DRAFT

Summary of the
Comprehensive Planning Committee Meeting
April 19-20, 1993
Anchorage, AK

The Comprehensive Planning Committee for the North Pacific Fishery Management Council met on Monday and Tuesday, April 19-20, 1993 at the Hilton Hotel in downtown Anchorage. Members in attendance were:

Robert Alverson (Chair)	Ronald Hegge	Steve Pennoyer
Linda Behnken	Richard Lauber	Wally Pereyra
Oscar Dyson	Al Millikan	Clem Tillion
Robert Mace	Henry Mitchell	Capt. Bill Anderson

The meeting was called to order by Chairman Bob Alverson, and an overview of the meeting agenda was presented by Clarence Pautzke. The Committee then received a staff report outlining the Comprehensive Planning process.

Staff Report

The Committee was presented with a report from staff which outlined the proposed methods and models for the comprehensive planning process. The comprehensive planning analysis proposal was broken into four cases: case 1 is the historical fishery, case 2 is the baseline fishery (this may be an abstract of the fishery and not what the fishery actually looked like in 1992), case 3 is a snapshot of the fishery after implementation of the alternatives, and case 4 is the downstream effects of the management alternatives after implementation.

A description of analytical approaches and methodologies was then presented to study each of the four cases. Development of a comprehensive data base and a representative fleet profile will provide a majority of the data to be used in the analysis. This data will feed into an assessment of the costs and benefits for each alternative. Costs and benefits were proposed to be studied under a scenario and a simulation/LP approach. Outputs from the cost/benefit analysis would be inputs to the community economic assessment models. The community impact models were proposed to be a fishery economic assessment model and economic base models. Income and employment information generated from the community economic impact models, along with secondary data from community profiles, would provide information for the social impact analysis. The possibility of conducting meetings with industry groups to gather and disseminate information was also discussed.

Public Testimony

The Committee then took public testimony, with the intent of receiving input on the major management alternatives and allocation scenarios. License limitation and IFQs were the main management alternatives discussed, with much of the focus on specific issues within the major alternatives. Public testimony on allocation issues covered a broad range of subjects including who should be allowed to receive quota shares and what criteria should be used to determine the distribution of quota shares based on historical participation in the fishery.

Committee Action

The Committee then began discussions based on staff reports, public testimony, and a draft discussion document to provide staff direction in developing a qualitative paper on comprehensive planning alternatives being considered by the Committee.

Under the various broad management headings the Committee provided the following direction:

1. License Limitation - The Committee thought that a compilation and summary of the work already done for license limitation would suffice for the June meeting.

2. All Species (Target and PSC) IFQs - A IFQ system with both target species and PSCs was discussed by the Committee, including the following specific issues:

   - Will all species under Council jurisdiction be included?
   - Should IFQs be allocated as targets with a suite of all needed by-catch species or on their own?
   - Should the sale of quota shares include a target species with all needed by-batch to prosecute that fishery?
   - How should PSC species be packaged with target species?
   - How should under-utilized species be allocated?
   - Should CDQs be included and if so what groups should be eligible and how much should they by allocated?
   - Will there be a use it or loose it clause attached to quota shares issued?
   - How should species complexes be allocated?

3. Target IFQs, or PSC IFQs - A target or PSC IFQ system alone would require a separate analysis from that from that for "All Species" because fishers would react differently under each of the IFQ systems. However, much of general discussion for "All Species" IFQs would apply to either target of PSC species only (i.e. the target species in a "All Species" IFQ system could be the same as those in a target species only IFQ system).

Recommendations

The committee stressed that if industry groups were consulted, regarding fleet profile information or how they might react if they were given various allocations, the Council should be provided both the initial staff estimates and the changes made by industry to allow comparisons.

Generally the Committee felt that:

1. Staff analytical resources should be focused primarily on the "All Species" alternative, with less quantitative analyses applied to the license limitation, PSC only IFQ, and target species only alternatives.

2. Staff should evaluate current CDQ fisheries for indications of changes in fishing operations.

3. Variables in the models which are "sensitive" should be identified.

4. All species under Council jurisdiction should be included in the IFQ program.

5. Species assemblages may be allocated based on an individual's historical catch of each species within the assemblage or by allocating a fixed percentage of each species based on the fisher's historical ~~landings~~ PARTICIPATION of all species in the complex. For example, a person's total rockfish landings, for the qualifying period, would be summed and then divided by the rockfish quota share pool (i.e. 0.01 percent of all rockfish). That fisher would then receive 0.01 percent of all rockfish species and assemblages currently managed by the Council.

6. Target species should be allocated in a package that includes the by-catch species needed to prosecute the fishery. The allocation could be made using rates based on fleet averages or a person's historical catch.

7. PSC species could be allocated based on a two tier system. First, a percentage of the total PSC would be allocated to a group based on, for example, a three year average of their PSC usage (i.e. trawl, longline, pots, etc.). Secondly, that group's portion of the PSC total would then be divided among the members of that group.

8. The sale of a target species would also include the by-catch species needed to fish the target.

9. A pro-rated system should be used to allocate under-utilized species, such as arrowtooth and the "Other Species" group.

10. A license limitation program would have different licenses for groundfish, crab, and scallops. A crossover license, which could be used in more than one of the specific fisheries listed would also be included in the program.

RL - re. States & 6 SP, Re all the ~~CDQ~~ things need to be considered, i.e., enforcement. Probs enc. in CDQ fisheries. Things need to start thinking about that.

DRAFT AGENDA
COMPREHENSIVE PLANNING COMMITTEE (April 19-20, 1993)

I. Call to order and overview (refer to action memo C-6)

- A. Progress and decision through January 1993 meeting
- B. Activities since January
- C. Anticipated activities in May and June
- D. Schedule through 1994

II. Overview of Comprehensive Planning Analysis (refer to attachment C-6(c))

- A. Case 1 - Historical Fishery
- B. Case 2 - Baseline Fishery
- C. Case 3 - Snapshot after Implementation of Alternatives
- D. Case 4 - Downstream Effects of Alternatives

III. Description of Analytical Approaches and Methodologies (C-6(c) cont'd)

- A. Comprehensive Data Base
- B. Representative Vessel and Processor Profiles
- C. Assessment of Costs/Benefits
  - 1. Scenario Approach
  - 2. Simulation Approach
- D. Community Economic Impact Models
  - 1. Fishery Economic Assessment Model (FEAM input/output model)
  - 2. Economic Base Models
- E. Social Impacts
- F. Consideration of Elements and Options

IV. Public Comment Period

V. Discussion of Elements and Options (refer to attachment C-6(d))

VI. Direction to staff

VII. Next meeting of Committee

AGENDA C-6
April 1993

MEMORANDUM

TO: Comprehensive Planning Committee, Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: April 12, 1993

SUBJECT: Comprehensive Planning

Progress through January 1993

At the first Comprehensive Planning meeting, November 12-13, 1992, we reviewed broad management options which included a paper by Dr. Harding and other staff as well as presentations from Drs. Lee Anderson and Dan Huppert on the applicability of ITQs to North Pacific fisheries. The Council developed a problem statement for the comprehensive planning process and provided this for public review along with the list of major alternatives under consideration. The Council also requested staff to develop a comprehensive (aggregated) data base to be made available to industry for purposes of reviewing historical fisheries activities.

On January 17 the Committee reviewed the major alternatives carried over from the inshore/offshore decision and, after receiving additional industry testimony, narrowed the list to two alternatives plus the status quo: ITQs and License Limitation. The Council reiterated its request for the comprehensive data base to be made available to industry to facilitate development of specific elements and options, such as initial allocation criteria, within the major alternatives. Item C-6(a) summarizes the January 17 Committee meeting. Attached to that summary is the draft problem statement.

Activities since January

Data: An aggregated data set for groundfish was provided for industry through the Council staff and the NMFS Bulletin Board. This was made available February 11 and contains fisheries landings data aggregated by species, processing mode, gear type, management area, and industry sector, separately for the GOA and BSAI. A separate handout is available at this meeting which summarizes this data. Data on the crab fisheries is still being developed and should be available within the next few weeks.

Agency Work Teams: An interagency data Committee has been established and has met twice since January to iron out development of the detailed Comprehensive Data Base (including individual catch histories) which will be used in the analysis. The NMFS Region is taking the lead on development of this data set, which also will be used in implementing of the sablefish/halibut IFQ program and the moratorium. At this point, that data set is being developed back to 1980, the beginning period of the moratorium. If data are necessary for groundfish and crab activities prior to 1980, these will be developed concurrently by Council staff. We will provide a more detailed report on the Comprehensive Data Base later today.

