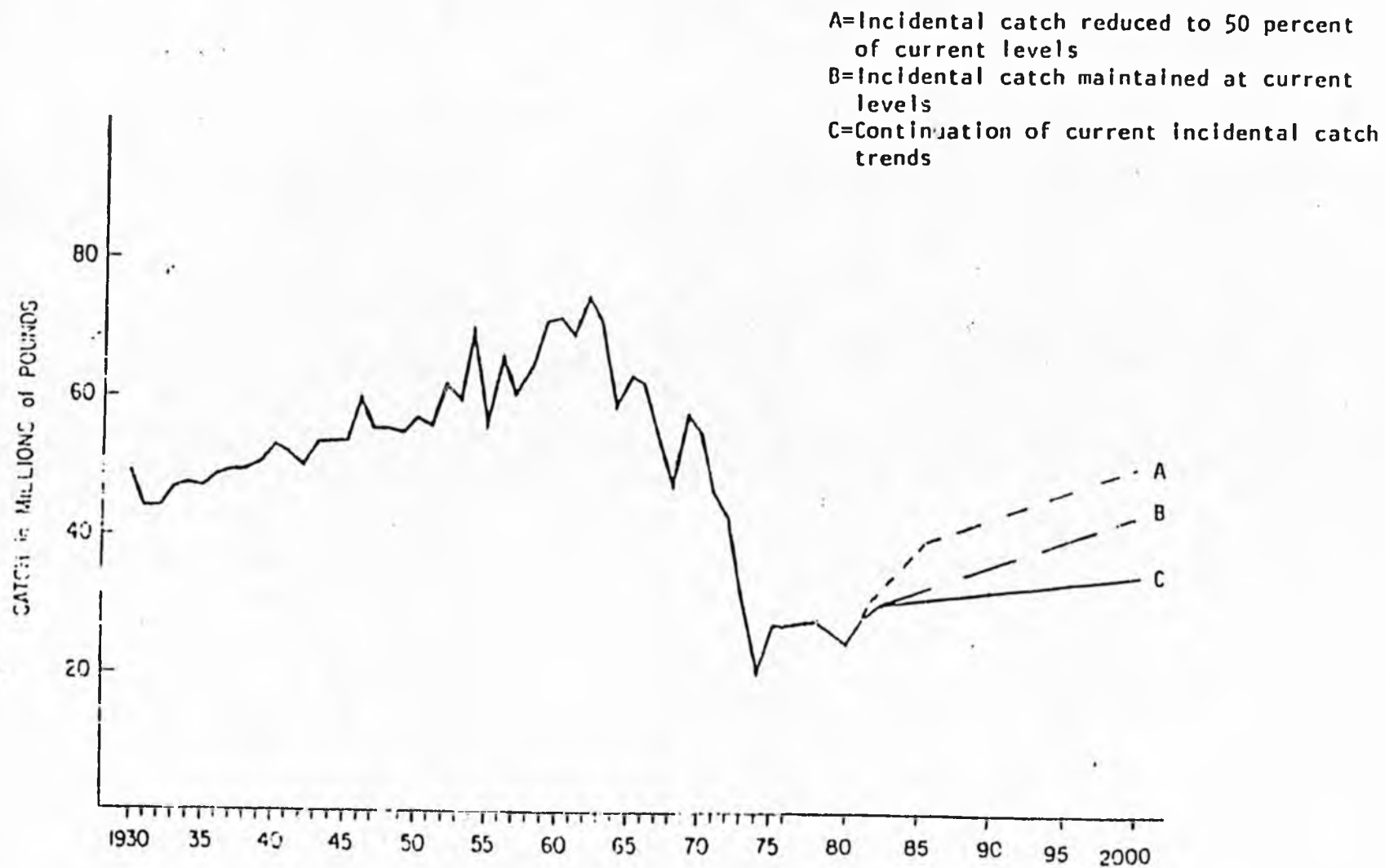


Figure 2-7, Past and projected setline catch of Pacific Halibut.

NOTE: This Figure has been duplicated from the full Northwest Resources Analysis Report.

PROCESSING AND MARKETING

A number of factors other than price determine where and to whom the halibut will be sold. These include time and dollar costs of running to ports, the quality of services available for the vessel and crew, and finally any non-price inducements being offered by processors.

In some cases (notably Prince Rupert, British Columbia, and Bellingham, Washington) halibut are sold to fisherman-owned cooperatives. Under the typical arrangement, the fisherman agrees to sell exclusively to the co-op in return for a guaranteed market. The cooperative makes two payments: an initial payment on delivery, and a post-season settlement calculated to distribute the operation's profits among participating fishermen.

Grading by size and quality also affects prices paid for halibut. Size classes are medium (10-59 lbs), large (60-79 lbs), and "whales" (80- lbs). The small or "chicken" size class (under 10 lbs) was eliminated when the Halibut Commission increased minimum size limits from 26 to 32 inches. Within each size class fish are graded No. 1 or No. 2. Most now fall in the former category, partly due to the fact that split seasons discourage holding halibut on board for long periods. When halibut are graded No. 2 it is usually because of flesh damage (seal bites, etc.) that preclude use of the entire carcass.

The bulk of northeastern Pacific halibut is now landed and initially processed in Alaska, for eventual sale as frozen products in the lower 48 states. The other major U.S. port of landing is Seattle, Washington.

