MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: September 21, 1992

SUBJECT: Comprehensive Rationalization Program

ACTION REQUIRED

(a) Status report on moratorium.
(b) Initiate planning process to develop comprehensive rationalization program.

BACKGROUND

(a) Status report on Moratorium and control date publication.

At its June meeting, the Council approved a vessel moratorium. Contained in that action was a request that NMFS notify the public that the Council may use June 24, 1992 as a control date in future management actions, i.e. the Comprehensive Rationalization Program. A draft of the control date notice has been forwarded to the Regional Office and is awaiting legal review before publication in the *Federal Register*. The EA/RIR/IRFA for the moratorium is ready for transmission to the Secretary of Commerce. The glut of new regulations resulting from the recent action on Inshore-Offshore, Community Development Quotas and Individual Fishing Quotas for halibut and sablefish, has delayed work on the proposed rule for the moratorium. This should be completed in October, which will most likely mean a delay in actual implementation of the moratorium until after fishing has commenced in 1993. NMFS does not feel this will adversely impact the effectiveness of the moratorium nor will it cause undue interruptions in fishing when it is finally put into place.

(b) Comprehensive Rationalization Program

In approving the inshore-offshore amendment in June 1991, the Council made the following commitment to develop a long-range plan to rationalize the fisheries:

> **Part 4. Other Alternatives to be Considered.** Commencing immediately, the Council instructs its staff and the GOA and BSAI plan teams, with the assistance of the Alaska Fisheries Science Center, the Alaska Regional Office of the National Marine Fisheries Service, the Scientific and Statistical Committee and the Advisory Panel, to undertake the development of alternatives for the Council to consider to rationalize the GOA and BSAI groundfish crab fisheries under the respective FMPs. The following alternatives shall be included, but not limited to:

1. ITQs
2. License Limitation
3. Auction
4. Traditional Management Tools
   a. Trip Limits
   b. Area Registration
   c. Quarterly; Semi-Annual or Tri-annual allocations
   d. Gear quotas (hook and line, pots, etc.)
   e. Time and area closures
   f. Seasons
   g. Daylight-only fishing
5. Continuation of inshore/offshore allocation
6. Implementation of community development quotas
7. No Action

Part 5. Duration. If by December 31, 1995, the Secretary of Commerce has not approved the FMP amendments developed under Part 4 above, the inshore/offshore and Western Alaska Community Development Quotas shall cease to be a part of the FMPs and the fisheries shall revert to the Olympic System."

This was followed by a motion in September 1991 to move ahead with development and implementation of a comprehensive IFQ program for all fisheries. And on March 4, 1992, Dr. Knauss, in his letter approving parts of the inshore-offshore plan, urged the Council to come forward with a market driven system as rapidly as possible:

> "I urge the Council to work as expeditiously as possible toward some other method of allocating fish than either the olympic system or direct government intervention. The olympic system's race to the quota contributed substantially to the problems of overcapitalization, preemption of one sector by another, bycatch and waste. It is not possible to build fences around all of the areas and industry sectors dependent on the wide variety of fish and have any semblance of a manageable fishery. Over the long term, a program that reduces the cutthroat competition of the olympic system and relies more on free market decisions, instead of government intervention, would seem to be the most viable alternative."

Schedule

The inshore-offshore rules will expire December 31, 1995, and the Council may want to set a goal of having the follow-on comprehensive program not only approved, but implemented, on January 1, 1996.

Though 1996 seems a ways away, it really is just around the corner as far as the regulatory process goes. If the Council decides to use traditional management tools as the basis for the comprehensive plan, those could be implemented rather quickly without much lead time. Essentially it would be business as usual in the annual management cycles. However, it may be more prudent for the Council to let the consideration of IFQs determine the schedule over the next few years, as that system would take the longest to implement.

Implementing IFQs for sablefish and halibut, for example, has become about a two-year process from time of approval by the Council. Part of that time is devoted not only to Secretarial review and establishing administrative machinery, but also to notifications and appeals. If we assume that about

a year and a half is required for Secretarial approval and implementation of groundfish and/or crab IFQs (if that turns out to be the Council's preferred management regime), then the Council needs to approve the new program no later than June 1994. It might be better to target April 1994 for a final decision to give ourselves some room for slippage. A draft analysis would have to be available by January 1994. Item C-7(a) is a schedule that might get us there.

Preliminary Discussion Paper

The Comprehensive Rationalization Program is an opportunity for the Council to build the management regime of the future. Although the Council has in the past indicated that it would like to move toward IFQ systems in all the fisheries in their jurisdiction, it may be that IFQs would be inappropriate or unacceptable in some cases. Some people in the industry believe that an open access system will be the best management regime for the future; therefore open access should be an alternative. The open access alternative examined in the analysis should be a comprehensive program that deals with all of the issues facing the industry, a system rather than a hodge-podge of management tools. Others in the industry believe that individuals should have the right to fish when and where they find it most beneficial, without their actions affecting the actions of others. This kind of system was envisioned with IFQs for the sablefish and halibut fisheries.

Russell Harding completed a preliminary discussion paper before leaving the staff this August to return to New Zealand. The emphasis of his analysis is how the alternatives in Part 4 of the inshore-offshore motion would satisfy the goals and objectives of the Council in managing the fisheries. The Council could use this as a first step in sorting through the options to identify the "reasonable" two or three alternatives for in-depth quantitative analysis.

There are many management alternatives that could be examined. Those identified in the inshore-offshore motion presumably are on the short list and several of those have been examined intensely already. We will lead you through Harding's discussion paper, and then we need to know how you want to proceed.

a. Should additional options be added and discussed?

b. Is the discussion sufficient for public review or is more detailed analysis required?

c. Is another configuration of alternatives more suitable than the seven items in the inshore-offshore motion?

d. What additional information does the Council need to pare the alternatives and come up with the short short list?

Planning Committee

I have suggested that the Council establish a planning committee to interact with the analysts. This follows the pattern of the FOG and Fishery Planning Committees which provided a forum outside the environment of normal Council meetings, where much of the time both staff and Council members are too busy with other issues to concentrate solely on long range planning. Committee meetings also would give the industry a forum to track our progress and offer advice.

If the Council appoints a committee, the staff would work with them in further developing the qualitative analysis, laying the foundation for the quantitative analysis, determining data needs, drafting a problem statement, and establishing the goals and objectives of potential solutions. Then during 1993, the committee would provide an excellent sounding board for the analysts as they work their way through the development of the quantitative analysis.

One other item that we need to discuss is whether or not to have a retreat as suggested by the SSC last April. If the Council does not have the inclination or time to hold a retreat outside our normal meeting schedule, the January 1993 meeting might do well for that purpose since the first meeting of the year usually has a lighter agenda than the rest.

Economists and Social Impact Focus Groups

I have noted in the schedule that focus groups could meet in October and November. This could be one or two groups with a mix of social scientists and economists to identify what studies need to be performed and what data to collect. They would help the analytical team develop a plan and structure for the benefit-cost analysis, economic impact assessment, and the social impact assessment. Our SSC would be involved also. These groups perhaps could meet periodically in 1993 to ensure that the studies stay on track.

Data Needs

The analysis will need data. Some we have; some we will need to get. Here is a first cut at data needs and I'm sure the focus groups will identify additional needs.

Economics Data Needs: Quantitative economic analyses rely heavily on cost and revenue data of the fishing fleets. Currently these data are not collected on a systematic basis. Recent Council actions on IFQs and Inshore-Offshore used economic data collected specifically for those proposed actions. Given the dynamic nature of the fisheries, these data may be regarded as dated and imperfect. Therefore the Council staff, analysts at the NMFS AFSC and Region, and members of the SSC, feel that the collection of regular and comprehensive economic data is a priority. The last time the Council and NMFS gathered economic data, the "OMB Survey" for the inshore-offshore issue, a survey instrument was put together quickly, probably too quickly. Although that survey did contribute to the inshore-offshore analysis, it was inadequate in many ways. To avoid the pitfalls of the "OMB Survey", a new survey should be developed within a focus group consisting of economists directly involved in the analyses as well as other NMFS, academic, and consulting economists with experience in the fishing industry and the collection of data. Additionally, the focus group should include consultations with industry personnel, specifically the bookkeepers, accountants, operation managers, etc; these individuals will be supplying the necessary information. Once a potential survey is developed, OMB must approve the data collection instrument. Achieving OMB approval of survey requests is a lengthy process, so the sooner it begins, the better.

Social Data Needs: Recent actions by the Council have generated numerous calls for detailed social impact studies of effected fishing communities, from Bristol Bay to Bellingham, and Seward to Seattle. Additionally, NMFS officials have stressed the importance of including more detailed examinations of the effects of proposed actions on communities. The SEIS for Inshore-Offshore used existing community profiles (secondary data) supplemented with field interviews. Although the Inshore-Offshore SIA was one of the most complete submitted by the Council, many communities, their leaders, and reviewing sociologists did not feel it was adequate. Additionally many feel that management alternatives do not go far enough in developing solutions which would promote the well-

being of communities. Approaches for analyzing social impacts need to be examined, along with the data needs of each approach. A social impact focus group consisting of sociologists from NMFS, as well as other federal and state agencies, academic and consulting sociologists, and community leaders involved in the industry and the fishing communities could help in that regard. They can identify existing studies, data bases, and needs. If more data needs to be collected, then this group could develop the appropriate surveys for OMB review.

Biological and Physical Environment: NMFS scientists have focused, since the agencies inception, on the biological and physical environment of the fisheries. Data collection is ongoing and apparently adequate. Development of a new management regime could affect these environments and therefore environmental impact will need to be assessed. The analytical team will need to bring forward their plan for assessing the environmental impacts of the alternatives chosen for further study by the Council.

Analytical Team

In October we will need to establish an interagency team to perform the required analyses. The team will need to meet with the focus groups and report back to the Council in December. We also will use consultants as funds permit. Scott Matelich at WSU has submitted a proposal to analyze crab IFQs (item C-7(b)). The Council's share would be $40,000 and he would need to get started by November 1 to produce results when needed by the Council in early 1994. Lee Anderson and Dan Huppert already have done some background work on groundfish IFQs that will be presented in December or January. A proposal submitted by Dan Huppert to study IFQs is under item C-7(c). We need to get the analytical sub-tasks up and running as soon as possible to meet the deadlines in 1993 and 1994.