Council staff has been working with another agency team composed of SSC members and other agency staff, primarily economists, to coordinate development of the specific analytical tools to be used in the

analysis. This group also has met twice since January and has been very beneficial in developing the overall work plan we will be presenting in detail at this meeting. We anticipate formation of a third team composed of members with sociological expertise to advise us in development of the social impact analysis.

Development of Analytical Tools: Since January we have been refining the input/output models developed by Jensen and Radtke. As a correlary to these models, we have began developing economic base models, in conjunction with the University of Alaska's Institute for Social and Economic Research (ISER), which will form a fundamental part of this analysis in terms of measuring economic impacts at the community level. Finally, we are investigating the development of a linear programming (LP) model as a primary tool in measuring the downstream effects of limited entry in our cost/benefit analysis. This will be an ambitious undertaking in itself, though preliminary discussions with our economic subgroup indicate it is an area we want to pursue. An alternative 'scenario' approach will also be pursued. Later we will present detailed reports on the specific analytical approaches and methodologies we will be employing in this analysis.

We have laid groundwork for development of the vessel/fleet profiles necessary for the analysis at hand, though work on putting the initial profiles together is just beginning. This is an area where we will likely be seeking industry interaction with the analytical team.

Community Profiles: As part of the analysis of potential community impacts, we are compiling community profiles for 127 Alaskan coastal communities and about 8 Pacific Northwest communites. Under our supervision, this work is being contracted to Krys Holmes (Winterholm Press) who put together the True North newsletters which were so well received by the industry. These will be brief, concise profiles (2-5 pages) with an emphasis on fishing activities in each community. Much work has been accomplished on these profiles, but much of the very detailed fisheries data still have to be filled in when we get the appropriate data bases more developed. We expect these profiles to be very useful, not only in this analysis, but as general, up to date reference documents for the industry. We will be going into detail later today on this part of the analysis as well, including how we intend to use these profiles.

Anticipated Activities in May and June

Major tasks scheduled for the May-June period include:

* Develop qualitative analysis of elements and options - interaction between staff and industry will be beneficial during May for this project. We will provide detail on this later today.

* Completion of community profiles - this is the first step of the overall social impact analysis; these profiles will also contain information to parameterize the economic base models.

* Initial development of vessel/fleet profiles - again, we will want industry to act as a sounding board at some point on these initial profiles. However, we may not have them developed enough until after the June meeting for that interaction.

* Continue on model development and comprehensive data base - development of the models may involve contract work to ISER or other entities. We will be discussing this in more detail later today and can address the contracting issue at that time as well.

Schedule through 1994

A schedule of timelines for the comprehensive planning process is included as Item C-6(b). We have also attempted to capture this in graphic form. The terminology will make more sense after we have gone through the staff presentation to follow, which covers the overall work plan in detail.

Item C-6(c) is a detailed description of the scope and the methodologies we intend to use for the analyses of the alternatives. Though some of the specific analytical tools and models will evolve throughout the course of this project, we want the Council, industry, and public to be aware early on of the approach we are taking in this analysis. For example, we will specifically discuss how the analysis will answer requirements of E.O. 12291 (cost/benefit estimation) and how we are approaching the assessment of potential social impacts.

I think that the most important task we are facing is putting the flesh on the bones of the ITQ and license alternatives. This will start at this meeting after public comment and likely continue all the way through your final decision next year. If the process at all resembles how we handled major policy decisions such as inshore/offshore and sablefish/halbut IFQs, we will go through an iterative process of adding elements and options, refining and deleting, adding, and so on, until we have a range of viable alternatives for the public to review next spring.

Much of this can be industry-driven. I found the April 14, 1993 letter from the combined industry groups very helpful in this regard, not only for suggesting elements agreed to by all, but also for identifying areas of disagreement. Other industry comments were very useful as well and I hope that our staff can be part of the industry's dialog in the future to give us a better indication of the directions in which we might be headed.

We will focus on elements and options later in this meeting after public comment. Item C-6(d) is a first cut at laying out the issues and is intended to generate discussion of the potential elements and options. Item C-6(e) has written comments received from industry since our last Committee meeting.

DRAFT

Summary of the Comprehensive Planning Committee Meeting January 17, 1993 Anchorage, AK

The Comprehensive Planning Committee for the North Pacific Fishery Management Council met on Sunday, January 17, 1993 at the Hilton Hotel in downtown Anchorage. Members in attendance were:

Robert Alverson (Chair)	Ronald Hegge	Ron Berg
Linda Behnken	Richard Lauber	Wally Pereyra
Oscar Dyson	Al Millikan	Clem Tillion
Robert Mace	Henry Mitchell	Capt. Bill Anderson

The meeting was called to order by Chairman Bob Alverson, and an overview of the meeting agenda was presented by Clarence Pautzke. The Committee then received a staff report outlining the Comprehensive Planning process.

Staff Report

The Committee was presented with a report from staff which outlined an overall approach for the comprehensive planning process consisting of two major parts: (1) deciding on the major alternatives for comprehensive rationalization of the fisheries and initiating the analysis after the January meeting, and, (2) based on preliminary analyses, Committee interaction over the next few months, and industry input, developing the specific elements and options within the major alternatives.

To facilitate the Committee's primary decision at this meeting, the major alternatives for in-depth analysis, staff presented a comparison of the alternatives to the 14 problems stated in the Committee's Problem Statement which was developed at their November 1992 meeting. Each alternative was evaluated as to its ability to alleviate each of the 14 stated problems. The Committee, as well as the public in attendance and the Council's Advisory Panel, were invited to make the same comparisons as staff. These comparisons have been tabulated and the overall results were quite consistent with those presented by staff.

The second half of the staff report dealt primarily with data and analytical approaches, and a process for developing the specific elements and options, such as allocation criteria. This part of the report was held in abeyance until the Committee reached a decision on the primary alternatives for analysis.

Public Testimony

The Committee then received public testimony, with the intent of reaching a decision on the major alternatives prior to proceeding to the next phase of the comprehensive planning process. Much of the industry testimony was focused on the issue of data availability, particularly relative to the development of the specific elements and options within the IFQ alternative. The theme of the comments was that a comprehensive data base, as requested in November, be developed and made available to industry and the Committee prior to any decisions on the specific sub-alternatives to be included in the analysis. Other comments were directly related to the issue of the major alternatives to be analyzed, such as whether license limitation should be included as alternative and whether IFQs were a viable alternative to address all of the problems identified.

Committee Action

The Committee then began discussions based on the staff reports and on public testimony. One concern expressed by the Committee, relative to the entire comprehensive planning process, was that the 'ground rules' for the process by clearly defined before we get too far down the road. For example, the legal parameters surrounding allocation of fishing rights needs to be clarified and the criteria by which the Secretary of Commerce will review a Council recommendation need to be known in advance of Council action.

The Committee then unanimously approved a motion that staff proceed with development of three major alternatives in the analysis:

1. Status Quo - this alternative is defined as the regulatory management regime currently in existence. Various traditional management tools would not be extensively analyzed in a quantitative manner. The Committee acknowledged that such management tools could be developed and implemented in a relatively short time if an impasse is reached on the limited entry alternatives in 1994.

2. License Limitation - for both groundfish and crab.

3. IFQs - this would include consideration of IFQs for target, bycatch and PSC species, and would include options for transferability vs. non-transferability. Auctions are deleted as an option for allocation.

Any of the major alternatives above may include consideration of Community Development Quotas (CDQs).

The Committee also unanimously approved a motion that staff provide to industry and the Committee the following data base (for all years back to 1976 and through 1992, for all species, for all management areas for which keypunched data exist):

1. Total ABCs, TACs and catch
2. Catch broken down by JVP/DAP
3. DAP catch further broken down by the categories of catcher, catcher/processor, shoreside delivery, mothership.
4. By major gear type.
5. By vessel size categories as practicable.
6. In terms of retained catch.
7. The Committee also requested economic data on different contributions of JV and DAP sectors and of foregone catches when JV catcher vessels shifted to DAP deliveries even under limited market opportunities.

Staff advised that such a data base aggregation could be provided in a relatively short time, and would likely differ only slightly from the final data base developed which will be based on examination of individual vessel records.

The Committee took no further specific actions, but stressed the necessity of making the requested data base available so that the Committee and industry, in coordination with the staff, can begin development of the specific elements and options for consideration within the major alternatives identified by the Committee.