Eastern Pacific halibut dominate U.S. and world production and therefore price patterns. In 1980, eastern Pacific halibut accounted for 67 percent of

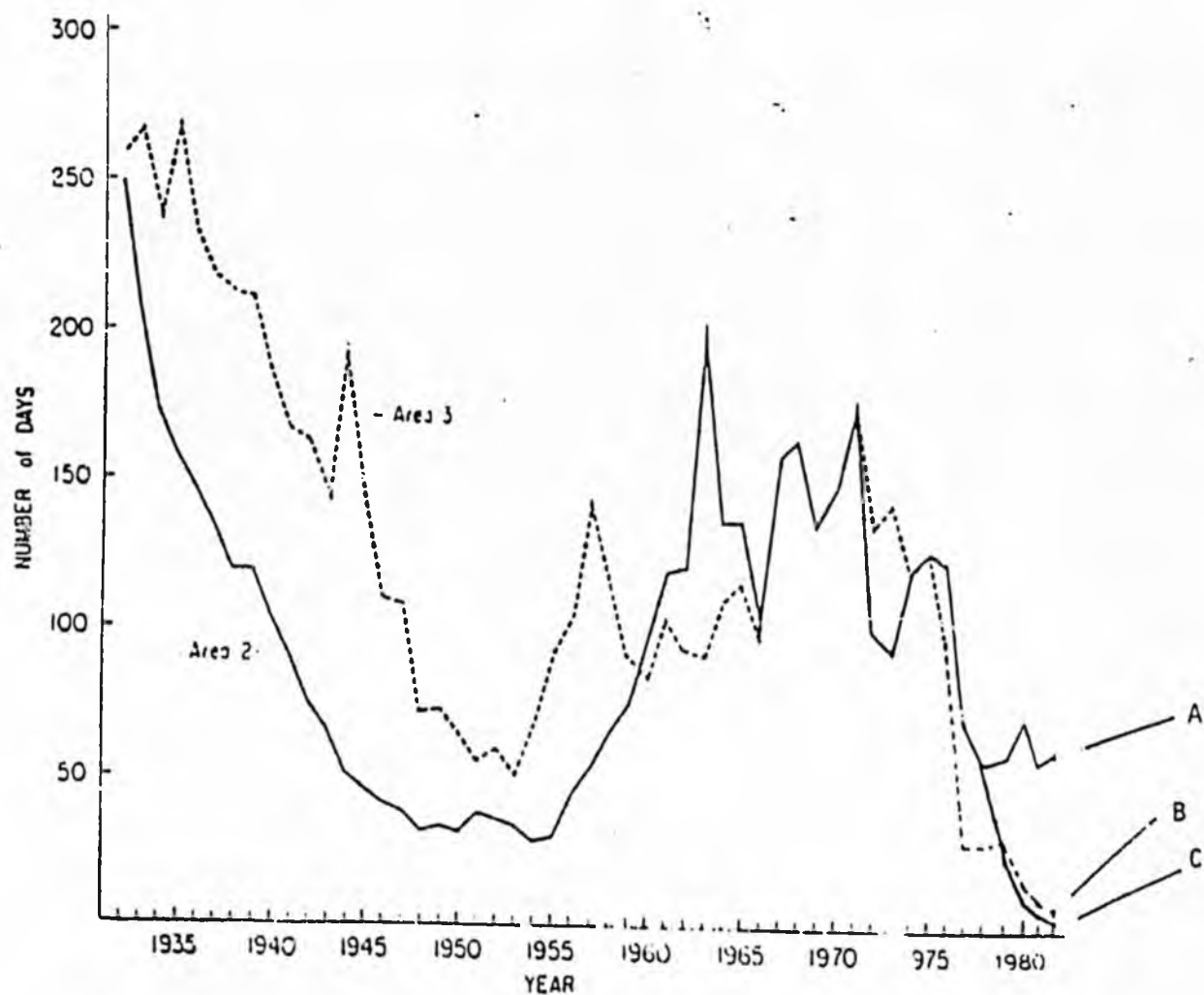
Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

world halibut production. In 1981, halibut prices were 96 cents to \$1.17 per pound at ex-vessel level, \$1.80 to \$2.15 at wholesale, and \$3.91 to \$5.54 at retail.

CONSERVATION MANAGEMENT

The eastern Pacific halibut fishery is managed under terms of a U.S.-Canadian treaty that established the IPHC and mandated it to achieve maximum sustained yield (MSY), or the greatest average catch which can be sustained in the long run, given environmental and other factors that determine natural productivity. Historically the IPHC has pursued this goal by setting catch quotas and seasons for the hook and line fishery.

Regulation of the 1982 fishery illustrates the basic system. In 1981, Commission scientists concluded that the next year's surplus production (recruitment less natural mortality) would be 64 million pounds. From this they subtracted the 28 million pounds expected to be caught in 1982 as an incidental catch by fleets over which the IPHC has no control. This incidental catch cannot be retained, but must be returned to the sea. The IPHC also decided to reserve 9 million pounds of the surplus production to increment the stock, in furtherance of the MSY goal. This left 27 million pounds for the hook and line fleet, apportioned into quotas for the major regulatory areas. Given fleet sizes in those areas, a sequence of 1982 openings in Alaska varying from 5 to 27 days was possible; after which area quotas had then been filled, and the fishery was closed for the year. Because the IPHC has no regulatory power over the size of the halibut fleet, its only recourse in the face of fleet growth is to close the season earlier. The resulting decline in season lengths, illustrated in Figure 2-12, is much



1977-1982

A= Overall US and Canadian season in area 2

B= Area 3A season only

C= Area 2 season for US fishermen, or area 2C season.

Figure 2-12

Length of fishing season in Areas 2 and 3A, 1932-1982

NOTE: This Figure has been duplicated from the full Northwest Resources Analysis report.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

like that in many other season-regulated fisheries. A variety of factors, including changes in resource abundance and catch per unit effort contributed to changes in season length. However, the major factor was fleet size.

The greatest decline in halibut seasons began with the start of the season regulation during which time the fleet grew from 384 vessels in 1933 to 661 in 1953, and the season declined from 268 days to 52 days.