Proposed Schedule

1992	
July-August	Staff develops discussion paper of options so Council can begin the process of selecting viable ones for quantitative analysis during 1993.
September	Council approves discussion paper, revised as appropriate, for public review.
	Council establishes Planning Committee to work with analytical team.
October-November	Economic and social impact focus sessions. Initiate data request and begin developing analytical tools.
December	Review of public comments and refinement of reasonable alternatives.
1993	
January	Council selects alternatives for in-depth quantitative analysis.
February -November	Team analysis and interaction with Council and Committee.
December	Preliminary presentation of results. Review by NMFS, Council family and industry.
1994	
January	Council releases draft analysis for public review.
February-March	Public review.
April	Final decision.
May-July	Preparation for submission to Secretarial Review.
August-November	Secretarial review.
December	Secretarial decision.
1995	
January-December	Establish administrative machinery; complete notifications and appeals procedures.
1996	
January 1	Implement new program.

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September 18, 1992

Clarence G. Pautzke, Executive Director
North Pacific Fishery Management Council
P. O. Box 103136
Anchorage, AK 99510

Dear Clarence:

I have given careful consideration to your request that I expedite the crab ITQ study--specifically, meeting your December 1993 Council meeting deadline. It is my belief that you set this deadline so that the development of the plan amendment analysis and Council deliberation could occur within the 1994 calendar year. My original proposal, with some modifications to assure Council edification and guidance, will allow meeting such a resolution schedule.

It has always been my intention that the research results must be designed to dovetail directly into the policy process. If an ITQ policy is found to be advisable, it will have no significant environmental impact, except possibly a decrease in by-catch handling mortality. The analysis and results we plan to provide will focus on the economic policy requirements stipulated by the Magnuson Act, IFRA and Executive Order 12291. Accordingly, the EA should be *pro forma*. Specifically, we intend to analyze:

I. Net benefit to nation.

II. Distribution of catch and net benefits by:
   - A. Vessel size-class
   - B. Port of landing
   - C. Onshore versus offshore processing
   - D. Residence of participants

III. Harvesting and processing sector employment

IV. ITQ price and trading patterns

V. Changes in harvesting and processing sector profitability

VI. By-catch mortality, high-grading and ghost fishing.

VII. Administrative and enforcement costs

VIII. Alaskan coastal community impacts

We will coordinate all activities with the appointed individuals so that research directions, issues and preliminary outcomes are known by the Council, NMFS and state while the study is underway. Boiler plate, format and other process requirements for the EA/RIR Plan Amendment can be coordinated with your staff and NMFS. This will facilitate strategic coordination which should decrease total time required to complete the decision document required by the Council. Accordingly, this project will enable you to make your final decision deadline by the end of 1994.

As for deliverables, we can brief the Council of very preliminary findings in December 1993, although staff will be kept abreast of all developments as they occur. A preliminary draft report will not be available until late March 1994, followed by testimony to the Council during the April meeting. I anticipate being able to provide final formal testimony in June 1994, followed by a final written report to staff.

This agenda should conform to your needs. And it simultaneously recognizes the greatest constraint--adequate time to conduct a very complicated study and, thereby, provide the decision process with the best available scientific information.

Should this expedited time horizon suit the Council's needs, we will need to START NOT LATER THAN NOVEMBER 1, earlier if possible. It must also be recognized that such close coordination will require extensive travel. The Council's share of the project ought to be budgeted at $40,000.

Please advise me of Council disposition at the earliest possible date.

Sincerely,

Scott C. Matulich
Professor

SCM:jlc

cc: Rick Lauber

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July 20, 1992

Jim Cornelius
North Pacific Fishery Mgmt. Council
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Dear Jim:

The proposal I sent you involves primary funding from Washington Sea Grant. I am seeking residual funding from the Council, PSPA, and fishermen (conceivably the ACC, though this group does not fully represent the fishing industry, and the fishing sector is less homogeneous). The amount needed is $90,000 over two years, starting October 1992. This represents $15,000/year from each of the three groups (NPFMC, PSPA, ACC).

If the project is fully funded, the research will provide two deliverables upon completion (approximately October-December 1994); a written report and separate oral reports to each of the funding groups. Pursuant to Council wishes, the research team will also give public testimony at the designated Council meeting.

The objectives of the proposal should be fairly clear. So, I will not rehash them here. But I do wish to make it quite clear that the overall purpose is to help the industry decide on whether to adopt an ITQ and how that management structure can address problems like by-catch. Accordingly, it is important to discuss the issues with industry participants and the Council as soon as the project is initiated.

I am not sure what else you need or desire. Please give me a call tomorrow and advise me.

Sincerely,

Scott C. Matulich

Scott C. Matulich
Professor

(jlc)

SCM:jlc

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RESEARCH PROPOSAL

ECONOMIC RATIONALIZATION OF THE NORTH PACIFIC CRAB FISHERIES

Scott Matulich, Ray Huffaker and Ron Mittelhammer
Department of Agricultural Economics, Washington State University

PROBLEM OR OPPORTUNITY ADDRESSED

Fish management councils are engaging in comprehensive economic rationalization of commercial fisheries, resulting in a rush to individual transferable quotas (ITQs). This is being done based ostensibly on two factors. First, there is an indisputable need to remedy the overcapitalization problems in most commercial fisheries. Second, an extensive theoretical literature promises rationalization by creating a market for privately held fishing rights. But there has been little empirical analysis of the few existing ITQ programs world-wide. And policymakers seem willing to embrace ITQ programs without the benefit of adequate prior quantitative analysis indicating the likely consequences of those programs.

The North Pacific Fishery Management Council (NPFMC) is no exception. In September 1990, the NPFMC notified the fishing community of a potential moratorium on new entry to groundfish, halibut and crab fisheries. One year later, the NPFMC approved a halibut and sablefish IFQ [ITQ] prior to developing an implementation plan. The Council also voted to give high priority to developing and implementing a comprehensive ITQ program for crab and groundfish fleets by 1993. In February 1992, Huppert, Anderson and Harding completed an initial examination of the potential implementation problems and solution options related to a groundfish ITQ. To date, there has been no analysis of a North Pacific crab ITQ.

ITQs are indeed an exciting experiment in property rights and markets as the basis for controlling excessive fishing power. But the prudence of industry-wide "experimentation" is questionable.

The proposed study will provide a quantitative analysis of ITQs applied to the peculiarities of the North Pacific crab fisheries before policymakers commit to an ITQ program. This is important because: (1) There is no record that ITQ implementation has ever been based on prior empirical analysis; (2) There is virtually no *ex post* empirical analyses of factors contributing to the success or failure of the few existing ITQ fisheries; (3) ITQs theoretically hold great promise for rationalizing open access fisheries; (4) There is a world-wide rush to ITQs; and (5) An ITQ management program will cause, as intended, profound restructuring of an existing fishery.

EXPECTED RESULTS

This study will analyze the fundamental tradeoffs between economic efficiency and distributional impacts (who wins, who loses, and how much) that are likely to result from an ITQ program in crab fisheries. Analysis will focus on economic rents (profits) accruing to industry participants: under the current management regime, at initial quota allocation, and potential redistribution of rents after quota trading. The results are critical to policy-

makers deciding whether to adopt an ITQ program and, if so, what form it should take. Final results will be presented to the NPFMC upon project completion. Scholarly papers will be submitted to journals as findings permit.

RATIONALE

The predominant argument for ITQs is to prevent rent dissipation from over-capitalization in open-access fisheries. North Pacific crab fisheries epitomize this over-capitalization problem. Consider the 1991 Bristol Bay red king crab eight-day "derby" season. Total vessels increased 25% (to 300) over the previous year, gear increased 30% to 90,000 pots, and catch dropped 15% from nearly 21 million pounds to under 18 million pounds. These figures stand in stark contrast to the 1980 record harvest of 130 million pounds caught by 235 vessels that fished for 41 days and used only 78,000 pots. Moreover, the increase in active vessels has been accompanied by a general increase in size and capacity.

In addition to recovering dissipated rents, policymakers must be sensitive to the distributional consequences of alternative rent-enhancing ITQ programs (particularly in this Alaskan context). For example, commercial fisheries represent the largest employment sector and the second largest income source for Alaska. Rural coastal communities depend almost entirely on income and employment generated by fishing and processing activities. There is considerable concern that an ITQ program will provide the impetus to transfer more of the industry out of state. There is a related concern that fishing rights will concentrate in the hands of a few large catcher and catcher-processor vessels, or possibly in the hands of processors. Accordingly, proper analysis of any ITQ program must involve explicit identification of rent generation and rent distribution tradeoffs so that policymakers can weigh the various potential impacts of an ITQ program, and then design the program to achieve the desired outcome. This proposed study will provide the North Pacific Fisheries Management Council and industry participants with such information prior to adopting an ITQ program. It also will provide a framework to evaluate Council-specified variations on program design.

PRESENT STATUS

More than a decade ago, Crutchfield aptly described ITQs as "a rather old idea that has recently taken on new life" (p. 748), crediting Christy and Scott and Christy with its origin. However, a series of symposia, the first held in 1979, at Powell River, British Columbia (Pearse, ed.) and the most recent one held a decade later in Reykjavik, Iceland (Neher, Arnason and Mollett, eds.) laid much of the theoretical foundations for ITQs. During this time, three nations began experimenting with ITQs. Iceland began managing its herring fishery in 1979 with an individual quota system hallmarked by restrictive transferability provisions. New Zealand subsequently adopted the first fully transferable quota system for selected species in 1982, later broadening the scope of application to

nearly all major finfish in 1986. Australia adopted an ITQ program for southern bluefin tuna in 1984. Five years later, the Australian government released a major policy statement committing to the reduction of overcapacity in all Commonwealth fisheries (Commonwealth of Australia). While stopping well short of endorsing ITQ management of all fisheries, ITQs were identified as a prominent management tool.