Draft Problem Statement

Expansion of the domestic fleet harvesting fish within the EEZ off Alaska, in excess of that needed to harvest the optimum yield efficiently, has made compliance with the Magnuson Act's National Standards and achievement of the Council's comprehensive goals, adopted December 7, 1984, more difficult under current management regimes. In striving to achieve its comprehensive goals, the Council is committed to: (1) assure the long-term health and productivity of fish stocks and other living marine resources of the North Pacific and Bering Sea ecosystem, (2) support the stability, economic well-being, and diversity of the seafood industry, and provide for the economic and social needs of the communities dependent upon that industry, (3) efficiently manage the resources within its jurisdiction to reduce bycatch, minimize waste, and improve utilization of fish resources in order to provide the maximum benefit to present and future generations of fishermen, associated fishing industry sectors, communities, consumers, and the nation as a whole.

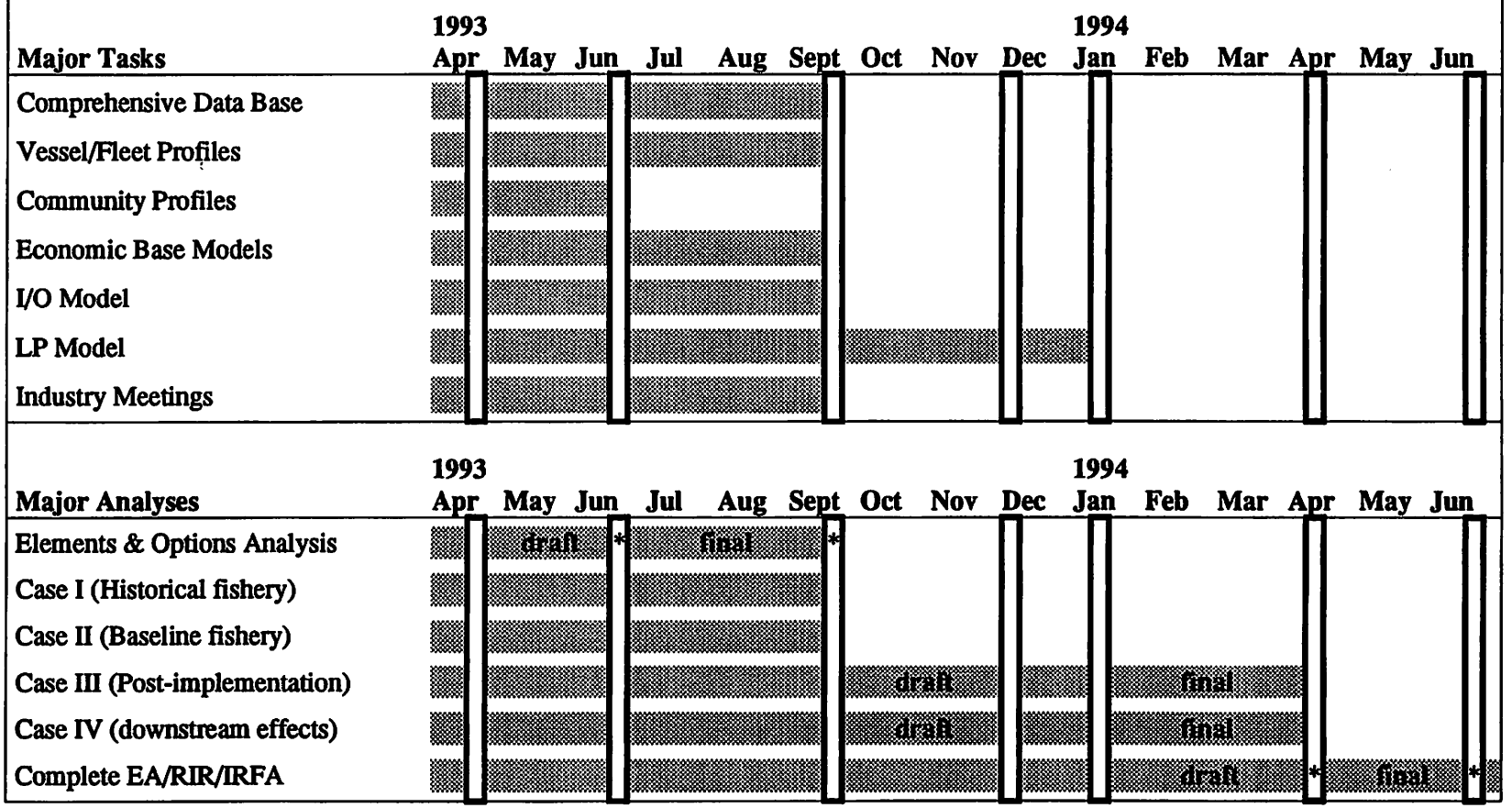
The Council's overriding concern is to maintain the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. In addition, the Council must address the competing and oftentimes conflicting needs of the domestic fisheries that have developed rapidly under open access, fisheries which have become overcapitalized and mismatched to the finite fisheries resources available. Symptomatic of the intense pressures within the overcapitalized groundfish and crab fisheries under Council jurisdiction off Alaska are the following problems:

- Harvesting capacity in excess of that required to harvest the available resource;
- Allocation and preemption conflicts between and within industry sectors, such as with inshore and offshore components;
- Preemption conflicts between gear types;
- Gear conflicts within fisheries where there is overcrowding of fishing gear due to excessive participation and surplus fishing effort on limited grounds;
- Dead-loss such as with ghost fishing by lost or discarded gear;
- Bycatch loss of groundfish, crab, herring, salmon, and other non-target species, including bycatch which is not landed for regulatory reasons;
- Economic loss and waste associated with discard mortality of target species harvested but not retained for economic reasons;
- Concerns regarding vessel and crew safety which are often compromised in the race for fish;
- Economic instability within various sectors of the fishing industry, and in fishing communities caused by short and unpredictable fishing seasons, or preemption which denies access to fisheries resources;
- Inability to provide for a long-term, stable fisheries-based economy in small economically disadvantaged adjacent coastal communities;
- Reduction in ability to provide a quality product to consumers at a competitive price, and thus maintain the competitiveness of seafood products from the EEZ off Alaska on the world market.
- Possible impacts on marine mammals and seabirds, and marine habitat.
- Inability to achieve long-term sustainable economic benefits to the nation.
- A complex enforcement regimen for fishermen and management alike which inhibits the achievement of the Council's comprehensive goals.

SCHEDULE AND TIMELINES FOR PROJECT

Feb-March 1993	(1) Compile initial data base to make available to industry and Council. (2) finalize species assignments and any other lingering questions regarding the comprehensive data base - these may be policy calls. (3) Finalize decision on methodologies, models, or other tools to be used in the assessment of net benefits and social impacts. (4) Begin compiling information for social impact section.
March-April 1993	(1) Begin assembly of comprehensive data base. (2) Begin putting together the Environmental Assessment section. (3) Continue development of baseline community profiles. (4) Begin compilation of costs and revenues of representative fleet. (5) Progress report to CPC and Council at April meeting.
May-June 1993	(1) Continue assembly of comprehensive data base. (2) Completion of baseline community profiles and representative community 'types'. (3) Develop initial analysis (Qualitative analysis) of broad IFQ options such as transferability, CDQs, target species, etc. (4) Industry meetings regarding data, fleet profiles, and possible sub-options for further analysis.
June 1993	(1) Progress report to CPC/Council. (2) CPC/Council determine primary (initial) sub-alternatives for study; this should include alternatives for allocation criteria.
July-Sept 1993	(1) Completion of comprehensive data base. (2) Completion of modelling approaches or other analytical tools. (3) Complete vessel/fleet profiles. (4) Finalize Qualitative analysis of sub-alternative (elements and options). (5) Complete community profile information for those communites/types selected for in-depth analysis.
Sept 1993	(1) Progess Report to CPC/Council at September meeting. (2) Identification of final sub-alternatives for inclusion in detailed analysis.
Oct-Dec 1993	(1) Complete economic analysis (Phases 1 through 4) including any assessments of downstream effects. (2) Complete social impact assessment, including any downstream effects. (3) Complete EA section. (4) Include any new alternatives from September Council meeting. (5) Progress report to CPC/Council at December meeting.
January 1994	(1) Draft analysis for Council review. (2) Refinement of sub-alternatives for additional analysis, or, additional instructions on analysis to date.
Feb-March 1994	Complete analysis based on additions or suggestions from January meeting.
April 1994	Council review of analysis and send to public review
June 1994	Council final decision on CRP.