The industry initiated voluntary layup and trip-limit programs during the 1930s and 1950s to limit this tendency toward short intense seasons. However, both attempts were abandoned, the first during World War II, and the second in 1977 after many new, smaller operators refused to participate. Thereafter, seasons again declined rapidly, culminating in the 1981 situation where 1590 vessels took the quota for Area 2C (Southeast Alaska) in 7 days and 1620 vessels took the quota for Area 3A (Central Alaska) in 13 days.

The incidental harvest of halibut in other fisheries, primarily the groundfish trawl fisheries, is a major conservation problem that largely falls beyond the control of the IPHC conservation program. Trawl-caught halibut are typically smaller than those caught in the hook and line fishery. Incidental catch rates (halibut per hour of trawling) appear to be increasing since the mid-1970s.

Groundfish trawlers from all nations are prohibited from retaining and selling halibut caught in the U.S. and Canadian 200-mile zones. Foreign trawlers, who have until recently dominated the Alaska trawl fishery, are also subject to time/area restrictions designed to control their halibut catch. U.S. trawlers who are increasing their share of groundfish catch are not subject to comparable restraints.

The IPHC's present regulatory system for the hook and line fishery culminates a process which began with a post-World War I initiative to achieve

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

international (U.S.-Canadian) regulation of the Pacific Halibut Fishery. Negotiations (begun in 1919 by those in the halibut industry concerned about the biological and economic consequences of three previous decades of unregulated fishing) led to a 1923 convention which closed the fishery for a three-month winter period starting in 1924. That convention also established an International Fisheries Commission (renamed International Pacific Halibut Commission in 1953) to study the halibut resource and to recommend further management measures.

In 1928 the Commission presented its recommendations. These included, among other things, establishment of regulatory areas with separate quotas, a vessel licensing program, and Commission control over vessel departures. These measures became the basic halibut management regime mentioned earlier. Notable among these measures was a provision permitting split seasons, which allowed the Commission to spread effort over a longer period. This in turn led to a more even harvest of all substocks, instead of a focus of effort on just those most accessible during the single open season.

More recent changes have adapted Pacific halibut management to the extension of national jurisdiction to 200 miles offshore and have begun the process of limiting entry. In 1979 the U.S. and Canada agreed that 60 percent of the Area 2 quota should be taken by Canadian fishermen in Canadian waters off British Columbia, and the remaining 40 percent by U.S. fishermen in U.S. waters off Washington, Oregon, and Southeast Alaska. Areas 3 and 4, Central Alaska and Bering Sea, became the exclusive preserve of U.S. fishermen. This ended the longstanding practice of allowing both nations' fishermen to compete throughout the IPHC area. In terms of total fishing opportunities, Canadian fishermen were the greater losers.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Canada's response to this decline in accessible halibut resources and to the recent growth in its halibut fleet was a 1979 license limitation program which limited the fleet to vessels landing at least 3000 pounds in either of the preceding two years. The 1982 Pearce Commission report on Canadian Pacific Coast fisheries also recommended application of the individual quota system to several fisheries, including Pacific halibut.

The U.S. Congress adopted the 1982 Halibut Act which authorized the North Pacific Fisheries Management Council to consider limited entry in the Alaskan halibut fishery.

The Individual Quota Approach to Limited Entry

The problems that caused the North Pacific Council to consider limited entry for the halibut fishery have been with us as long as that fishery has been under any form of management. The IPHC was successful in bringing the fishery back from its depleted condition to nearly maximum sustained yield by the late 1950s; however, as stock abundance and catch rates increased, so did the number of fishermen, repeatedly forcing the Halibut Commission to shorten the season.

Growth in effort has been a major reason for many of the industry's historic economic and conservation problems. This growth has caused fleet overcapitalization and often requires fishermen to operate "flat out" when the season is open, regardless of the state of equipment, personal condition or weather.

More vessels and shorter seasons have also impeded the IPHC's efforts to achieve maximum sustained yield. It is increasingly difficult to decide when seasons should be closed and thus to prevent a large and growing number of vessels from exceeding annual quotas. Data on catch per unit of effort, now confined to a week or two, are more subject than before to transitory influences such as weather rather than stock abundance. Finally, short periods of intensive fishing expose vulnerable substock to overfishing while leaving others unexploited.

EVOLUTION OF HALIBUT LIMITED ENTRY

The North Pacific Council's 1979 decision to begin consideration of limited entry to the halibut fishery led to several specific actions. The first was formation of an ad hoc limited entry working group which designed and reviewed the progress of this study. The Council also proposed a

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

moratorium on entry into the halibut fishery. Although not yet approved by the Secretary of Commerce, that moratorium is expected to take effect during 1983.

Federal legislation adopted in 1982 explicitly authorizes the North Pacific Council to implement a limited entry program for the halibut fishery. See Section 5(c) of the Northern Pacific Halibut Act of 1982.

The Council's limited entry study group decided early on to explore more effective limited entry measures than the restrictive licensing programs already in effect in the salmon fisheries of British Columbia and Alaska. Experience has shown that such licensing programs can only retard but not stop growth in fishing effort, or reduce fleet size unless government is also prepared to remove a significant number of fishermen from the fishery through buy-back programs or legislating current fishermen out of the fishery.

To explore alternatives to the licensing approach the North Pacific Council, on recommendation of the study group, chose to focus its attention on the individual quota option concept. This approach has been little used to date, but many who have studied it have concluded that it can achieve a variety of benefits through fleet rationalization, without impairing conservation objectives, and without creating the undesirable side effects resulting from license limitation. The North Pacific Council began further exploration of the individual quota concept by setting the following objectives for a limited entry system:

1. Distribute the hook and line halibut fishery by time and area to ensure resource conservation.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

2. Reduce capitalization, thus encouraging development of an economically viable and efficient year-round domestic halibut hook and line fishery that, unconstrained by regulatory seasons,
  - (a) potentially could provide high quality fresh and frozen fish to the consumer twelve months of the year;
  - (b) is made up of owner/operator rights holders; and
  - (c) enables some fishermen to earn a major share of their income from hook and line halibut fishing.
3. Ensure that the costs of administration and enforcement do not exceed the benefits of the program.
4. Provide that royalties from the fishery at least sufficient to cover the program costs may be recoverable at some point in the future.
5. Minimize adverse biological impacts of the program on related fisheries.
6. Ensure that no particular entity acquires excessive control of rights to participate in a fishery.
7. Attempt to be compatible with IPHC objectives.
8. Minimize disruption of the present fleet by using past performance to distribute initial rights.
9. Let the market govern transfer of fishing rights after initial distribution.