Canada also is experimenting with ITQs, most recently in the 1991 Pacific halibut fishery. This particular application, however, has produced an important outcome not addressed in the body of theoretical literature that evaluates the potential merits and problems of implementing ITQs. The Canadian experience demonstrates that a by-product of any efficiency gains in the harvesting sector is the potential for dramatic price feedback effects. The switch to an ITQ management program reduced the rush to catch the halibut TAC. This, in turn, elongated the season sufficiently so as to create a long-lasting fresh market for Canadian halibut. Canadian halibut fishermen benefitted by no longer competing directly with Alaska for a share of the lower-valued frozen halibut market.

The promise of ITQs are essentially untested. Geen and Nayar provide the first empirical economic appraisal of an on-going ITQ program--the Australian southern bluefin tuna fishery. Though they claim their analysis shows the ITQ program to be a success overall, Copes argues that their model is too simplistic to judge program merits. Moreover, their appraisal neglects distributional issues which will permeate the North Pacific Crab ITQ policy environment.

Huppert, Anderson and Harding address practical implementation issues of a North Pacific groundfish ITQ program in terms of acceptability to industry and government, and qualitative economic and biological consequences. This report is particularly useful for studying ITQ design in the North Pacific crab fisheries because of similarities in the underlying institutions and political interests. However, it provides no numerical analysis and suggests the potential scope of an *a priori* ITQ design study is enormous. Even if modeling the most prominent implementation issues and programmatic permutations were possible, policymakers ultimately would confront minute details such as whether quota can trade intraseasonally, or whether spot markets should be created to buffer uncertain catch performance and, if so, how they should be organized. No single model is likely to capture all the requisite features of an optimal program.

APPROACH

This study is designed to compare a general ITQ program with the *status quo* open-access fisheries in terms of economic rents accruing to different classes of participants and different geographic (management) areas. Huppert, Anderson and Harding identify two pivotal questions concerning fishery rents under an ITQ program: "How can resource rent generated under an [ITQ] system be measured? Should some or all of the rent be collected by the State from owners of [ITQs]?" (p. 64). The research

proposed here consists of four major tasks (outlined below) which center on these questions. Expected completion dates are indicated in parentheses following the task number.

TASK 1: Measuring Resource Rents (7/93). Resource rents represent the capitalized value of fishing revenues net of operating and fixed costs associated with production and management of the fish resource. Adherence to this simple definition is problematic in practice because of difficulties in forecasting revenue streams for fish stocks governed by complex population dynamics and complex international markets. Similarly, knowledge of all costs, including opportunity costs of participants is requisite--an inescapable pitfall for empirical rent measurement. Short of a comprehensive study of vessel owner and crew motivations, opportunity costs cannot be fully appraised. Even then it is difficult to calculate the psychic cost to those fishermen who are romantically tied to the sea and contemplate selling quota, possibly retiring their vessels. It follows that any empirical study must be satisfied with approximating economic rents with estimable quasi-rents, and results must be interpreted accordingly. Estimation of quasi-rents is the centerpiece of this study.

There are six components to (baseline) harvest-sector rent estimation under historical management:

1. Estimate vessel-specific production functions by pooling cross sectional and time series fish ticket and vessel characteristic data from the Alaska Commercial Fisheries Entry Commission (CFEC). Access to this confidential data is provided under a cooperative agreement between the Alaska Department of Fish and Game (ADFG) and Washington State University. This task involves not only isolating individual vessel technologies, but also recognizes the multiproduct character of North Pacific crab fisheries.

2. Estimate by-catch production functions from the federal observer program data and/or experimental data; then generalize to the crab fleet.

3. Engineer long-run cost estimates by vessel class.

4. Compute total revenue by vessel.

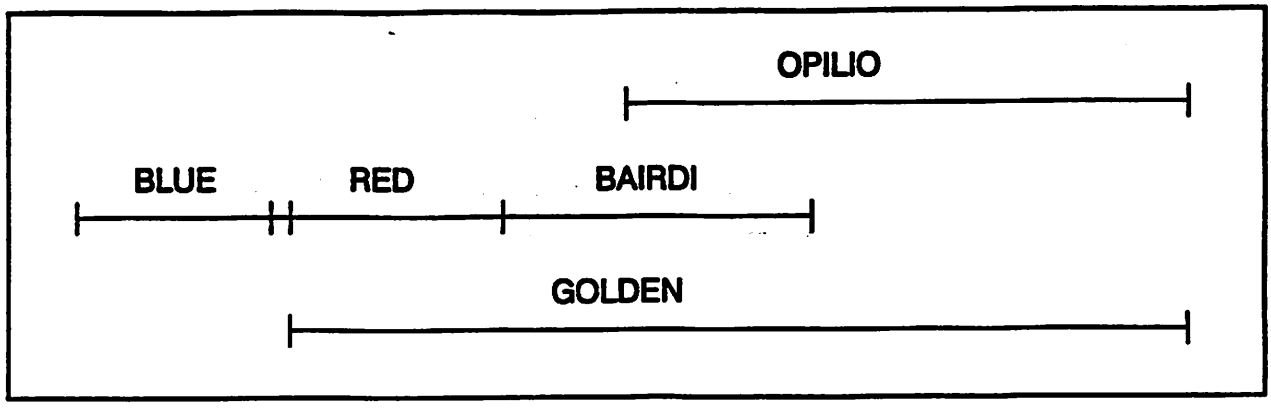
5. Estimate individual vessel rents.

6. Aggregate participants into classes to maintain confidentiality and to express harvest sector rent as a function of vessel or participant characteristics.

Recognizing that interaction among different species can affect harvesting technology associated with multiproduct fisheries is among the more important considerations in rent estimation (either in the historical context or under ITQ management). The three species of king crab (blue, red, and golden) and two species

of tanner crab (bairdi and opilio) currently are managed as independent stocks, each with distinct seasons. The sequence of current seasons are shown in Figure 1. Despite regulation-defined stock independence in all but the overlapping bairdi and opilio seasons, there is economic jointness among stocks brought on by at least two factors.

Figure 1. Current temporal sequence of annual crab seasons, by species.



The first factor is that the crab fleet represents a collection of multiproduct firms operating subject to a bundle of fixed inputs. This fact has implications for the method of production function estimation. The technology of crab vessels should not be represented by a set of separate and independent, species-specific production functions. Rather, it should be modeled as an interdependent system of equations, one for each species. As Pfouts argued in his seminal work on joint production, production processes of the firm are linked through resource constraints representing the limited availability of fixed inputs for which the different products must compete.

The second factor stems from the by-catch of illegal, out-of-season species. By-catch not only reduces harvest efficiency of the target species, but is believed by many management biologists to cause handling mortality *vis-à-vis* the by-catch species (personal communication with J. Reeves and G. Kruse). By-catch mortality in the current season imposes externalities in subsequent seasons when fishing is later directed at the by-catch species.

Regardless of the sources and form of production jointness, Kirkley and Strand, and Squires (1987, 1988) provide compelling evidence for not modeling production and economic behavior of multiproduct fishing firms with separate, independent production functions for each species. To do so may lead to erroneous analytical and empirical results. In particular, failure to account for the interaction among species in the joint production technology of the fishery will generally represent a specification error in the vector function representation of the technology. Subsequent econometric estimation of such a system leads to statistically biased and inconsistent technology parameter estimates that are also statistically inefficient. Simulations of such an estimated system for the purpose of analyzing policy scenarios focused on altering harvest behavior, then,

are also biased, inconsistent, and inefficient. Furthermore, even if species jointness is accounted for in the specification of the joint technology of a fishery, a question remains as to whether the production system should be represented and estimated in structural or reduced form. Estimates of the former representation will be statistically more efficient if the system is well-specified, while estimates of the latter representation will be more resistant to specification error. In this study, modeling production technology will explicitly allow for joint production relationships induced by fixed input capacity constraints and by-catch effects. Appropriateness of a structural versus reduced form technology representation will be statistically investigated using specification-testing techniques.

The extent to which empirical production function analysis can capture the jointness in these fisheries remains to be seen. However, a likely model specification is illustrated by the system of equations (1) and (2), which represent a segment of the model that would be used to represent the production technology for seasonal catch of blue, red and golden king crab and for bairdi and opilio tanner crab.

$$(1)\quad \begin{cases} BL_{1vLt} = F^{BL}_{1,t}\,(VChar_{vt},\ X_{vt},\ L,\ R_{1vLt},\ B_{1VLt},\ O_{1vLt},\ BLS_{1Lt},\ E_{1Lt}) \\ R_{1vLt} = BC^{R}_{1,t}\,(BL_{1vLt},\ L,\ RS_{1Lt}) \\ B_{1vLt} = BC^{B}_{1,t}\,(BL_{1vLt},\ L,\ BS_{1Lt}) \\ O_{1vLt} = BC^{O}_{1,t}\,(BL_{1vLt},\ L,\ OS_{1Lt}) \end{cases}$$

$$(2)\quad \begin{cases} BL_{2vLt} = BC^{BL}_{2,t}\,(R_{2vLt},\ L,\ BLS_{2Lt}) \\ R_{2vLt} = f^{R}_{2,t}\,(VCHar_{t},\ X_{vt},\ L,\ BL_{2vLt},\ B_{2vLt},\ O_{2vLt},\ RS_{2Lt},\ E_{2Lt}) \\ B_{2vLt} = BC^{B}_{2,t}\,(R_{2vLt},\ L,\ BS_{2Lt}) \\ O_{2vLt} = BC^{O}_{2,t}\,(R_{2vLt},\ L,\ OS_{2Lt}) \\ G_{2vLt} = f^{G}_{2,t}\,(VCHAR_{vt},\ X_{vt},\ L,\ GS_{2Lt},\ E_{2Lt}) \end{cases}$$

The species-specific harvest variables BL, R, and G refer to blue, red, and golden king crab, respectively; the variables B and O refer to bairdi and opilio tanner crab. VChar is a vector of vessel characteristics, X is a vector of other input levels, and L is the harvest location. The variable E_{bLt} represents total fleet fishing effort applied at location L in season b of time period t. Such a variable accounts for possible crowding effects on harvesting efficiency induced by changes in aggregate fishing effort applied at a given

location. The variables BLS_{bLt}, RS_{bLt}, BS_{bLt}, OS_{bLt}, and GS_{bLt} represent stock estimates or TAC levels of the various species of crab at location L (or more likely, management area) in season b of time period t. Stock levels of the various crab species at various locations are specified to account for the effect that crab density has on harvesting efficiency. It is unlikely such location-specific stock information will be available, so the stock effect may have to be proxied. The function $f^s_{b,t}(\cdot)$ represents a harvest function for crab species s in season b of time period t. The function $BC^s_{b,t}(\cdot)$ represents the level of by-catch for crab species s in season b of time period t. The subscripts define: the seasons (in this case, 1 = blue and 2 = red); v identifies the vessel; L identifies the catch location; and t specifies the year (1984-90).