TIMELINES FOR COMPREHENSIVE PLANNING PROCESS



▯ - Denotes a Council Meeting

* - Denotes a Council Decision Point

II. OVERVIEW OF COMPREHENSIVE PLANNING ANALYSIS

The analysis of the proposed alternatives will be structured around four periods. For each period, or case, the analysis will examine the distribution of catch, the representative fleet and its costs and revenues, estimates or forecasts of the net national benefits of the fishery, and estimates or forecasts of the economic impacts at the community level. Additionally, we may be able to provide informed forecasts of other social impacts at the community level.

CASE 1 - Historical Fishery (1976-1992)

Case 1 is the historical distribution of catch and benefits of fishing activities. Vessel and fleet profiles will be developed from available information for this period (1976-1992). Baseline community profiles also will be developed. This section is primarily descriptive in nature and will include information on:

1) Harvest and processing activities from 1976 through 1992, aggregated by fishery and community.

2) Vessel and processor operating characteristics including cost, CPUE, and revenue information. These underpin the representative vessel and processor profiles described in the next section.

CASE 2 - Baseline Fishery

Case 2 is a baseline derived from the Case 1 description of the historical fishery. This may or may not differ from 1992. Depending on our modeling choices, we may choose, as we did for the inshore/offshore assessment, to describe a baseline case which differs from the most recent year. For inshore/offshore the baseline case differed from 1991 in several ways: (1) PRRs were assumed to differ from those used by NMFS in managing the fishery, thereby changing the catch distribution. (2) The representative fleet used in the inshore-offshore analysis was clearly different from that employed in the 1991, e.g. the offshore sector was characterized as a single multi-purpose catcher/processor, and there were no motherships modeled. The use of a simulation/linear programming model may require aggregating several sectors of the industry: the prototype model envisioned would examine one type of onshore processors, two types of offshore processors, two types of catcher vessels, two species for the Bering Sea/Aleutian Islands. For comparison the baseline case would include similar simplifying assumptions.

CASE 3 - Immediate Post-implementation

Case 3 is the post-implementation case. We will assume in this case only the effects of the allocation of fishing rights, either by licenses or IFQs. We will not assume at this point any changes in operating cost, or changes in the structure of the fishing industry of the impacted communities.

CASE 4 - Downstream Post-implementation

Case 4 is the fishery at some point in the future. We plan to examine Case 4 in three phases. The first phase takes the post-implementation case and overlays assumptions regarding structural changes. These include changes in fishing operations, processing operations, and potential community structure changes which may result from fishers being able to choose when, where, and how they will fish. The second phase examined in Case 4 would look at impacts of the potential fleet aggregation. In the third phase we look at the industry in the future. This could include estimates of the optimal fleet, as well as some projections of how the optimal fleet might differ from reality.

III. DESCRIPTION OF ANALYTICAL APPROACHES AND METHODOLOGIES

This section describes the analytical approaches and methodologies the staff proposes to use to assess the impacts of the different alternatives. The development of the comprehensive database (CDB) and the representative processor and vessel profiles will provide information to document the historical perspective (Case 1) and to establish a baseline (Case 2) against which to compare the alternatives. Data from the CDB and from the fleet profiles will be used as inputs into models developed to assess the costs and benefits as well as other social and economic impacts of the fisheries. Impacts of the alternatives will be assessed under Case 3 and Case 4. Each of the methodologies described below will add pieces to the overall picture allowing the Council to make an informed decision on each of the alternative management regimes. We've divided this section into six parts:

A. Comprehensive Data Base

B. Representative Vessel and Processor Profiles

C. Assessment of Costs and Benefits
   1. The "Scenario" Approach
   2. Simulation Model

D. Community Economic Impact Models
   1. Fishery Economic Assessment Models (FEAM)
   2. Development of Economic Base Models

E. Social Impacts

F. Consideration of Elements and Options
   1. Outline of the Qualitative Analysis
   2. Use of the Qualitative Analysis

A. COMPREHENSIVE DATA BASE

Development of a Comprehensive Database (CDB) is underway. As currently envisioned, the CDB will contain information from State of Alaska, NMFS, and the U.S. Coast Guard. It is only through the enthusiastic cooperation of the different agencies that any progress has been made. The database will be assembled by NMFS in their Juneau offices in ORACLE®, a relational database software available for most hardware platforms. The CDB will meet the needs of the analysis, as well as serving as the official data set for the implementation of the moratorium and of halibut and sablefish IFQs. The CDB will also be available for other analyses undertaken by the Council, NMFS, and the State of Alaska. At this time, there are no provisions for use by non-agency personnel because of the confidential nature of much of the data. The State will provide information from fish ticket, permit, vessel, and processor files. NMFS Regional Office will provide information from weekly processor and permit files. NMFS NORPAC observer database will contribute catch and vessel information. Finally, the U.S.C.G. will provide vessel documentation and ownership information.

The development of such a large data base involving so many different agencies with data from so many sources is a monumental task. However, because NMFS will be using the CDB for its implementation of the moratorium and IFQ systems, much of its development should be completed by September of 1993. It is very unlikely, however, that complete error checking and debugging can be accomplished by then. None-the-less, for analytical purposes, a reasonable set of data for the analysis should be available by September. Although the CDB itself will contain information only back through 1980, additional data are available if the Council wishes to examine harvest back to 1976 as they originally intended. Finally, it should be noted that the CDB is envisioned as an ongoing data project. The CDB will be updated annually, and eventually we hope to have the information available to other users, including the industry and the public, ensuring of course that no confidential information is released.

B. REPRESENTATIVE VESSEL AND PROCESSOR PROFILES

The analysis of the economic impacts of policy action in fisheries is dependent on cost, revenue, and fishery performance data. Development of acceptable information for use in economic analysis is the primary objective of the "Representative Fleet Profiles" portion of the analysis. Under ideal conditions each participant (both fishers and processors) in the fishery would submit detailed cost, revenue, and performance data on a regular schedule (monthly, annually, etc). This would allow analysts to use the best analytical tools and data at their disposal. Regular and standardized performance data are available from many sources (observer data, fish tickets, weekly and annual processor reports). Unfortunately, cost and revenue data are not available from participants on a regular basis. For some participants we have data for a given year or for a given fishery (the OMB survey, and other surveys). Further, we have several sources of secondary data which generalize cost and revenues of specific fisheries for different types of vessels. Much of this secondary data is imbedded in models or analyses developed over the years by different groups with different objectives with differing levels of specificity. It is hoped that the "representative fleet profile" development will gather the existing information and use industry input for verification and validation. These profiles would then become part of the annual "Economic Status of Groundfish Off Alaska" report generated by NMFS/AFSC. This would allow the profiles to be used in a wide range of analyses undertaken not only by NMFS and the NPFMC, but also by agencies such as ADF&G, PFMC, various universities, and private consultants. If all analysts use an accepted, common dataset then study results become much easier to verify and validate.

We propose that an "engineered" approach be employed to develop representative profiles. This approach is outlined as follows:

I. Gather all known existing cost/revenue data into a single location. Sources include analyses of Pacific Cod allocation, exclusive registration, delay of the 'B' season, Inshore/Offshore, IFQs, PFMC analyses, ISER/UAA studies, UAF studies, WSU studies, and private consultants such as LGL, Gary Brown (AT Kearney), Jensen/Radtke, and Richardson/Birden.

II. Determine the appropriate set of activities and define different areas over which cost/revenue and performance data are expected to vary. Ideally activity areas should be unique descriptors which fit not only fishery performance data but also fall within existing regulatory areas (both state, federal, and international). For harvesters, activities will be based on target species. For processors, activities will be based on species and products (including joint products). For each activity we would determine an appropriate unit of time to capture variable costs. For some activities variable costs are defined by fishing trip. For others the appropriate time unit might be the fishing season (tendering for example). Another example might be pre-roe pollock in the 'A' season.

III. Define basic vessel/processor types. These should be defined along lines of potential activities and the capacity to undertake those activities. For example a vessel type might be defined as "wooden schooner." These boats range between 60 and 100 feet, were built in the early 1900's, are primarily fixed gear vessels but have some potential ability to use other gears. Another 60-100 foot vessel class would probably be called a "combination vessel." These, usually newer vessels, have the capability to use trawl gear, fixed gear, and would also have potential uses as tender vessels in salmon, herring, or other fisheries. Types should be determined on a potential activity basis and activities should include not only Federal fisheries in the North Pacific but also State fisheries and fisheries outside of the North Pacific region. Note that shorebased processors types will be defined as well.