As the effort to develop an individual quota system has proceeded, several objections have surfaced. No one, it is argued, should be granted a property right in any fishery, nor should any system be established that protects fishermen from the competition inherent in the present common property fishery.

Small boat fishermen protest that the share system would freeze the distribution of catch just when they have begun to make gains at the expense of larger operators. Others assert that the individual quota system would make fishing so much like other shoreside businesses and occupations that the

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

unique lifestyle it now provides would be destroyed. In the process, they say, the share system would also close one of the last avenues through which someone without a great deal of money or credit can get into Alaska fisheries. A final concern is that groundfish trawlers historically prohibited from marketing their incidental halibut catch might, under same share system, argue that "their money is as good as anyone else's." That is, if market forces are going to determine allocation among hook and line fishermen, why might they not equally well determine allocation between hook and line fishermen and trawlers.

DEVELOPMENT OF THE INDIVIDUAL QUOTA CONCEPT IN THE ECONOMIC LITERATURE

Early discussions of halibut limited entry alternatives largely eliminated taxation and sole ownership of fisheries on political and social grounds. Restrictive licensing has usually taken the form of a simple moratorium on effort, which merely defers the problem of effort reduction. In some cases, however, initial effort reductions have been attempted by disqualifying some historic participants (in Alaska and British Columbia) or by the government purchase (buy back) of licenses (in British Columbia and Washington).

In most cases, though, the economic performance of restrictive licensing has been disappointing. Because the fishery remains the object of unrestricted competition among licensed fishermen, there has been a tendency to overcapitalize the license fleet. To achieve significant effort reduction, managers must use other measures.

Proposals have been made to divide total quotas among nations in international fisheries, or among individual fishermen in the case of domestic fisheries. These measures are seen as a means to achieve economic efficiency in the fishing industry.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Proposals to allocate quotas among individual domestic fishermen went one step further in the pursuit of economic efficiency by recommending transferable shares. The intent behind this was to permit some participants to buy out others, and thus more efficiently take the allowable harvest throughout a season determined by weather, availability of fish, and other factors. Because this is the economic effect hoped for in the Pacific halibut fishery, we examine it in more detail below.

ECONOMIC THEORY OF INDIVIDUAL QUOTAS

The bare elements of a fishing fleet's response to the current season/quota arrangement in the halibut fishery and the expected response to an individual quota system are illustrated in Table 3-1. Current and potential fishermen are assumed to be identical with respect to both productivity and opportunity costs of participation.

Under season regulation, the fisherman's economic choice is whether or not to participate for the fixed season. He arrives at this decision by estimating daily net revenues (total revenue less variable costs) and comparing their sum over the season with his fixed costs of annual participation. If a significant number of potential as well as current fishermen conclude that the sum of daily net revenues more than covers annual fixed costs then entry will occur and the season will have to be reduced because of the new entrants in order to keep fishing mortality within the allowable quota.

Conversely, if the current season is too short to cover fixed costs exit will occur and the season can be lengthened. In Table 3-1 the equilibrium situation (no entry or exit) occurs where 900 fishermen harvest a hypothetical 10 million pound quota in a 22-day season.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Now consider implementation of the same quota by allocating it equally among current fishermen in the form of freely transferable individual quotas, rather than by setting a season. Present and potential fishermen can now choose among the entire range of fishing programs described in Table 3-1. The economic goal of each fisherman is to select the most profitable combination of quota transactions and fishing operations open to him, given his own costs and productivity and the willingness of others to trade in quotas.

Over an initial range (20-40 fishing days) the spreading of fixed annual costs over increased output yields a decline in average cost. Eventually, however, increasing daily variable costs dominate, causing average costs to rise. The general economic principle of diminishing returns and, more specifically, the economic alternatives open to diversified fishermen support this conclusion that average costs will reach a minimum rather than decline continuously. Much of the opportunity of participating in the halibut fishery reflects income opportunities foregone in other fisheries or in shoreside employment.

The point of minimum average (40 days of fishing in Table 3-1) would be the economic equilibrium under an individual quota system. Fishermen who select that program can pay up to the difference between price and average cost for quotas; therefore they can, if necessary, outbid fishermen who select other programs. In a reasonably competitive quota market, one would therefore expect the price of quotas to move toward the difference between price and minimized average cost.

In the long term the economic advantages of this arrangement over season regulation will be reflected in the value of quotas and in economic rent earned by fishermen with inherently lower opportunity costs than others. In a sense, many fishermen will break even under either system. But with

<u>Number of Vessels</u>	<u>Catch per day (pounds)</u>	<u>Season length (days)</u>	<u>Total revenue (at 1.50/lb)</u>	<u>Annual fixed Costs</u>	<u>Daily variable costs</u>	<u>Average cost (dollars per pound)</u>	<u>Total cost</u>	<u>Profit</u>	<u>Quota value (dollars per pound)</u>
1000	500	20	15,000	3,000	614	1.53	15,280	-280	-.03
900	500	22	16,500	3,000	615	1.50	16,530	-30	.00
800	500	25	18,750	3,000	616	1.47	18,400	350	.03
700	500	29	21,750	3,000	617	1.44	20,893	857	.06
600	500	33	24,750	3,000	620	1.42	23,460	1290	.08
500	500	40	30,000	3,000	625	1.40	28,000	2000	.10
400	500	50	37,500	3,000	650	1.42	35,500	2000	.08
300	500	67	50,250	3,000	700	1.49	49,900	350	.01
200	500	100	75,000	3,000	750	1.56	78,000	-3000	-.06
100	500	200	150,000	3,000	800	1.63	163,000	-13000	-.13

Table 3-1 Hypothetical Halibut  
Vessel Costs  
Revenues and Profit

NOTE: This table has been duplicated from the full Northwest Resources Analysis report.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

individual quotas only a portion of the opportunity cost of fishing represents the sacrifice of real economic resources and opportunities. The remainder is represented by quota prices which reflect net economic gains to initial quota holders.