The system of equations represented by (1) and (2) capture the intertemporal linkage of current season regulations (illustrated in Figure 1) and also by-catch. Equation (1) represents the blue king crab season. The first equation in this set is the target species. Catch is a function of production technology and handling inefficiencies caused by by-catch. The next three equations are simultaneously determined by-catch equations, which are presumed to vary spatially.

Since the North Pacific crab fisheries evolve sequentially, there is a recursive relation between (1) and (2). In the second crab season, red king crab becomes the target species, with blue, bairdi and opilio becoming the nontargeted by-catch species. Golden crab is an alternative legal target that competes for the fixed capital stock. By-catch appears to be inconsequential in the golden crab fishery because of nonoverlapping habitats and, thus, by-catch is not modeled in the specification of the golden crab harvest equation. The system would sequence throughout a fishing year with each set of equations reflecting the changing target species. Five sets of equations are required to model the regulation-defined pattern of catch. In addition to (1) and (2), equations are needed to represent: (3) the bairdi target, (4) the overlapping bairdi/opilio season, and (5) the opilio target.

It is assumed in the specification of (1) and (2) that the by-catch data available from the federal observer program will reflect a by-catch technology that exhibits no input control. That is, changing input mixes will have no appreciable effect on by-catch level relative to the target species harvest level. If this assumption is substantiated by the data, it follows that by-catch level can be related to the level of the targeted species caught, and will be unaffected by vessel characteristics or input levels. The assumption will be statistically tested.

The observer program, which is limited to catcher-processor vessels, reflects approximately 10% of the fleet. The data clearly indicate location-specific by-catch "hot spots." It also indicates that by-catch gradients may exists across fishing seasons. This research will attempt to develop a gradient or zonal approach to by-catch estimation, and extend the estimates to the catcher fleet based upon location and time within the seasonal year.

Estimation of a system of equations such as (1) and (2) can present significant econometric challenges. First of all, it seems apparent that the error structure of the equations in (1), and (2), can exhibit contemporaneous correlation. That is, it would appear likely that some environmental and/or biological events affecting a geographic location would have the potential to affect many or all of the crab stocks in the location simultaneously, linking the disturbance structure across equations. Secondly, the effects of a biological and/or environmental shock on crab stocks may not fully dissipate within a time period of one season. Thus, the disturbance terms of the equations in system (1) and (2) could be linked over time, i.e., the disturbance structure could be autocorrelated. Thirdly, just as one might expect harvesting efficiency to vary over locations, it might be expected that the variances in harvesting levels across locations need not be equal. In addition, it might be expected that the variance in harvest levels at a given location will vary over time, especially if the crab population at a given location varies over time. Heteroskedasticity could be present, both across locations and across time.

Finally, the structural equations in (1) and (2) include explanatory variables that are simultaneously determined with the dependent variables of the equations--a reflection of the jointness in the harvest of the crab species. Ordinary least squares techniques cannot be expected to yield unbiased, consistent, and efficient estimates of model parameters. In summary, the inherent characteristics of the technology being modeled suggest that estimation of the system (1) and (2) will require some form of autocorrelation and/or heteroskedasticity-corrected three-stage least squares estimation technique in order to obtain accurate estimates of the technology parameters.

While a few recent studies (Squires, 1987 and 1988; Kirkley and Strand, 1988; and Lipton and Strand, 1992) employed dual approaches to multiproduct fisheries production estimation, a primal approach will be used here because cost data are very limited. Each of these studies had access to federal income tax returns of fishery participants. Actual profitability of the industry was known. No such data is available for the North Pacific crab fisheries. Costs must be engineered. This will involve estimating the primary variable cost (fuel expenditure) based on individual vessel horsepower, size, number of potlifts, time spent in the fishery and distance from catch to landing location. Estimates will be verified by comparing actual fuel consumption of cooperating fishermen. Bait expenditure will be computed as a function of potlifts. Vessel values will be engineered based on interviews with Seattle ship brokers, marine architects and cooperating fishermen. Where possible, recent purchases will be used to index vessels based on vessel characteristics. Insurance expense will be estimated in similar manner. Annual pot gear expenses will be estimated based on the number of pots carried, total potlifts, and vessel length. Lost gear estimates will be developed from interviews with fishermen.

Extreme variability in North Pacific crab stocks makes forecasting stocks and, thus, revenues, impractical. Red king crab is the possible exception because Greenberg, Matulich, and Mittelhammer previously developed a population dynamics model for this fishery. In lieu of accurate stock and revenue forecasts, high, medium, and low trend scenarios will be assumed for both stock and exvessel price. This will yield a range of

rent estimates by vessel. Rents then will be related to vessel participant characteristics in order to simplify/generalize subsequent comparative ITQ policy analysis. Factors such as vessel-size class, port of landing, catcher processor versus catcher, and vessel owner residence will be used to generalize the results.

TASK 2: Processing Sector Considerations (12/93). Although the rights-based fishing literature focuses on the common property externality, i.e., on rent dissipation in the harvesting sector, it is imperative that impacts on the processing sector also be evaluated. A myopic view of fisheries rationalization that considers only harvest rent generation is likely to ignore tradeoffs that occur in the processing sector. The market benefits obtained in the British Columbia halibut fishery are one case in point where the net benefits of an ITQ program exceeded rent captured from more efficient fishing. But the broader perspective on rents that are likely to accrue to an ITQ fishery need not resemble the Canadian experience. Industry-wide rent theoretically could shrink if the processing sector is adversely affected. This point is conspicuously absent in the ITQ literature and is easily illustrated in the context of North Pacific crab fisheries.

One of the purported benefits of an ITQ program is season elongation as quota transfers to the more efficient vessels and the fleet consolidates. In the case of the 1991 Olympic-style, eight-day Bristol Bay red king crab fishery, the benefits from season elongation are obvious. Two years earlier, the industry successfully argued to delay opening the red season several weeks until November 1, and link it to a November 15 early opening of the bairdi season. The principal impetus for this recent season realignment was improved processing efficiency. Shore-based processors collectively saved millions of dollars by linking the red and bairdi seasons simply because they did not have to retain and house idled workers or fly them home and back to remote western Alaska one month later. Fishermen also may have benefitted in a like manner. But processors like the derby environment because processing plants are used more efficiently, which implies lower per unit processing costs. Season elongation is likely to raise unit processing cost, which in turn can be expected to have an associated negative exvessel price feedback as both processors' absolute rent and rent share decline.

It follows that analysis of an ITQ program must include an investigation of processing plant utilization efficiency. A survey of processors will be conducted to establish unit processing cost relations for various throughput levels. Unit processing costs under current fisheries management regulations set the benchmark against which ITQ policy-induced changes can be measured and balanced against harvest sector benefits.

While changes in processing costs will capture heretofore unmeasured and unacknowledged reductions in purported net benefits to the nation, the ultimate incidence of the cost cannot be assigned to processors or fishermen. There is a fundamental market-power indeterminacy that precludes any statistical analysis of cost shifting and, thus, exvessel price feedback. Processors will, of course, attempt to maintain rent share

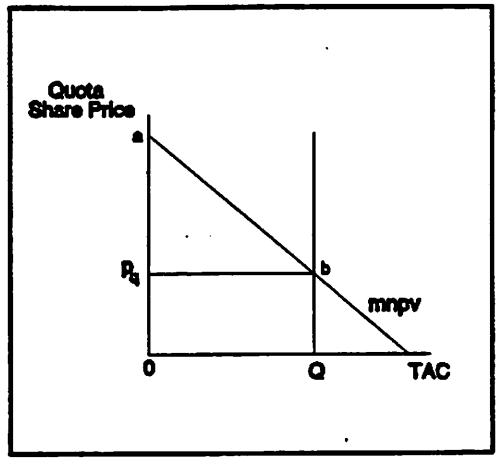
through exvessel price reductions. Fishermen who invested in their own rent enhancement by purchasing quota will resist cost shifting.

Insight into who will ultimately benefit and how much, can be gained by simulating relative rent shares under polar cost-shifting scenarios. This information is particularly useful to policymakers who will have to balance efficiency with distributional objectives if an ITQ program is to gain political support. It also has the potential to help analyze the possible merits of season realignment to maximize net benefits to the nation. This, in turn, has implications for by-catch management, discussed later.

TASK 3: Government Collection of Rents (3/94). The switch to a rights-based fishing program needs to recognize "rights-in-prior-use" if it is to be politically feasible. However, rights-in-prior-use must be balanced against the government's duty under the Public Trust Doctrine to seek just compensation for private use of public resources (Epstein). Giving quota shares to fishermen based on historical catch performance recognizes rights-in-prior-use but transfers wealth from public owners to the fleet--an apparent violation of the Public Trust Doctrine. Auctioning the quota to the highest bidder can maximize government collection of rents, but ignores rights-in-prior-use. Neither polar approach is likely to pass any legal or political litmus test. Alternatively, rights-in-prior-use can be recognized while some public resource rents are collected.

Figure 2 provides a simple conceptual framework showing the relationship among individual quota share Q, as a percent of total allowable catch (TAC); price of the quota p_q; and rents accruing to a representative fisherman. NPV in (3a) represents the net present value of Q

Figure 2. Economic rents from quota.