A. For each vessel type estimate fixed costs.[1]

B. For each vessel type determine potential activities. These include activities not specifically managed by the NPFMC and NMFS.

IV. For each harvesting activity determine CPUE by fishing area by month (or other appropriate time unit). For trawling activities the haul-by- haul data should be used and CPUE should be measured in terms of target catch per hour. Thus a CPUE of 50 mt indicates that 50 mt of the target species is caught in an hour. Fixed gear CPUE should capture catch rate per gear unit per hour of soak time, where gear units are defined as hooks for longline and jig fishing and pots. Note that catch should be defined as legal size specimens. Thus CPUE for crab is continually increasing over soak time.

We would also determine bycatch of non-target species as a percent of target CPUE. Thus if CPUE of pollock bottom trawls in area X is 50 mt per hour, and the catch includes 10 mt of Pacific cod as well, then the Pacific cod bycatch rate would be 20% (10 mt/50 mt), and the total catch per hour would be 60 mt.

V. For each vessel class determine a catching power index. We suggest that catching power be specified as a percentage of the highest potential CPUE for each area. For example, in the case of trawling, CPUE is not only area and season specific, but perhaps also specific to the type of vessel used. We would assume *a priori* that combination vessels would have less catching power than vessels with more horsepower, surimi factory trawlers for example. If surimi factory trawlers demonstrate the highest CPUE for a given gear type then that class would have a catch power index of 1. If the combination vessel can catch at a rate of 60% of the surimi factory trawler, then it would have a catching power index of .6.

For each activity and time unit determine appropriate variable cost, revenues:

A. If cost, revenue, and performance vary by fishing area then this should be documented.

B. If there are portions of costs that are one time expenses per time unit, and other portions are more dependent on catch or CPUE for example, then these should be separated. An example of this might be groceries, fuel to run to grounds, transportation of crew, etc, as opposed to incremental costs of making another drag or setting an additional skate.

VI. For each processed product determine a range of product recovery rates at any given time. Triangle distributions for PRRs have been specified in the past and this may still be the most appropriate. If PRRs vary over time then this should be specified. Products should be defined such that bimodal distributions are eliminated. For example, surimi should probably be specified as two products--inshore surimi and offshore surimi.

VII. Build specific vessel profiles. There may be more than one vessel profile per vessel type. For example, longline fleets based in Homer may have decidedly different costs and activities than longline vessels based out of Chignik or Sand Point.

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[1]Note that for all parameter estimates we hope to have some variability information. The appropriate measure for variability will depend on the data and the type of measurement. In many cases our best estimate of variability will be defined by a triangle distribution (low, mode, high), in other cases we may have sufficient data to assume different distributions and estimate appropriate moments to describe that distribution.

C. ASSESSMENT OF COSTS AND BENEFITS

An assessment of the costs and benefits of proposed change in a fisheries management regimes is mandated by Executive Order 12291 as follows:

> This Executive Order applies to the issuance of new rules, the review of existing rules, and the development of legislative proposals concerning regulations. Its purpose is to reduce regulatory burden, increase agency accountability, provide presidential oversight, minimize duplication and conflict of regulations, and ensure well-reasoned regulations.
>
> Oversight. All rules must be reviewed by OMB.
>
> Requirements. In developing regulations, the Council must ensure that:
>
> 1. regulatory objectives and priorities are established with the aim of maximizing net benefits to the United States,taking into account the condition of particular industries, state and local governments, and consumers affected by the rule;
>
> 2. rules are developed with a cost/benefit approach when possible;
>
> 3. the chosen regulatory approach or alternative is the one with the least net cost to society, if practicable; and
>
> 4. regulatory action is not undertaken unless the potential benefits outweigh the potential costs to society.

Point 2 of E.O. 12291 suggests the use of a cost/benefit approach when possible. Change in the regulatory environment in fisheries of the North Pacific will create costs and benefits, not only to individuals and firms, but also to the local, regional, and national economies. Economists define a cost/benefit approach as the present value of the consumer surplus and producer surplus summed over the life of the program, for each alternative.

Fully specified, consumer and producer surplus will, theoretically at least, capture all effects of the proposed action, including non-market effects. However, full specification of all effects is rarely, if ever accomplished. Economic quantification of non-market effects is a relatively new field, and its use in practical applications has been problematic. Most often non-market effects are left to qualitative assessments, as will be the case in this analysis. Consumer surplus is traditionally defined as the difference between what consumers are willing to pay for a product or service and what they actually pay, as a result of the action. To estimate these changes quantitatively, economists need demand curves of the products involved and their substitutes. Unfortunately, demand curves for the fishery products coming from the North Pacific have not been specified. Although economists throughout the world are working on this problem, little progress has been made because of the international nature of the product markets, and the dynamic nature of the industry and the products themselves. Therefore, any consumer surplus will fall, like non-market effects, into the realm of qualitative assessment. Fortunately, measures of producer surplus are relatively easy to estimate. These are defined as the net changes in revenues, costs, and returns to operators which would accrue as a result of a management action. Additionally, any changes in the cost of administering and managing the fisheries due to the proposed action should be added into the cost/benefit equation.

Two separate but complementary approaches to measuring producer surplus are proposed to assess the effects of the alternatives. These are referred to here as the "scenario" approach and the "simulation" approach.

The SSC and the staff of the Council and NMFS have concluded that producer surplus resulting from the alternatives could be assessed through the use of a simulation model based on linear programming algorithms. They make this recommendation with several strong caveats including the uncertainty of its completion. The simulation model will use historical cost and revenue data as well as assumptions of the economists to predict changes in behavior of the harvesting and processing sectors as they respond to a new management regime.

The scenario approach acknowledges that harvesters and processors have their own ideas about how they will respond to a new management regime. If the projected responses of operators were systematically collected and categorized, perhaps by surveying the industry, analysts could estimate costs and benefits of the alternatives without the use of a complex model. Further, since the responses to alternatives would be derived from the industry rather than the assumptions by analysts built into a complicated model, this method would perhaps be more credible with the Council, the Secretary of Commerce, NMFS, the industry and the public.

1. The "Scenario" Approach

The Case 2 or baseline case for the scenario approach will be a compilation of cost and revenue data developed from the representative fleet profiles. This baseline would likely be specified in greater detail than the baseline used in the simulation model. The increased detail will be in the types of vessels and processors specified and the activities in which they are engaged, and would more closely resemble the fishery in the most recent year. Specification of vessels and processors type, and activities in the baseline case for the simulation model, will likely be more abstract and simplified in order to make the model tractable. In the scenario approach, calculation of the net benefits (Quasi-Rents) in Case 2 for the entire industry will entail adding up all costs and revenues for the representative fleet.

The post-implementation case is being called Case 3; a "snap-shot" of the fishery immediately after the allocation. In order to capture the effects of any redistribution of catches due strictly to allocation, the cost and revenues assessment in Case 3 assumes that fishers and processors have made no adjustment to the new management regime. In other words, they still fish and process the same species and products from the same areas, in the same manner, and at the same time as they did under open access. This of course is entirely unrealistic, but it allows decision makers to judge the effects of the allocation separately from the additional changes expected as the industry responds to the new regime.

For Case 3, the scenario approach will use the fishing rights allocations of the specific IFQ alternatives to adjust the number of operators and catches for each harvesting sector for all species. Processors, unless specifically allocated quotas, will be assumed to acquire raw product from the same sources as in the baseline case. For license limitation the numbers of vessels will be adjusted according to the allocation scenario. Catch will then be adjusted to assure the TACs are taken.

Case 4 examines the downstream effect of the alternatives and how the industry will potentially respond to them. Case 4 will be examined at three different phases:

Phase 1: The industry has responded to the new management regime by altering harvesting and processing patterns, but no trading of fishing rights has occurred.

Phase 2: Some transfers of fishing rights have occurred, but the fleet has not yet reached a long-term equilibrium.

Phase 3: Long-term results after the fleet and processors have fully adjusted to the new regime.

All of the estimates of Case 4 will involve forecasts of industry reactions to management changes. The only thing certain about any of these forecasts is that none of them will be entirely accurate. Further, these predictions will not be able to capture the dynamic nature of fishing and processing technology. The results of the Case 4 assessment should be used only as an indicator of the direction and magnitude of the changes anticipated.