It is within this general framework that we now address specific tasks of share quota program design, benefit cost analysis and allocation.

Recommended Program and Options

This section describes the recommended elements of an individual quota system for the Pacific halibut fishery. Provisions discussed below were developed through discussion with industry leaders, fisheries management officials, and others.

ALLOCATION

No recommendation is made concerning specific individual quota allocation rules. Here we describe only a format for allocation which meets Council objectives of reliance on historic harvest and conformance with the IPHC conservation management program. All allocation options should be structured as follows.

1. Allocations should be based exclusively on recorded historic catch for the period 1978 to 1982, except as specified in the 1982 Halibut Act for certain residents of rural Alaskan coastal villages who fish in the Bering Sea north of 56°N latitude.
2. Assignment of individual catch quotas should proceed in two stages: initial assignment of permanent entitlements with an annual individual catch being calculated by application of an annual adjustment factor. The reader is referred to Table 6-1 of this synopsis for an example of how this allocation approach would work.
3. Permanent entitlements should be allocated on the basis of IPHC management areas rather than Alaska-wide; provision should be

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

made for automatic adjustment or apportionment of entitlements in the event IPHC subsequently changes management areas or boundaries.

4. Multiple area qualifications should be dealt with in one of the following ways:

- (a) No restrictions. Fishermen with recorded landings in two or more management areas would be allocated entitlements and annual quotas in each area based upon their history of fishing in each area. Fishermen would also be permitted to buy and sell quotas in two or more areas. Misreporting the area of catch would subject fishermen to the same legal penalties as not reporting their catch at all. Such misreporting is most likely to occur between Areas 2C and 3. To prevent this practice, one of the following measures could be adopted.
- (b) Restrictions on transfer. Only the original group of fishermen would be permitted to qualify in both Area 2c and 3. Thereafter, transfers would be permitted only if they reduced the extent of multiple qualification in those two areas. All initially qualified and subsequently entering fishermen would elect one of the two areas in which they could both buy and sell rights. New fishermen would be prohibited from buying entitlements in both Areas 2c and 3.
- (c) Combining initial rights. Under this option fishermen who would have qualified in both Areas 2c and 3 under (a) or (b) could sum their catch in both areas and use it as a basis for entitlement in the area where their historic catch was the greatest. Thereafter no one would be permitted to buy quotas in both Area 2C and 3.
- (d) Rights calculated for only one area. Each fisherman qualifying in both 2c and 3 would be required to elect his desired area of operation. His entitlement and annual quota would then be calculated from his historic catch in that area.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Supporting Analysis

Management area quotas. Assignment of quotas by management area rather than on an Alaska-wide basis seems the most compatible with the conservation objectives of the IPHC. Assignment of quotas on an Alaska-wide basis would allow fishermen to overharvest some management areas and underharvest others.

Multiple area qualification. It would seem that in deciding between these options the tradeoff is between enforceability and equitable treatment of fishermen who have historically fished in two or more areas. Enforcement problems may not be as serious as initially foreseen. In particular, Alaska fisheries officers already enforce a variety of area-type restrictions, notably in the shrimp and crab fisheries. If the enforcement problems should actually prove more serious, it could be dealt with by partly or totally restricting multiple area qualifications.

QUOTA ACCOUNTING

Possible quota accounting methods include a system of deducting overages during a season's harvest from the individual's quota the following season. An underharvest would result in additions to the permitted catch the following year. A system of penalties for overharvest and underharvest above a certain level, e.g., 10 percent of an individual's quota, could also be implemented as an incentive to comply with quota guidelines.

Another method that may be used is to cancel underages at the end of each season and levy fines for any overharvest. This might reflect the view that the flexibility provided by longer seasons is sufficient to allow fishermen to respond effectively to changing in-season conditions.

The recommended system for implementing either of these accounting approaches is a "reverse money" system. This system would require establishment, for each qualifying fisherman, of a checking account

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

denominated in pounds of annual halibut quota rather than dollars. Landings would be subtracted by writing checks against that balance and attaching them to fish tickets.

In-season transfers would be handled much like second party checks. One fisherman would buy quotas from another and attach the purchased check to his fish ticket, if necessary, along with a check of his own to cover the balance of the landing.

The poundance checks would be cleared through each fisherman's account just as a monetary check is cleared through the bank. And, in similar fashion, penalties or enforcement actions would be initiated against fishermen who overdraw, or otherwise abuse the system.

ENFORCEMENT

The enforcement system proposed would rely primarily on established recording procedures including the IPHC logbook system and the State of Alaska fish ticket system. Failure to comply with reporting provisions would subject fishermen to substantial penalties including, for repeated or flagrant offenses, the permanent cancellation of entitlements.

TRANSFERABILITY

Permanent entitlements would be freely transferable, subject to the following conditions: A limit on the number of shares owned; an individual's entitlement account would designate a single vessel on which fish harvested on that account must be taken; all transactions in permanent entitlements would have to be completed by December 1 of the year prior to their becoming effective.