(3a) $NPV = \Sigma_{t=1}^{T} [p_t Q - TC(Q)]/(1+r)^t$

(3b) $MNPV = \Sigma_{t=1}^{T} [p_t - \partial TC/\partial Q]/(1+r)^t$

where p_t is the exvessel price at time t, TC(Q) is the cost function, and r is the interest rate. MNPV in (3b) represents the marginal net present value of quota, which is the average demand price for quota. If the government does not charge for quota, the fisherman receives rents equal to area abQO. Alternatively, the rent area abQO could be collected by the government if it could perfectly price discriminate in the sale of quota. A more likely alternative is that the government can charge up to the market clearing price, p_q, collecting some or all of the rents in area p_qbQO, while assuring that the full quota is used. The fisherman retains rents equal to area abp_q plus any portion of p_qbQO not collected by the government.

At issue is where to set the fee within the closed interval [0, p_q]. Huppert, Anderson and Harding list three rationales consistent with the Public Trust Doctrine for charging fishermen $p_q > 0$ under an ITQ program. These are:

> (1) to compensate the public at large for relinquishing their open access fishing rights to the limited number of QS [quota share] holders; (2) to obtain a normal return on the public's resource assets; and (3) to recover the government costs of fishery research and administration. (p. 67)

Only item number (3) is consistent with the Magnuson Fishery Conservation and Management Act (38 U.S.C.A. §1854(3)(d)) which limits the collection of fees to the administrative costs incurred in an ITQ program. However, rationales (1) and (2) may become more relevant in the future as the public demands greater accountability for private use of public resources. Any study of an ITQ program should embrace a longer-run perspective of likely public policy forums and not be constrained only by current interpretation of policy.

There is precedence for this broader policy view based on recent policy changes in other public resource management programs. Consider, for example, changes in fee policy related to private grazing on public lands. The Taylor Grazing Act of 1934 authorized the Secretary of the Interior to issue ten-year grazing permits ". . . upon payment of a reasonable fee" (43 U.S.C. §315(b)(1982)). Interpretation of the "reasonableness" of fees evolved over time through a variety of related acts, each assuring that benefits accrued primarily to the user (much like the Magnuson Act). In 1978, the Public Rangelands Improvement Act (43 U.S.C. §1903 et seq) tethered the fee structure to a formula adjusting a 1966 base value to reflect annual changes in the costs of production and beef cattle prices. The formula-generated public grazing fees were much lower than those on comparable private lands. Mounting public pressure motivated Congress in 1991 to require that grazing fees more accurately reflect "full market value."

There is at least one additional reason for the government to price quota in excess of administrative costs. It reduces the economic incentive for fishermen to cross-over from other fisheries. Failure to charge a fee that reflects the full rental value (p_q in Figure 2) may create arbitrage opportunities wherein individuals claim quota for the purpose of resale at full rental value. Recent public testimony before the Council arguing for cross-over rights are much less likely to persist if initial quota commands a competitive fair market price.

The maximum quota share price (p_q) at initial allocation will be estimated based on the above outlined framework. This will be done for alternative initial allocation schemes, assuming that estimated quasi-rents reflect the full rental value of quota. Initial allocation of quota shares will be computed on a three- and five-year average of historical catch performance. Methods of equitably accommodating new (late) entrants or vessels temporarily withdrawn from the fisheries will be investigated. Pricing policy also will

assume that p_q will differ across vessel/participant classes reflecting the different *status quo* rental values.

Notwithstanding the above arguments for government collection of rents, there is good reason not to charge an empirically estimated full rental price p_q. Recall that the empirical counterpart of MNPV in Figure 2 represents quasi-rents, which may overestimate rental price p_q since it does not fully account for opportunity costs. Moreover, performance variation within vessel/participant classes implies that a class-specific p_q is likely to promote nonuse of quota among the less than average efficient firms within the class. Accordingly, the amount of total rents that could be collected or, alternatively, the amount of pure wealth transfer to the fleet if quota share is given away, will be estimated as various percentages of p_q.

Collection of any non-zero price for quota represents a potential threat to a firm's economic viability, at least in the short run. Various methods of paying for quota should be explored, including short-term government financing so that fishery income can be used to write down quota debt.

TASK 4: Measuring the Potential Economic Benefits of an ITQ Program (12/94). The foregoing proposed analysis establishes the *status quo* or benchmarks against which an ITQ program can be compared. While there are alternative logical design attributes of a North Pacific crab ITQ program, it must be stressed that the intent of this research is not to design or recommend a particular ITQ program. Rather, the purpose is to provide policymakers and industry with the ability to assess whether a ITQ program should be more fully developed for the North Pacific crab fisheries.

The range of rental prices estimated in Task 3 imply incentives for trade among initial allocation recipients. Theoretically, quota should flow from the less efficient operators to the more efficient. For example, vessel/participant-classes realizing rental prices in the top 50% of TAC theoretically have incentives to acquire quota share from the less efficient, bottom 50% vessel classes. These less efficient operators, in turn, should have an incentive to sell their quota.

There are, of course, numerous constraints on trading patterns that make predicting the final, post-trade equilibrium extremely difficult. Among the more onerous considerations is absence of individual operator opportunity costs. Those individuals romantically tied to crabbing or place-bound by rural coastal community lifestyles are less likely to sell quota share at post-trade equilibrium prices. Similarly, opportunities for alternative uses of crabbing vessels that sell quota pose another serious, unpredictable constraint on trade. Council intentions to move toward comprehensive rationalization of all North Pacific fisheries may seriously limit alternatives, thereby lowering opportunity costs of capital and raising prices at which trade will occur. Moreover, even if vessels retain options to move into other fisheries, they may impose a crowding cost on those fisheries, which would go unaccounted for in calculating ITQ net national benefits.

Abstracting from many of these complications, a simple Samuelson-Enke trade model (or other suitable trade model), constrained only by current fleet capacity in each vessel class can be used to estimate baseline potential gains from trade and, hence, general trade patterns. Changes in processing costs developed in Task 2 must be balanced against rents generated by fleet consolidation. Redistribution of both catch and economic rents can be assessed under alternative assumptions concerning the percent of vessels in each class that elect to trade quota shares. All of these potential trade outcomes will be summarized in terms of the character of the pre-ITQ industry versus the post-trade ITQ industry.

The analysis should also provide some general insight into possible by-catch reduction strategies. The potential benefit of season realignment to retain at least some by-catch could be analyzed within the above analytical framework. Depending on the level of success in estimating the spatial dimension of by-catch, ITQs conceivably could be priced differentially over space (zones). Fishing activity conceptually could be moved from higher to lower by-catch zones throughout the season.

SPECIAL CONSIDERATIONS

The proposed research will make extensive use of a full-time Post-Doctoral Research Associate, Dr. Carlos Reberte. Several factors collaborated in this decision. First, Carlos Reberte holds a D.V.M. degree which he previously employed in South American commercial fisheries management. Second, Carlos will complete a Ph.D. in Agricultural Economics in fall 1992. He is regarded as the most intellectually-gifted mathematical economist to complete our program within the last 15 years, possibly ever. Third, the analysis proposed here requires rigorous application and advancement of economic theory and econometrics. Upon completing his Ph.D. degree, Dr. Reberte will have earned a minor in statistics. Grant funds will be used to acquire computing equipment for Dr. Reberte.

The research will involve considerable travel to Seattle, where most of the processors and fishing fleet are based, and where the regional headquarters of the National Marine Fisheries Service is located; to Anchorage, where the NPFMC is officed; and to ADFG and CFEC headquarters in Juneau.

CITATIONS

Christy, F.T., Jr. 1973. "Fisherman Catch Quotas." Ocean Div. Intl. Law J., 1:121-40.

Christy, F.T., Jr., and A. Scott. 1965. The Common Wealth in Ocean Fisheries. Baltimore, MD: The Johns Hopkins Press for Resources for the Future, Inc.

Commonwealth of Australia. 1989. New Directions for Commonwealth Fisheries Management in the 1990s: A Government Policy Statement. Australia Government Publication Service, Canberra.

Copes, P. 1989. "Comments on Gerry Geen and Mark Nayar's 'Individual Transferrable Quotas in the Southern Bluefin Tuna Fishery: An Economic Appraisal.'" In Rights Based Fishing, ed. P.A. Neher, R. Arnason, and N. Mollett. NATO ASI Series, Series E: Applied Sciences, Vol. 169, pp. 382-87. Boston: Kluwer Academic Press.

Crutchfield, J.A. 1979. "Economic and Social Implications of the Main Policy Alternatives for Controlling Fishing Effort." In "Symposium on Policies for Economic Rationalization of Commercial Fisheries," ed. H. Pearse. J. of Fish. Res. Board of Canada, 36:7.

Epstein, R.A. 1987. "The Public Trust Doctrine." Cato J., 7.

Geen, G., and M. Nayar. 1989. "Individual Transferrable Quotas in the Southern Bluefin Tuna Fishery: An Economic Appraisal." In Rights Based Fishing, ed. P.A. Neher, R. Arnason, and N. Mollett. NATO ASI Series, Series E: Applied Sciences, Vol. 169, pp. 355-81. Boston: Kluwer Academic Press.

Greenberg, J.A., S.C. Matulich, and R.C. Mittelhammer. 1991. "A System-of-Equations Approach to Modeling Age-Structured Fish Populations: The Case of the Alaskan Red King Crab, Paralithodes Camtschaticus." Can. J. Fish. Aquat. Sci., 48:1613-22.

Huppert, D., L. Anderson, and R. Harding. 1991. "An Individual Fishing Quota Program for the North Pacific Groundfish Trawl Fishery." Draft report prepared for NOAA, Nat. Marine Fish. Sv.

Kirkley, J.E. 1984. "An Empirical Examination of Fisheries Production Relationships: Single and Multiple Species." In Lectures on the Economics of Fisheries Production, ed. R. Marasco. NOAA Tech. Memo, Nat. Marine Fish. Sv., F/NWC-60, Northwest Alaska Fish. Ctr., Seattle, WA.