Phase 1 of Case 4 of the scenario approach will ask operators for each of the sectors defined in the representative fleet how they expect to change their fishing and processing patterns. These responses will then be synthesized by the analysts into a scenario (or set of scenarios) which utilizes the quotas of each harvesting sector. The analysis assumes, as in the simulation model, that processors create a demand for raw product and that harvesters supply raw product to meet that demand. Therefore, the scenario analyzed will start with the processor's ideas of how and when over the year they would choose to process a suite of species, given that open access constraints have been removed. For example, processors might indicate that they would shift their pollock operations later into the 'A' season to capture more benefits from roe. In the early part of the year they might choose to focus more on Pacific cod instead of pollock. Using the responses from processors, we will assume that vessels will react by filling the demand. It is believed unlikely that harvesters will be able to operate unilaterally, i.e., that they could find markets for whatever species they wished to harvest without regard to the needs of processors. It could be that a range of scenarios is developed and consequently a range of net benefits (costs) estimated.

Phase 2 of Case 4 will examine the effects of the transfers of fishing rights. Again license limitation and IFQ alternatives will be examined separately. In an IFQ system it is assumed that operators with relatively low cost and high profits will purchase quota from operators with higher cost and lower profits. These transfers will occur within vessel classes and across vessel classes. One approach for capturing transfers within a vessel class will be to examine the variability of catch as determined in fish tickets and weekly reports. For example, assume the average catch per week within a vessel class was 100 tons with a standard deviation of 25 tons. If each of these vessels is assumed to have the same operating costs, then it follows that some vessels will have higher catch and therefore revenues and profits per dollar spent. These higher profit operators could purchase quota from lower profit operators. If we assume that all operators within a class of vessels with catch rates below the average sold their quota to owners with catch rates above the average, then the average of the remaining vessels would be higher. Assuming that these transfers took place then the analysts could estimate the effect of transfers to vessels with higher profits.

Analysis of IFQ transfers across vessel classes is much more difficult to assess. This is in fact one of the main reasons for the development of the simulation model. There may, however, be some limited inter-class transfers that could be assumed. For example, any pollock allocated to fixed gear operators could be assumed to be transferred to trawl operators. Another might be an assumption that pollock trawlers could transfer much of their halibut PSC quota to flatfish trawlers. Transfers of quota, particularly across vessel classes remains however a weakness of the scenario approach. Certainly, the analysts could ask operators whether, and to whom, they envision transferring quota.

Phase 3 of Case 4, which forecasts the fleet in the long term, would incorporate industry responses of the different sectors to questions such as: "How would you predict the fleet to look after 10 years under this alternative, assuming current TACs?" "How many vessels in your Class do you think would remain?" Responses again would be synthesized perhaps into a range of scenarios. Then each scenario would be analyzed given cost and revenues from the representative fleets and assumptions regarding operating patterns under earlier phases. It would be emphasized that these approaches represent the thinking of the industry and that the actual industry ten years down the road may not resemble the scenarios. None-the-

less these approaches could give the decision makers a feel for the magnitude and direction of the effects of the different alternatives.

The scenario approach must rest on information provided by industry. We envision soliciting information from focus groups for each sector. Each group would comprise 3-5 knowledgeable persons representing the particular sectors of the representative fleet. The analyst would work with the group to explain the questions and to facilitate discussions leading to responses. Clearly this approach opens the door for bias. If a sector of the representative fleet was opposed to one alternative or another they would be more likely to shape their responses to fit their preferred choice. Given that the entire quantitative analysis will be based to a large degree on the representative fleet profiles, and that much of this information will come from volunteer industry participation, the reliability of both the simulation and the scenario approaches could be jeopardized. Though bias is a legitimate concern, it will have to be weighed against the needs and requirements for the analysis to assess cost and benefits.

2. Simulation Model[2]

The groundfish and crab fisheries off the coast of Alaska are open access fisheries in which multiple gear groups participate in a number of potentially overlapping fisheries for mixed stocks, which are processed by diverse processors into multiple products. Fisheries are limited by total allowable catch (TAC) and bycatch limits, as well as gear and area restrictions.

In such a complex fishery, it is very difficult to predict how the fleet will be able to readjust its activities when there is a large change in the regulatory environment such as under a limited access system. Without some modeling framework to predict how the fleet will redirect effort spatially, over the course of the season, among target fisheries--it is impossible to forecast the costs and benefits of regulatory changes.

Models Available for the NPFMC to Use

The inshore-offshore analyses used information from surveys to estimate a distribution of fishing and processing costs for different types of operators. The analysis estimated a cost function for catcher-processors from the survey data, but included no model that could project how limiting access to a given fishery such as pollock might change effort in other fisheries.

Arnarson and Johnston (no date) constructed a linear programming simulation model of the Alaska groundfish fishery based on maximizing profits of integrated processor-harvesting units. This model simulates the open-access fishery by optimizing each catch-processor class sequentially in each period, cycling through available capacity until catch limits are reached.

Unfortunately, the Arnarson model has not been completely debugged, and is not usable for policy analysis. Even if it could be made to work as designed, the sequential nature of the simulation algorithm embedded in the model allows for only one type of catcher vessel for each type of processor. The model, therefore, has no capability to address redistribution of harvest effort among different types of catcher vessels under individual quotas or other access limitation measures.

In addition to the Arnarson model, linear programming models have been constructed for a number of other fisheries. For example, Dan Huppert and Dale Squires constructed a linear program several years

[2]The following section is excerpted from a proposal submitted to the Council from Matt Berman of the University of Alaska's Institute of Social and Economic Research.

ago to estimate the optimal size of the Pacific coast trawl fleet. This model does not have the capability of analyzing the role of the processing sector, or of examining changes in effort in different fisheries during the course of the season.

The only model currently available for the Council to use to examine the effects over the season of regulatory changes of the Alaska offshore fisheries is a simulation model of the groundfish trawl fisheries. This model, originally developed by Terry Smith and Denby Lloyd, projects directed and incidental harvest for components of the trawl fleet by species and area. The model then projects time and area closures that occur when catch limits are projected to have been reached. The Smith model does not contain any information on fishing costs, so it cannot be used to model how fleet behavior might change if the current open-access management regime where replaced by a limited access regime.

Approach

Given the time constraint and the need to model complex interactions of multiple components of the fishery, there are several advantages to a linear programming-based simulation approach. Linear programming models are relatively simple to construct. Applications software is widely available, so there is no need to rely on proprietary custom-built programs that can be expensive and difficult to modify. Although the linear program imposes potentially unrealistic restrictions on technology, it can nevertheless suggest how a fishery would react to regulatory decisions that change the relative profitability of available activities. Thus it provides a reality check on cost assumptions, and helps analysts gain a better understanding of how the fleet might react to alternative limited access systems.

General Approach

We would construct a set of linear programming models that are embedded in a program that simulates the Bering Sea and Gulf of Alaska groundfish and crab fisheries during a year. Annual changes anticipated in harvesting and processing capacity for each type of vessel or processor should be analyzed outside of the model, and entered manually as a new set of capacity constraints.

The open access simulation model would retain elements of the approach of the Arnarson model. However, the custom-built programming approach would be abandoned in favor of using more user-accessible software. I would recommend building the simulation model in a spreadsheet and using the spreadsheet add-in *What's Best!* (Lindo Systems, Inc.) to run the linear programs. This would make the model easily transferred to Lotus 1-2-3, Excel, and Quattro spreadsheet users in both MS-Dos PC and Macintosh environments. Model users could take advantage of the ease of working with spreadsheet programs, so that the model can be updated easily and refined at a reasonable cost.

A variety of specific approaches to building such a model is possible. One particular variant is outlined below.

Specific Approach

An important aspect of the North Pacific fisheries is that processing firms (including catcher-processors) greatly influence how the fishery progresses over the season. Some processors are fully integrated, others less so. A way of keeping the model manageable while allowing both the processing and harvesting sectors to be treated explicitly is to separate the two sectors into two optimization models. The processing and harvesting models are linked together through deliveries of harvested fish.

The processing model considers each group of similar processors as a multi-product firm manufacturing a variety of processed products from raw fish inputs. Processed product prices, a cost technology, and

a set of manufacturing capacity constraints are taken as given for each simulation period. Processors choose rates for a set of product lines in order to maximize profits. The solution to a linear program with raw fish prices set equal to zero generates derived demands for raw fish: a set of quantities that each processor demands from the harvesting sector. Prices processors are willing to pay for each species are derived from the dual of product capacity constraints. That is, for species that can be made into more than one primary product, the input price is derived from the primary product activity whose constraint generates the lowest dual value among those in use during the period.