To discourage absentee ownership, entitlement owners may be required to be present on the vessel whenever a catch is made on their account. This may, however, also restrict fishermen's flexibility.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

The transfer of annual quotas between entitlement holders might be permitted anytime during the year of their assignment. Such sales would be recorded through the annual quota accounting system.

Supporting Analysis

In general, entitlement transfers would reflect long run decisions to begin, expand, reduce, or terminate halibut fishing. In-season quota transfers would result from short-term changes in circumstances.

Fishermen could also pyramid their quotas by making in-season transfers by selecting one of their number (who was previously designated a permanent entitlement holder) to fish the entire group's quota.

These transfer provisions should prevent speculative ownership or the amassing of rights beyond the fishing capability of a single vessel. Entitlements and quotas would be owned by an "entity" consisting of an individual and his vessel. The individual who bought more quotas than he actually intended to harvest would run a considerable risk of either losing some portion of those quotas due to the penalty provisions or of being forced to sell them at distress prices near the end of the season.

It may, however, be desirable to restrict or eliminate in-season transfers further in order to more effectively preclude speculation or absentee ownership. Total elimination of in-season transfers would achieve this objective, but at the cost of restricting active fishermen and increasing entry costs. An intermediate approach might be to limit quota sales to 40 percent of the entitlement holder's past five-year total allocation. This would prevent absentee ownership because the owner must actively fish in at least three of any five years.

Other restrictions on transferability might have to be imposed, such as limiting ability to fish in multiple areas. The share system would not

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

guarantee any long-run maintenance of the present distribution of effort by area and vessel size but market forces should do much to preserve the status quo. To see the reason for this, we must distinguish between two kinds of costs incurred in halibut fishing. Out-of-pocket expenditures such as fuel, bait, ice, interest, etc. will be unaffected by whether an individual is a long time or a new participant. However, foregone income alternatives are unique to each participant with present participants bearing lower opportunity because they only give up the chance to find better employment, while potential new entrants must give up jobs already held. Because of these lower opportunity costs, current participants will have a greater economic interest in holding their quotas than potential entrants will have in buying them out.

APPEALS

Because the agencies that may be given responsibility for administering this program already handle appeals under established procedures, no specific appeal procedures are recommended in this report; however, if necessary, a special appeals board might be advisable.

Supporting Analysis

No specific appeals procedures would be necessary if the Council chooses a clear-cut allocation rule which minimizes the number of hardship cases. To achieve this goal it may be necessary to base entitlements on the best catches over a certain period. It would not then be necessary to explain why events beyond a fisherman's control prevented him from making an adequate harvest during any one of several years. Allocation rules based on the harvest in one specific year would create many hardship appeals. The same is true to a lesser degree of allocation rules based on the average of several years.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Under any rule, disagreements will still arise between fishermen and managers over the accuracy of records, but present appeal procedures should be able to handle this kind of dispute satisfactorily.

TAXATION

The issue of taxation would not seem relevant to this analysis, as the Council has no independent taxing powers.

ADMINISTRATIVE RESPONSIBILITY

The Alaska Commercial Fisheries Entry Commission should be given responsibility for administering those aspects of the program having to do with assignment and transfer of entitlements and quotas, and the IPHC be given responsibility for quota accounting with one of these agencies designated as lead agency for the entire program. Catch reporting would be supervised by existing state and federal agencies as part of their overall enforcement responsibilities.

Supporting Analysis

These recommendations are highly tentative. A separate NOAA legal analysis deals with the question in more detail.

Currently, neither the North Pacific Council nor the National Marine Fisheries Service has the capability to administer a limited entry program.

The IPHC is not subject to personnel limitations currently placed on Federal agencies. Since the IPHC would be involved in quota accounting if the proposed Canadian system is adopted, it seems most efficient that it should consolidate such accounting for the entire halibut fishery. However, under its treaty mandate, the Halibut Commission cannot take responsibility for the allocation issues inherent in the assignment of initial rights and the administration of transfer provisions.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

The agency with the most experience in these matters is the Alaska Commercial Fisheries Entry Commission which also maintains the catch, vessel, and license holder data required to make initial assignments of entitlements. To satisfy Alaska's confidentiality rules, any other agency would have to gain access to Entry Commission records through an intermediary.

PROVISION FOR BERING SEA RESIDENTS

The Northern Pacific Halibut Act of 1982 includes a provision for residents of rural coastal villages of Alaska to develop a halibut fishery in the Bering Sea north of 56° latitude. The following provisions are recommended to implement that special provision.

1. The qualification of these residents should be based on pre-1983 residence criteria rather than on historical participation in the fishery.
2. Entitlements and annual quotas should be calculated under the same allocation rules applied to other fishermen, except that one or more of the years 1983-1985 may be substituted for years otherwise included in the allocation formula.

Supporting Analysis

The above provisions, it is felt, reasonably incorporate the letter and spirit of the 1982 Halibut Act that certain rural Alaskan coastal residents may be granted three years to develop a local commercial halibut fishery. One legal point that may arise is exactly which future years should be included in the grace period allowed that group. A generous approach (1983-1985) would be reasonable, as relatively few fish or fishermen will be involved, and because a more restrictive approach (1982-1984) would likely result in litigation.

AN OPTIONAL COMMON PROPERTY FISHERY

Allowing fishermen the option of remaining in a common property fishery is recommended as a way (1) of allowing for individual preferences among

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

fishermen; (2) of testing the share concept by experience; and (3) of achieving greater acceptance of, and compliance with, the share system. The proposed system works as follows. After assignment of entitlements, fishermen would be given a choice between participating in the share system or continuing in a common property fishery much like that in effect today.

Those in each area electing not to participate in the quota system would, on an annual basis, surrender their entitlements to a common pool in return for being allowed to continue fishing during a season established as follows. The total quota for the common property fishery would be the sum of quotas held by those electing not to participate in the share system. The IPHC would estimate how long it should take non-share fishermen to harvest the sum of their quotas. Based on these estimates a season (or series of seasons) would be announced during which non-share fishermen could fish without any limits on their individual catches.