Kirkley, J.E., and I.E. Strand. 1988. "The Technology and Management of Multi-Species Fisheries." Applied Econ., 20:1279-92.

Kruse, Gordon. 1991. Personal communication. Senior shellfish biometrician, Alaska Dept. of Fish and Game, Juneau, AK.

Lipton, Douglas W., and Ivar E. Strand. 1992. "Effect of Stock Size and Regulations of Fishing Industry Cost and Structure: The Surf Clam Industry." Amer. J. Agr. Econ., 74:197-208.

Matulich, S.C., R.C. Mittelhammer, and J.A. Greenberg. 1990. "A Model of Exvessel Price Determination in the Bristol Bay King Crab Fishery." A.E. Series 90-2.1, Dept. of Agr. Econ., Wash. State U., Pullman.

Neher, P.A., R. Arnason, and N. Mollett, ed. 1989. Rights Based Fishing. NATO ASI Series, Series E: Applied Sciences, Vol. 169. Boston, MA: Kluwer Academic Press.

Pearse, H., ed. 1979. "Symposium on Policies for Economic Rationalization of Commercial Fisheries." J. of Fish. Res. Board of Canada, 36:711-866.

Pfouts, Ralph W. 1961. "The Theory of Cost and Production in the Multiproduct Firm." Econometrica, 39:65-68.

Reeves, J. 1991. Personal communication. Senior Scientist, Nat. Marine Fish. Sv., Seattle, WA.

Squires, D. 1987. "Public Regulation and the Structure of Multiproduct Industries: An Application to the New England Otter Trawl Industry." Rand J. Econ., 18:232-47.

_____. 1988. "Production Technology, Costs and Multiproduct Industry Structure: An Application of the Long-Run Profit Function to the New England Fishing Industry." Can. J. Econ., 2:359-78.

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EDUCATION

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POSITIONS HELD

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PROFESSIONAL MEMBERSHIPS

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SELECTED PUBLICATIONS

Greenberg, J. A., S. C. Matulich, and R. C. Mittelhammer. "A System-of-Equations Approach to Modeling Age-Structured Fish Populations: The Case of the Alaskan Red King Crab, Paralithodes Camtschaticus." Can. J. Fish. Aquat. Sci., 48(9):1613-22, Sept. 1991.

Matulich, S. C., R. C. Mittelhammer, and J. A. Greenberg. "A Model of Exvessel Price Determination in the Bristol Bay King Crab Fishery." A.E. Series 90-2.1, Dept. of Agr. Econ., Wash. State U., Pullman, 1990.

Matulich, S. C., R. C. Mittelhammer, and J. A. Greenberg. "Predicting Japanese Wholesale Price and Demand for Alaskan King Crab." A.E. Series 90-2.2, Dept. of Agr. Econ., Wash. State U., Pullman, 1990.

Matulich, S. C., J. E. Hanson, and R. C. Mittelhammer. "A Market Model of the Alaskan King Crab Industry." NOAA Tech. Mem. NMFS F/NWC-157. U.S. Dept. of Commerce, National Ocean. Atmos. Admin., Springfield, VA, Dec. 1988.

Mittelhammer, R. C., S. C. Matulich, and D. Bushaw. "On Implicit Forms of Multiproduct-Multifactor Production Functions." Amer. J. Agr. Econ., 63(1), 1981.

BIOGRAPHY

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PROFESSIONAL MEMBERSHIPS

American Agricultural Economics Association
American Economic Association
American Water Resources Association
American Geophysical Union (Associate Editor of *Water Resources Research*)

SELECTED PUBLICATIONS

Huffaker, R. G., and J. E. Wilen. "Animal Stocking Under Conditions of Declining Forage Nutrients." Amer. J. Agr. Econ., 73(4):1213-23, 1991.

Bhat, M. G., and R. G. Huffaker. "Private Property Rights and Forest Preservation in Karnataka Western Ghats, India." Amer. J. Agr. Econ., 73(2):375-87, 1991.

Huffaker, R. G., J. E. Wilen, and B. D. Gardner. "A Bioeconomic Livestock/Wild Horse Trade-off Mechanism for Conserving Public Rangeland Vegetation." West. J. Agr. Econ., 15(1):73-82, 1990.

Huffaker, R. G., and J. E. Wilen. "Dynamics of Optimal Stocking in Plant/Herbivore Systems." J. Nat. Resour. Modeling, 3(4), Fall 1989, Rocky Mountain Mathematics Consortium.

Huffaker, R. G., J. E. Wilen, and B. D. Gardner. "Multiple-Use Benefits on Public Rangelands: An Incentive-Based System." Amer. J. Agr. Econ., 71(3), August 1989.

Huffaker, R. G., and B. D. Gardner. "Rancher Stewardship on Public Lands: A Recent Court Decision." Nat. Resour. J., 27(4):887-98, Fall 1987.

Huffaker, R. G., and B. D. Gardner. "The Distribution of Economic Rents Arising from Subsidized Water When Land is Leased." Amer. J. Agr. Econ., 68(2):306-12, May 1986.

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PROFESSIONAL MEMBERSHIPS

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SELECTED PUBLICATIONS

Herrmann, M., B.H. Lin, and R.C. Mittelhammer. "Effects of Countervailing Duty on Norwegian Farmed Salmon," Agribusiness, 7(1991):339-355.

Greenberg, J.A., S.C. Matulich, and R.C. Mittelhammer. "A System-of-Equations Approach to Modelling Age-Structured Fish Populations: The Case of Alaskan Red King Crab, Paralithodes Camtschaticus." Can. J. Fish. Aquat. Sci., 48(1991):1613-1622.

Blayney, Don P. and Ron C. Mittelhammer. "Decomposition of Milk Supply Response into Technology and Price-Induced Effects," Amer. J. Agr. Econ., 72(1990):864-882.

Lin, B.H., M. Herrmann, T. Lin, and R.C. Mittelhammer. "Forecasting the Price of Farmed Atlantic Salmon: An Integrated Econometric and Time Series Approach." Agribusiness, 5(1989):477-488.

Mittelhammer, R.C., and R.K. Conway. "Applying Mixed Estimation in Econometric Research." Amer. J. Agr. Econ., 70(1988):859-866.

Kirkland, J.J., and R.C. Mittelhammer. "A Nonlinear Programming Analysis of Production Response to Multiple Component Milk Pricing." Amer. J. Agr. Econ., 68(1):44-54, 1986.

Ahmad, I., K. Duft, and R.C. Mittelhammer. "Analyzing Equity Capital Programs of Banks for Cooperatives." Amer. J. Agr. Econ., 68(1986):849-856.

Conway, R.K., and R.C. Mittelhammer. "The Theory of Mixed Estimation in Econometric Modelling." Studies in Economic Analysis, 10(1986):79-120.

AGENDA C-7(c)
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July 31, 1992

Clarence Pautzke
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, Alaska 99510

Dear Clarence;

The enclosed research proposal should be of interest to the Council. Since I will be in Juneau on August 3 and 4, I can discuss this with you or any Council members who have questions.

This is primarily a master's degree project, under my supervision, for a student currently in the Fisheries Management Curriculum at the School of Marine Affairs. Her background includes an M.S. in agricultural economics and a year of courses here. She currently has an internship position with the International Pacific Halibut Commission and she will be working as a fish checker in Seattle and Kodiak this summer. I can provide a resume if you desire.

My main concern now is for developing funding for the project. While I have provided funds for 3 months of the research assistantship, and the halibut commission is providing access to information and moral support, we still need the funding described in the preliminary budget for the proposal -- a total of about $24 thousand. I solicit the Council's interest and support. Partial funding for the project would be welcome, as I will be seeking support from others.

Let's talk further about this in Juneau.

Sincerely,

Dan

Daniel D. Huppert

cc: S. Rebert
O. Chapman

Research Proposal

IFQs and Other Modified Fishing Rights for Longline Fishing

Principal Investigator: Dr. Daniel D. Huppert

Associate Investigator: Suzanne Rebert

This exploratory research will assess a range of common property fishing rights systems, focussing on various forms of and modifications to the Individual Fishing Quota (IFQ) option.

Current Status. Individual Vessel Quotas have been implemented in British Columbia's sablefish and halibut fisheries in 1990 and 1991 respectively. The NPFMC has submitted a halibut and sablefish longline IFQ plan for implementation in the spring of 1994. Public testimony reveals that some Alaska fishermen, residents of some fishing communities, and some fish processors continue to oppose the IFQ system. Further, alternatives to and modifications of IFQs are still being proposed to the Council (e.g., the "Sitka block" proposal). Many opponents to IFQs agree that current fishery management system must be reformed, but contend that more desirable management options exist and deserve serious consideration. Some IFQ proponents envision further adaptations to ensure protection of local economies. While the NPFMC openly considered many alternatives before adopting individual quotas, it seems that continued research on management system design is appropriate.

We propose to use the recent management actions in Alaska and British Columbia as a basis for clarifying the nature of management reforms coming under the general heading of "modified fishing rights". Modified fishing rights includes IFQs and other allocations of fishing rights or management authority variously called "co-management" (Pinkerton), territorial use rights in fisheries or TURFs (Christy), community development quotas, and exclusive registration areas. While differing in important respects, all these forms of fishery management entail modifying rules of access to common property marine fish stocks. Each approach entails a different set of property rights. Further, each offers a different range of policy consequences -- including degree of local or decentralized control over the fishery, ability of fishing rights holders to optimize economic performance, stability in the structure of the fishery, and other aspects.

This research would begin by examining the opposing arguments to IFQs in an attempt to: (a) categorize and understand the source of opposition; (b) clarify the nature of alternatives (aside from traditional open access regulations) that are offered or implied by opponents; and (c) explore the potential for these alternatives to address the management objectives of both proponents and opponents of IFQs. In particular, we are interested in clarifying and further developing options under the following headings:

(a) Territorial Use Rights in Fisheries (TURFs);
(b) Co-management or co-operative management;
(c) Super-exclusive registration areas; and
(d) Community-based quota allocations.

The main objective is to clarify the specific sources of current dissatisfaction with the IFQ plan and to examine alternative modifications of fishing rights likely to provide the expected benefits of IFQs while also satisfying the opponents of IFQs.