The harvest model considers each group of harvesters as a multi-product firm that delivers a vector of fish catches to each processor. In open access simulation, catch-processors are constrained to harvest no more than their processing capacity. Catcher boats may harvest as much as the sum of onshore and mothership processing capacity. Activities for the linear programming model are defined as time fished in various target fisheries in each area.

The open access version of the model computes maximum profit for processors and harvesters for each simulation period without regard to TAC or bycatch limits. In simulation, gear groups and areas are dropped (constraints on activities changed) as TAC and bycatch limits are reached and as seasons open and close. The attached figures show the flow of the model to simulate an open-access fishery.

When limited access is imposed in the form of individual quotas, one could project the initial equilibrium by giving each vessel class its own TAC (and/or bycatch) limit. When that particular vessel class reaches its quota limit in the simulation, the dual values of the constraints in the programming model for the remaining simulation periods yield estimates of the initial demand price of quota for that vessel class.

A long-term ITQ equilibrium would not occur until after quota transfer prices have reached equilibrium levels. This long-term fishery is modeled by asking the linear program to compute the sum of profits for all vessel groups for all periods of the season simultaneously. The full-year time horizon linear program replaces the month-by-month simulation until catch limits are reached. The dual values of the total catch constraints in the full-year simulation yield an estimate of the equilibrium prices of each type of quota, given whatever constraints are modeled in the system. The attached flow-chart illustrates how the equilibrium ITQ fishery would be simulated.

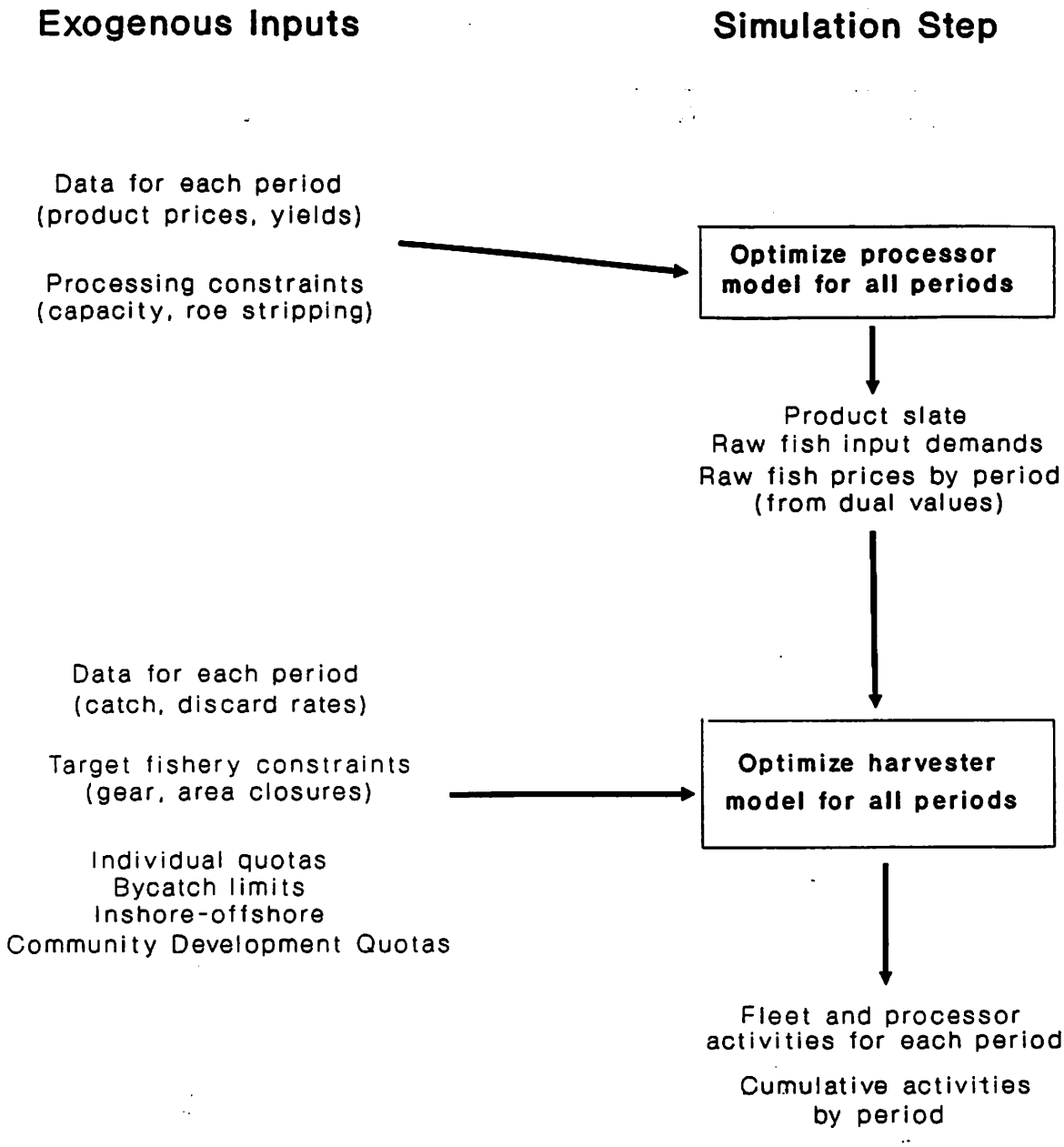
While the hierarchical link from processor to harvester envisioned in the model is likely to work well in general, it is easily seen that such a configuration will sometimes fail to represent reality. In particular, the models may project that processors will demand raw fish inputs that can not be filled, and, as a corollary, refuse (or pay too low a price for) fish that harvesters could harvest. Usually, correcting for this problem is simply a matter of constraining primary product capacities in processors to zero. For example, surimi capacity could be constrained to zero when the pollock fishery is closed.

It is possible, however, that the processor model will continue to generate demands for raw fish that can be legally but not economically supplied (for example, due to low catch per unit effort). In this case, the harvester and processor models need to be combined. This is a simple process: the objective function being the sum of catching and processing sector profits in the period.

With a combined processor-harvester model, one cannot make explicit use of the transfer price of fish. That is because these prices are variable, and the profit equation would become nonlinear from the programming perspective. However, the constraints in a combined model that harvesters provide at least as much fish to each processor as that processor demands would yield another set of dual shadow prices. These prices would represent the marginal cost of harvesting those fish. Assuming that processors pay harvesters their marginal cost, profits can be split between harvest and processing sectors using the dual prices.