Fishermen electing the share system might or might not be permitted to fish during the common property season. But they would still be subject to their annual catch quotas. Catches taken by share fishermen would not be considered in determining the length of the common property season.

Initially qualifying fishermen would be permitted to continue using their present vessels (or vessels of no greater tonnage) in the common property fishery, in return for surrendering an amount of quotas equal to the ratio of total area catch to total area tonnage (e.g., say 800 pounds of quotas per net vessel ton in Area 3). Any fisherman wanting to increase the size of his vessel, or any new entrant, would also be required to contribute to the pool an amount of quotas equal to that ratio.

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

Supporting Analysis

By providing the common property option it may be possible to satisfy many of the objections raised against the quota system while imposing no losses on fishermen who prefer the share system.

In either the dual option or the status quo, stock abundance would be determined by natural conditions and the IPHC conservation program. Similarly, seasons would continue to be shortened in either type of fishery. However, under the optional common property fishery the decline would be less rapid because of the required ratio between quota contributions and new tonnage. Those electing the optional common property fishery would have access to the same resources for at least as long as under the status quo. Thus fishermen who relish the risk of fishing under common property condition, who feel that they can do better than in the past, or who just don't want to change, can achieve all those aims independently of those who prefer the quota system.

To enter the quota fishery a fisherman would have to buy enough entitlements to allow him to land his expected harvest. By contrast, the same fisherman could enter the optional common property fishery by contributing to the common pool an amount of quotas less than his expected harvest. He would have the opportunity to catch his expected catch, possibly a larger harvest or a smaller harvest.

Entry costs would be even lower if a fisherman were to lease annual quotas and contribute to the common pool because annual quotas would sell for much less than permanent entitlements.

The second advantage of the optional common property fishery would be the opportunity to test the quota system. The analysis reported here indicates that the share system will offer economic advantages to the fisherman who

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

first choose it. With additional time to catch their quotas and the opportunity to trade quotas among themselves, quota fishermen would be able to plan their fishing to take account of weather, tides, participation in other fisheries, shoreside employment, and other options. They would also have more time to search out higher prices for their catch in existing markets or to penetrate more attractive markets. Other fishermen taking note of these advantages would be expected to opt for the share system the next time around.

If the prospective benefits fail to appear, initial participation would attract no followers. Indeed, they might themselves choose (and be allowed annually) to return to the common property fishery.

This capability to move incrementally toward a new management regime and to learn by doing is almost imperative when one considers the essentially irreversible nature of the step the Council is preparing to take. Once exclusive fishery rights are established under a limited entry system it is unlikely that they could later be significantly altered or canceled.

An optional common property fishery would avoid any such irreversible commitment. Instead, the two systems would coexist, or one or the other would wither away, as determined by the individual choices of fishermen based on their own continuing experience.

Economic Benefits and Costs of the Individual Quota System

This section discusses some of the changes in the halibut industry which are expected to occur if the share system of limited entry is adopted, and the types of economic benefits and costs which would likely result.

The method used for evaluating these changes is known as benefit/cost analysis, or B/C analysis. It has been used fairly widely in situations where a decision must be made concerning whether or not to commit public funds to a

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

project or activity. Simply put, the method compares two situations: the "status quo," or the current situation before any action is taken, and the situation after the project is undertaken.

Undertaking a major project will necessarily affect industries, individuals, and geographic regions which are in some way related to the project. Building a dam, for example, will provide jobs and increase economic activity in the nearby area during its construction, generate electricity, possibly reduce the habitat or populations of fish and wildlife, and change the nature of recreation activities in its vicinity. Benefit/cost analysis is used to measure and compare the beneficial and adverse economic consequences of the dam, compared to the situation where no dam is built, as an aid to making the decision whether or not to build it.

In the present case, the decision being evaluated by B/C analysis is whether or not to institute a share quota system for the halibut fishery off Alaska. Compared with the current situation in the halibut fishery, the benefits from adoption of the quota share system identified and discussed in this report are: (1) reduced fishing costs; (2) reduced inventory holding costs; (3) increased product value because of an increase in fresh market sales; and (4) better utilization of halibut taken incidentally in other hook and line fisheries. The costs of adopting the share quota system (again, compared to the present condition of the industry), have been identified as: (1) additional public (i.e., government) expenditures on administration and enforcement; (2) the economic cost of unreported catch; and (3) losses due to "hygrading," or throwing back lower grade fish to try to replace them with higher grade fish.

Before discussing each of these benefits and costs in turn, some further comments about benefit/cost analysis might be useful. The actual process of

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

measuring economic costs and benefits is a difficult one, largely because of limitations in the data which is available. Complex economic models typically must be simplified to be of use in estimation. Even then, there may be questions about the accuracy or representativeness of the data which is used. To help in making the decision, then, it is useful to know how much the data used in the model could be in error without changing the decision which results. That is, if your economic models tell you that benefits of the project are greater than the costs, the project should be undertaken; the question is, how much could the basic data be in error before the costs are greater than the benefits and the project should not be undertaken? This "what if" process of changing values of different variables (usually one at a time) to see how the results change is known as sensitivity analysis.

BENEFITS OF THE SHARE SYSTEM

Reduced Fishing Costs

The share system's effect on fishing costs will be determined by adjustments fishermen make if the current, short seasons are replaced by a longer (say eight months or so) season. With current season lengths, many fishermen's production of halibut is determined (constrained) by the length of the season rather than by economic conditions (cost of production vs. exvessel price). Their fishing in a given area is cut short because of closures before they reach their profit maximizing output, or the point where the cost of catching a halibut just equals the gross earnings received from it. As a result, the average cost of production for these fishermen is greater, and their profits are lower, with short seasons than would be the case if there were not season closures.