Method

To identify the specific concerns of parties to the Alaska longline IFQ debate, we will review the public record created by the North Pacific Fishery Management Council, conduct interviews with selected members of the fishing community in Alaska, Seattle and British Columbia, and examine the assessment of British Columbia's halibut and sablefish IQ program (based upon a study to be completed under recently-released Request for Proposals). From these three sources of information, we will develop a matrix of management characteristics and associated outcomes, clarifying the relationship between various management approaches and objectives.

The public record includes correspondence received by NPFMC, minutes of public meetings held by the Council, and some media coverage. This information will enable us to isolate the arguments made for and against the proposal by individuals and groups who perceive they will be affected by IFQs. Public testimony will also suggest some of the management alternatives we intend to examine, including TURFs, superexclusive registration areas as defined by the Alaska Department of Fish and Game, and co-management or cooperative management. We will also draw from the resource management literature to identify these options.

Primary information will be developed through interviews of IFQ supporters and opponents in Alaska and in British Columbia. These interviews will be of the type known to sociologists as "elite interviews," signifying that the interview subjects are selected based upon knowledge, experience, and recognition in the communities. The interview format is relatively unstructured, and the style of questioning encourages the subject to reveal his/her priorities and to suggest new topics, rather than merely to confirm or deny the perceptions of the interviewer.

Having identified the concerns of parties to the IFQ debate, we will categorize the management options suggested by both the affected parties and the recent literature, in terms of their projected ability to address the major concerns, meet economic objectives for the longline fisheries, and satisfy the statutory and constitutional requirements of Alaska and the Magnuson Fisheries Conservation and Management Act.

Results

The study report will (a) describe sources of support and opposition to IFQs in Alaska's longline fisheries, (b) review the recent experience in British Columbia, and (c) assess other management options proposed by resource management professionals and parties to the debate. Specific applicability of these options to Alaska fisheries, and their probable economic and legal status, will be discussed.

The work will begin during the fall of 1992, with a prospective completion date of June, 1993.

Preliminary Budget

Research Assistant 9 mos. @ 50%	9,233
Benefits	92
Graduate Operating Fee	3,180
Travel	2,000
Supplies (survey and coding forms)	1,000
Other (Telephone, Fax, photo copier)	1,000
Total Direct	16,505
Indirect (50% of Direct)	8,253
Total Project Costs	24,758

D. Huppert 8/1/92

AIR QUALITY PERMITS

Shore based facilities in the Dutch Harbor area have been required to have air quality permits for the last two years. These permits limit the hours of operation for major pieces of equipment (primarily diesel generators) in order to ensure that air emission ceilings which trigger more stringent air quality controls are not exceeded. The shoreside processors, through extensive testing, must demonstrate that they will not exceed the emission limit.

Offshore seafood processors are not required to receive air quality permits; therefore, they avoid the expense and operating limitations imposed on shore based operators.

Chapter 3
Revenue Considerations

Overall Tax Considerations

The inshore component pays state and local raw fish taxes, property taxes and state corporate income tax. These revenues are the major source of income for communities adjacent to the Bering Sea for infrastructure, maintenance, police and emergency medical services, and other services used by both the inshore and offshore industry. The inshore component also pays an assessment of 0.3% of the ex-vessel value to the Alaska Seafood Marketing Association, which conducts marketing programs for groundfish that benefit both components.

The offshore fleet pays essentially no taxes beyond federal corporate income and some sales and fuel taxes. Fuel purchases represent over 50% of the goods and services expenditures by the offshore fleet in Alaska. These purchases are subject to a 5¢ per gallon state marine fuel tax. Revenues to the state from the marine fuel tax totaled less than $5 million in 1991. The inshore component also pays this tax.

Washington has no personal or corporate income tax, or taxes on products produced in-state but consumed elsewhere. With the exception of the observer program and minimal fuel taxes, the offshore component pays no significant taxes or user fees.

Alaska Fisheries Business Taxes in the EEZ

The pollock fishery can be characterized as a high volume, low value fishery. In 1990, groundfish accounted for 70% of the harvest reported on ADF&G fish tickets, 22% of the value harvested, but only 6% of the tax revenue collected. The low tax revenue is due primarily to the huge volume of the offshore activity in the EEZ (which cannot be taxed by the state).

Table 7 shows that pollock, sablefish and pacific cod represented 97% of taxable pounds and 96% of taxable groundfish value reported in 1990. Obviously pollock has increased in importance dramatically since then as discussed in Chapter 3.

Anyone who "lands" finished product in Alaska ports must complete fish tickets. So, ADF&G fish ticket summaries do reflect those species and pounds harvested by processors claiming EEZ status who are still completing fish tickets. The state's data does not include those pounds harvested and processed by operators who do not file fish tickets, and may therefore be understated.

Table 7
Values Reported to the Department of Revenue

1990	Million of Dollars		Millions of Pounds	
Groundfish	Millions of Dollars	Percent of Total	Millions of Pounds	Percent of Total
Pollock	$49.6	38%	660.5	67%
Sablefish	$41.3	31%	34.8	4%
Pacific Cod	$37.6	28%	270.1	28%
Flatfish	$1.2	1%	12.1	1%
Rockfish	$1.5	1%	4.0	0%
Other	$0.9	1%	4.6	0%
Total	$132.1	100%	986.1	100%

Source: Alaska Dept. of Revenue, Fisheries Tax Compliance, 1991

Table 8 provides an overview of groundfish compliance using ADF&G data. The table shows total pounds as reported to the Alaska Department of Revenue, total pounds as reported to ADF&G by EEZ operators, total pounds which are unaccounted for, and total harvest per ADF&G.

The state is not able to determine from the available data, how much, if any, groundfish reported as EEZ are actually processed in state waters. Numerous anecdotal reports have been received that offshore vessels taking cover from weather or moving their areas of operation process in state waters, but due to the remoteness and cost of surveyance, no estimate is available concerning the degree to which this occurs.

Table 8
ADF&G Pounds of Groundfish Harvested and Percent Reported to DOR
(in millions of pounds)

	1988		1989		1990		3 Yr. Avg.	
Groundfish	Fish Ticket Pounds	% of Total	Fish Ticket Pounds	% of Total	Fish Ticket Pounds	% of Total	Fish Ticket Pounds	% of Total
Reported to DOR	573.6	40%	711.7	32%	986.1	30%	757.1	33%
EEZ Not Rep'd	707.4	48%	1,342.5	61%	2,071.7	64%	1,373.9	59%
Other Not Rep'd	173.3	12%	144.4	7%	203.8	6%	173.8	8%
Total Harvest from Fish Tickets	1,454.3	100%	2,198.6	100%	3,261.6	100%	2,304.8	100%

Source: 1991 Fish Tax Study, Alaska Dept. of Revenue

MUNICIPAL REVENUE LOSS IF NO ALLOCATION IS MADE

The revenue impact to coastal communities in Alaska will be significant if no inshore allocation is made. With processing concentrated in Unalaska/Dutch Harbor and Akutan, these communities would feel the most immediate impact. These communities have local fish taxes which they apply to landed harvests. This is in addition to the state fisheries business tax, which is shared 50% with local boroughs and municipalities. The state tax rate on pollock has been 1% in the past, but will increase to 3% in 1992. This will significantly increase revenues to both state and local governments to help pay for necessary infrastructure improvements to cover the cost of impacts to emergency medical services, police, etc.

1992 Fisheries Business Tax Revenue Projections

The projected total fisheries business taxes for 1992 Unalaska and Akutan, the communities currently receiving fish taxes from pollock, and the historic fisheries taxes, are shown in Table 9. The underlying assumptions are a 35% inshore allocation, a 3% tax rate on ex-vessel value, and an average price of $303/mt. Inshore pollock processors are clearly contributing major sums that support the affected region, and their contributions will increase significantly this year. This major revenue source is at risk.

Table 9

1992 Alaska Fisheries Business Tax Revenue Projections

(from Pollock only)

Tax Projections	1992	1991
Dutch Harbor/Unalaska		
Est. 75% of inshore landings, mt	300,359	257,428
State Fish Taxes	$2,909,128	$446,259
Municipal Share	$1,454,564	$223,130
Local Fish Tax - 2%	$2,068,713	$297,506
Total Municipal Share	$3,523,277	$520,636
Akutan		
Est. 25% of inshore landings, mt	100,120	85,809
State Fish Taxes	$969,709	$134,778
Boro/Muni Share (50/50)	$484,855	$67,389
Local Fish Tax - 1%	$258,589	$89,852
Total Municipal Share	$743,444	$157,241

Table 10. Revenue Sources and Expenditures for Bering Sea Communities

** Local taxes included real and personal property taxes, sales tax, and license.*

REVENUES AND EXPENDITURES

Community	FY	Population	Total Local Inshore Revenues	Total Local Offshore Revenues	State Fish Tax	Total Revenues	Total Public Safety	Total Public Services	Total Operating Expenditures
AKUTAN	1985	189	$56,195	$0	$120,656	$521,977	$14,751	$168,806	$515,839
	1986	189	$96,810	$0	$357,135	$727,131	$12,706	$186,327	$490,758
	1987	274	$140,940	$0	$424,641	$773,982	$11,531	$183,348	$619,816
	1988	274	$193,214	$0	$408,432	$806,101	$16,579	$241,563	$664,303
	1989	432	$217,308	$0	$509,089	$952,383	$25,260	$413,735	$856,932
	1990	432	$159,697	$0	$364,630	$852,228	$17,179	$310,922	$726,790
SAINT GEORGE	1985	172	$0	$0	$1,154	$1,430,127	$7,481	$1,156,806	$1,794,867
	1986	190	$0	$0	$1,363	$1,976,200	$1,414	$751,358	$1,367,239
	1987	216	$0	$0	$84,472	$852,643	$18,000	$292,443	$924,228
	1988	216	$0	$0	$0	$955,716	$18,000	$315,310	$1,317,480
	1989	188	$0	$0	$0	$881,298	$2,434	$346,361	$1,061,936
	1990	188	$0	$0	$739	$2,902,078	$2,279	$921,161	$2,853,014
SAINT PAUL	1985	595	$0	$0	$0	$3,231,957	$0	$3,347,667	$4,357,942
	1986	595	$0	$0	$1,705	$3,467,403	$283,016	$3,535,721	$4,357,942
	1987	466	$0	$0	$27,982	$2,203,609	$118,837	$2,315,214	$4,999,113
	1988	600	$66,546	$0	$0	$3,955,279	$153,711	$2,350,627	$4,145,192
	1989	586	$135,135	$0	$0	$2,898,368	$209,461	$2,726,441	$3,826,323
	1990	586	$250,802	$0	$169,877	$4,929,251	$249,345	$3,515,221	$4,123,468
UNALASKA	1985	1,922			$286,922	$7,865,085	$741,012	$5,054,183	$7,138,340
	1986	1,922	$1,480,862	$953,709	$223,510	$9,678,341	$838,550	$5,767,537	$9,813,345
	1987	1,331 †	$2,151,281	$1,264,832	$538,147	$8,907,187	$833,452	$6,475,171	$8,532,670
	1988	1,908	$2,957,473	$1,799,427	$664,687	$10,850,559	$1,046,788	$7,316,739	$9,671,302
	1989	2,265	$4,831,005	$3,540,056	$1,122,983	$15,914,131	$1,290,766	$7,368,175	$10,435,257
	1990	2,265	$6,664,393	$4,593,551	$1,109,909	$20,938,503	$1,264,231	$9,392,409	$13,199,945

+ Different census method used. Population was probably 1,900.

In addition to the loss of fish taxes, other revenue losses would occur through sales tax and enterprise fund revenue reductions. It is likely that property taxes would also decline as property values fall in the face of a collapsing economy. Table 10 identifies sources of revenue for a few of the affected communities. As used in the table, local taxes include property and sales taxes. Enterprise funds are separate accounts used to finance and pay the costs of utilities and chargeable services that may be operated by various municipalities. Extraordinary revenues for capital construction and other one-time sources have been deducted.

The Pribilof communities are particularly dependent on this allocation decision. Their only potential long term source of revenues is inshore processing. Very little ongoing state support is received, and the federal trust funds set up to finance the transition from federal government managed fur sealing to a private economy are essentially depleted. Until 1990 the trust funds were virtually the only sources of revenue for the municipalities. Both communities revenue and expenditure figures are distorted by trust fund and construction money that cycle through the city budgets. These funds are of course not sustainable. In the long run, these communities have staked their futures on the seafood industry.

Both Pribilof communities are severely constrained in their options by the size of their harbors, and few factory trawlers can use the ports. St. George's harbor is too small to accommodate offshore processing vessels, and there are relatively few mothership based offshore harvesting vessels that could potentially use the harbor. The city has incurred the second highest per capita debt load in the state (outside the North Slope Borough) in order to finish the harbor and other infrastructure. Without inshore processing, the community faces bankruptcy. St. Paul currently receives the vast majority of its long term revenues from the inshore fleet as well. While the harbor is large enough to accommodate small factory trawlers, to date very few have made port calls. Given the Pribilof's location, pollock would logically be one of the primary species processed.

Akutan receives nearly all its revenues from the inshore sector. Forty-three percent of the total revenues to the Aleutians East Borough are generated by Akutan and its inshore processors. Impacts to Akutan would cause serious disruptions to the borough and its numerous, small communities on both sides of the Alaska Peninsula.

Table 11 shows the amount of revenue generated by each component through 1990 for Unalaska/Dutch Harbor. The inshore sector directly contributed about 50% of the enterprise revenues, and about 60% of total property and sales taxes. A significantly smaller portion of these revenues come from the offshore sector. Other sources could not be allocated. Since 1990 fisheries taxes generated by the inshore revenue sector have increased significantly as seen in Table 9.

During the past several years, Unalaska/Dutch Harbor has become increasingly reliant on revenues generated from the groundfish industry and the inshore sector in particular. It is important to note that the increase in revenues generated by the inshore component has occurred at the same time that state revenue sharing programs with municipalities was declining. More than ever before, Unalaska/Dutch Harbor is dependent upon the inshore sector.

Table 11

Revenues Generated by Inshore & Offshore Components to Unalaska/Dutch Harbor

Unalaska	Inshore Revenue	%	Offshore Revenue	%	Other Revenue	%	Total Revenue
1986	$1,704,372	18%	$953,709	10%	$7,020,260	73%	$9,678,341
1987	$2,689,428	30%	$1,264,832	14%	$4,952,927	56%	$8,907,187
1988	$3,622,160	33%	$1,799,427	17%	$5,428,973	50%	$10,850,559
1989	$5,953,988	37%	$3,540,056	22%	$6,420,087	40%	$15,914,131
1990	$7,774,302	37%	$4,593,551	22%	$8,570,650	41%	$20,938,503

Chapter 4
Conclusions

National benefits as measured in the cost/benefit analysis in the SEIS focus on company level effects, and in our opinion are of little value in analyzing the effects of allocating a common property resource. The Council and the Secretary must take into account a much broader range of costs and benefits to the nation than were captured in that analysis. The vast majority of those benefits favor an inshore allocation, in our opinion.

COMMUNITY STABILITY IS A NATIONAL BENEFIT

Managing the nation's fisheries to encourage economic stability in adjacent coastal communities is identified in the MFCMA as a national goal. There is no question that Alaskan coastal communities are far more dependent on these fish supplies than other communities that would be impacted by this action. Communities immediately adjacent to the resource are clearly in mortal danger if no allocation is made. It is the state's strong belief that the offshore fleet, if allowed to operate unbridled, threatens to completely eliminate all major shorebased pollock processing in the Bering Sea/Aleutian Island area.

Seafood processing is five times as important to the Aleutians as aircraft manufacturing is to the greater Seattle area (King and Snohomish Counties). If Seattle were as dependent on seafood processing as the Aleutians, nearly 555,500 people would be directly employed; *this is equivalent to five times the aircraft industry's total Washington State employment!* By comparison, even if all of the offshore component's employees lived in the greater Seattle area, which they don't, they would still represent less than 0.3% of total direct employment.[12]

The indirect and induced output to the state's economy per ton of fish harvested is nearly three times as great for inshore processed product.

GENERATING REVENUE IS A NATIONAL BENEFIT

The inshore sector pays significant taxes on fish harvested. They pay raw fish taxes to the state, city and borough, as well as sales tax, property tax and a state corporate income tax. These revenues support services and infrastructure used and relied upon by the entire industry, whether inshore or offshore. The state has no taxing jurisdiction in federal waters, and is therefore unable to impose an equitable tax load on all users.

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[12]Figures are from "Economic Impacts of the US North Pacific Factory Trawler Fleet", A. T. Kearney, June 1991, and Washington Dept. of Labor figures as reported by Jeff Hadland, Research and Analysis Section, Alaska Dept. of Labor, personal communication.

Most of the offshore fleet is homeported in Washington State. Since Washington State generally does not tax product landed in processed form, and there is no federal fee for fish caught in the EEZ, the offshore fleet pays virtually no taxes anywhere on the fish that they harvest.

Preemption and significant reductions in inshore landings would seriously damage the revenue base of the local communities and affect the ability of the state to compensate for those costs. Unfortunately, preemption would not lessen the impact of the offshore fleet on the coastal communities.

It is clearly in the national interest that the public be compensated for the impacts of economic activity. This is particularly true when a public resource is extracted for private gain. Only the state of Alaska and the Alaskan coastal communities are even attempting to extract some compensation from the harvest of this public resource. Efforts at the Federal level have not even recovered management costs.

FULL UTILIZATION OF THE RESOURCE IS A NATIONAL BENEFIT

The nation has an over-riding interest in seeing that public resources are properly utilized. This includes full utilization of harvested resources, including the recovery of processing wastes and the elimination of discard waste. The cost/benefit analysis failed to adequately address this issue. The state believes that waste imposes a cost on the public, and that this cost cannot be justified as mere economic efficiency.

The offshore fleet continues to dump huge volumes of dead fish and processing waste overboard, much of it in relatively concentrated areas north of Unimak Pass. According to the SEIS, the offshore fleet discarded 94,822 mt of pollock during the directed pollock fishery during 1991. The use of metric tons often disguises the true level of discards. Viewed as pounds instead of metric tons, 1991 pollock discards were 245,400,640 pounds. *This is equivalent to approximately six times the entire commercial harvest of salmon in Washington State, or the entire combined commercial harvest of herring, halibut and shellfish in Alaska in 1990.* The "economic discards" alone were worth an estimated $35 million in 1991. This is a direct cost to the nation.

The shorebased processors are subject to routine inspections by DEC and EPA. The offshore processors face no enforcement since they can only be inspected when they come to port to off load and resupply; of course, since they are not actively processing at that time, there is nothing to inspect. Due to the difficulty of monitoring the offshore component, reliable information on compliance is not available. DEC has estimated, however, that less than 2% of general permit violations by these vessels are discovered.[13]

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[13]"Bottomfish Seafood Processors in the Vicinity of Dutch Harbor and the Bering Sea", Alaska Department of Environmental Conservation, July, 1992.

The SEIS discusses marine pollution only in the context of shore plants. Those facilities are now processing nearly all wastes to meal and oil. A limited number of offshore processors have fish meal processing equipment. Those that do not have meal plants discharge their groundfish processing waste and discards untreated beyond grinding and screening to 0.5". The recoverable meal and oil wasted totals nearly 100,000 mt.

CONCLUSION

The public interest is not served by allowing a relatively unregulated fleet to prosper while the shore plants are preempted from access to a reasonable amount of fish. While relatively unregulated operations may be more "economically efficient" based on certain narrow grounds, the consequences are clearly not in the national interest.

The purpose of the Magnuson Act is to protect the nation's seafood resources and to return ecological, social, and economic benefits to its citizens. The Magnuson Act specifically speaks to the issue of stability for dependent coastal communities. The Council and Secretary must not allow narrowly defined economic efficiency to be the primary measure of national benefit.