With a share quota system, each fisherman would be awarded a permanent entitlement to the resource based on historical participation in the fishery

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

(how they are awarded is discussed at some length elsewhere in the report). Each year, a catch quota will be determined for each fisherman, based on his entitlement and the condition of the stocks. The fisherman will have the choice, then, to harvest that amount, increase his catch by buying more quotas, reduce his catch by selling some of his quotas, or not fish at all that year by selling all his quotas (while still retaining his entitlement).

The price of quotas will fluctuate year to year, depending on what the exvessel price and fishery-wide average cost of harvest is. The quota price should be equal (or very close) to the difference between exvessel price and minimum average cost per pound of harvest (excluding quota costs). If it were less than that, more fishermen could figure to make a profit by acquiring and fishing additional quotas from someone else than there would be fishermen willing to sell their quotas. Demand for quotas would outstrip the supply, and the price charged would rise. The point at which demand would just equal the supply of quotas would be when the price of quotas equals the difference between exvessel price and minimum average cost per pound of harvest.

Given this situation, each fisherman would be free of season length constraints to make the business decisions best for himself. Each fisherman's average cost of production would guide him to find the profit-maximizing output. For some fishermen it would involve buying additional quota shares if their average cost of production for those additional shares were lower than the fishery-wide average. Other fishermen might find that they increase profits by fishing less than their annual quota and selling off part of it. High cost producers (those whose average cost of production is higher than the fishery-wide average) might find that they could fish their annual quota and make a profit, but they could make a larger profit by selling the entire annual quota and not fishing at all that year.

## Staff Synopsis

### Limited Entry in the Pacific Halibut Fishery: The Individual Quota Option

The benefits of the share system would be the increased profits of fishermen who are currently constrained by short seasons from finding the profit-maximizing production level, where the cost of producing the last halibut just equals the gross earnings from its sale.

#### Cold Storage Holding Benefits

The quota system will also affect costs of processing and marketing halibut, particularly cold storage holding costs. Because of the present short seasons, the amount of halibut held in storage far exceeds levels required for orderly marketing. The share system could significantly reduce the levels held in storage.

With very short seasons, most of the annual supply of halibut must be added to inventory rather than being immediately consumed. Larger inventories are more costly to hold than smaller ones, both because of cold storage rates and interest costs to finance the inventory. In the case of self-financed inventories, there is still a cost, which is the foregone interest income of the money tied up in financing inventory.

Without any season constraints, the supply of halibut would be more spread out over the course of the year, as fishermen scheduled halibut fishing around other activities. More halibut could be marketed directly for consumption instead of being added to inventory, thereby reducing the costs of holding frozen product. There would be considerable incentive for processors and fishermen to work together on scheduling deliveries, splitting the savings on holding costs.

Spread-out deliveries of halibut should not increase processing or transportation costs, since the plants which process most Alaska halibut operate year-round to process other species, and would be able to handle small

Staff Synopsis  
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The Individual Quota Option

quantities of halibut without much disruption. Halibut shipments could, if necessary, be combined with other species to ensure that full shipments were made.

Consumer Benefits

A substantial share of the Pacific halibut catch was marketed in fresh form before drastically shortened seasons reduced that practice. Consumers who are willing to pay premiums for fresh-marketed halibut will benefit if fresh halibut becomes available during a greater portion of the year.

Current demand for fresh halibut is less than it will likely be under the quota share system, because it does not now pay retailers and distributors to invest in the necessary equipment and market development efforts with fresh halibut so seldom available. As fresh halibut becomes available more regularly, these efforts will be made and the fresh market should grow. As the market grows, there will be an increase in consumers' surplus associated with the increased marketing of fresh halibut.

Consumers' surplus is the difference between what people are willing to pay for a commodity and what they actually have to pay at the going market

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Consumers' surplus is the difference between what people are willing to pay for a commodity and what they actually have to pay at the going market price. Downward sloping demand means that people are willing to pay higher prices for the first units of a commodity (like halibut), but they are willing to buy increased amounts only at lower prices. At the intersection of supply and demand, where the market price is actually determined, that price is lower than what the demand curve says people would have been willing to pay for the first units purchased. Thus, consumers enjoy a surplus from not having to pay as much as they would have been willing to for the first units; the amount of the surplus is the difference between what they would have been willing to pay

Staff Synopsis  
Limited Entry in the Pacific Halibut Fishery:  
The Individual Quota Option

and what they actually paid. Because demand is downward sloping, the consumers' surplus decreases with each successive unit purchased at a given market price. the consumer's surplus for the last unit sold is zero.

One of the benefits of the quota share system, then, is the increase in consumers' surplus resulting from greater marketing of fresh halibut.

Another important benefit to consumers of the quota share system is an improvement in the quality of the frozen fish marketed, because of the shorter cold storage time. The improvement in quality should increase the demand for frozen halibut, and result in an increase in consumers' surplus similar to that described for fresh halibut.

Benefits to Other Hook and Line Fisheries

Another benefit of the quota system would be a reduction in the wastage of halibut caught in other hook and line fisheries. Currently all halibut caught out of season must be discarded (including those taken incidentally to other species), even though many do not survive. Much of this loss could be avoided if incidentally-caught halibut could be landed legally.

The quota share system provides a mechanism for this to occur. Fishermen targeting on other species could land halibut, regardless of when taken, if they had a sufficient quota. Many, like salmon troll fishermen, for example, would be allocated a quota based on historic halibut fishery participation. Others would be in a good position to purchase quota shares, because as multiple-species fishermen, they can reduce their fixed costs of operation by spreading them out over more species. Lower fixed costs attributed to halibut fishing means lower average cost of producing halibut and a greater chance of bidding successfully for halibut quotas.