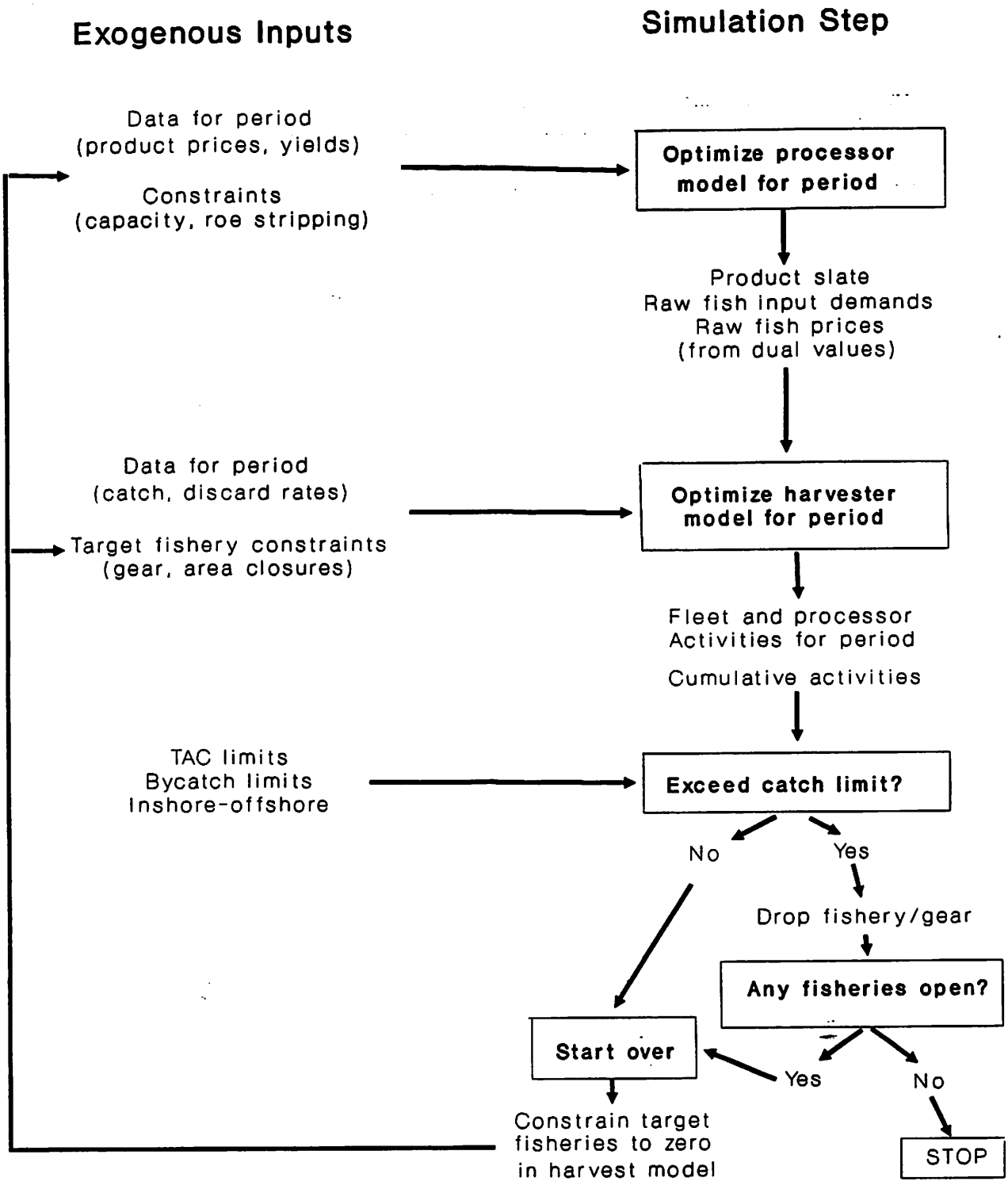
North Pacific Fisheries Model

ITQ Fishery



North Pacific Fisheries Model

Open-Access Fishery



D. COMMUNITY ECONOMIC IMPACT MODELS

A major part of the analysis will be an examination of social and economic impacts on fishing communities in Alaska, Washington, and Oregon. We envision two separate but complementary approaches to the community economic assessment. These include the development of **Economic Base Models (EBM)**, and further refinement of the input/output based **Fishery Economic Assessment Models (FEAM)** built by Jensen and Radtke. These two approaches differ in their level of detail and aggregation, but both should indicate impacts of fisheries on specific communities. Because of the controversial nature of these studies, both approaches will be employed. To the extent the two models track each other, the more believable will be the outputs. If the models do not track, then questions regarding the ability to estimate impacts will be substantiated.

For each of the four cases outlined earlier, estimates of the harvests, processed products, costs, and revenues of the representative fleet of harvesters and processors will be developed. Using historical distributions of the industry, or assumptions developed from the assessment of costs and benefits, landings and processed product in a community will be estimated. The economic impact models will use these as inputs to derive estimates of community incomes and employment.

1. Fishery Economic Assessment Models (FEAM)

These models were used by the Council staff in its analysis of the inshore/offshore allocation and by ISER in their analysis for the Council of exclusive registration and a delay of the 'B' season. In both cases the FEAMs were criticized for their lack of documentation. Other users, including the PFMC and Alaska's Marine Advisory Program have had similar criticisms. There are three basic areas of the model which need further documentation: (1) assumptions built into the model by the developers, (2) assumptions built into the model by users, and (3) if both 1 and 2 are satisfied, the model still lacks a standardized explanation of what it all means, what it doesn't mean, and how the information should or should not be used. The NPFMC and the PFMC are planning to ask Jensen/Radtke to supply the documentation for the first and third in a joint proposal. Documentation of the second will be left to users, but much of this can be solved by using a standardized set of fleet and processor profiles. Additionally, both Councils and ISER are working toward putting the FEAM models into a spreadsheet format. This will make many of the assumptions and calculations explicit. Further, this will allow the incorporation of uncertainty via the @RISK add-in, as used the Inshore-Offshore cost/benefit analysis.

Documentation of Assumptions Used by the Model Developers.

These assumptions make up the structure of the program and the initial input parameters included with the model. We will ask Jensen and Radtke to provide information and answers in the following areas.

(1) What is the structure of the model? How do input parameters work their way through to final outputs?

(2) Documentation of multipliers and technical coefficients. This includes information on which set of IMPLAN coefficients has been applied, as well as the derivation of "combined" multipliers, and the functions which generate them.

(3) What is the procedure for changing one of the technical coefficients? If, for example, the user believes that ice and bait should consist of a difference blend of IMPLAN codes, how would he go about it?

(4) Document the "location" section of the model. Why do we need a separate model for each community, when we can access other communities from whatever community model is used? What is the procedure for tracing out expenditures in the local, state, regional, and U.S. economies. Additionally, what are the differences in the different locations, i.e., what parameters are likely to change?

(5) What are the idiosyncracies of the model? For example, when changing the amount of product going to a vessel, is it imperative to go through the entire list before exiting? These types of potential problems should be noted, and if possible, programming should be undertaken to prevent them from happening.

(6) Documentation of the distribution of expenditures section.

(7) The model output reports local sectors impacted by expenditures. This section needs to be documented. What is the importance of this section, should it be believed, how would the user make changes?

Documentation of Assumptions made by Model Users

In addition to the assumptions above, it is imperative that users document any model parameters they have changed or added. Jensen and Radtke supply with the model some budget information regarding processors and fishers. Users should be aware that these parameters should be considered as examples only. Users have control of the parameters defining the economic activities and uses of resources, and should be prepared to document the following when using the model.

(1) Resource definitions and harvest levels
(2) Vessels and processors Used
(3) Cost profiles
(4) Catch totals
(5) Product totals
(6) Distribution of expenditures to local, state, region, etc.

2. Development Of Economic Base Models[3]

Economic Base Models (EBMs) for use in the analysis will be developed as part of a cooperative agreement with the University of Alaska's Institute for Social and Economic Research (ISER). The Institute has received a Saltonstall-Kennedy grant to analyze the impacts of halibut and sablefish IFQs in Alaskan communities. The models developed will be applied both to their S-K project and to the Council's assessment. EBMs assume that regulatory changes affect coastal communities by changing the amount of the catch, the timing of the catch, the mix of products, and the residency of the harvesting and processing workers. The economic impact will be the result of changes in the amount of income brought into the community and spent locally.

The economic base model is one of the best tools to use for estimating the impact of exogenous (externally-driven) changes on small communities. The model is straightforward and easy to understand. In addition, the model is adaptable to the limited data available for these types of communities.

The economic base model assumes the economy can be described by two sectors, the basic sector and the support sector, and the relationship between them, the *base multiplier*. The basic sector is composed of those activities which bring money into the community from outside; the fishing industry would be in the basic sector. The support sector includes those activities which are supported by local income or business demand; retail trade is an example of an industry in this sector. Economic base models assume growth in the basic sector drives the economy and the support sector simply expands in response to this growth. The response of the support sector is described by the economic base multiplier, which is the amount the support sector expands when the basic sector expands by one. Activity in each sector is usually measured in terms of jobs or income.

There are two problems associated with the use of this approach in small communities. First, although the data required for this approach are minimal, there may be problems with data. Information on employment and income may be available for only some years or at a level of aggregation which masks the particular community. The second problem is structural change. As a community grows the relationship between the support and basic sector may change as more types of activities enter.

Use of Economic Base Modeling Approach

We propose to estimate a series of economic base multipliers which can be used to predict the impact of changes in fishing regulations on particular Alaska communities. To overcome the problems stated above we propose a two-part approach.

Multipliers for Specific Communities. The first part of the work will be to estimate multipliers for selected Alaska communities of particular importance for analysis. These multipliers would be based on analysis of the economic structure and history of these places. Time series analysis would most likely be used.

Multipliers for Types of Places. The second part would be to develop a series of multipliers for types of places. Places would be grouped into types which would reflect size, economic function, subsistence participation, population characteristics, and other factors which affect economic performance. The set of comparative communities would include more than the impact communities. For each category of places we would calculate a multiplier. This approach would be especially useful if we expect changes in the regulations will result in structural changes. When there is a structural change the community will

[3]The following text on Economic Base Models has been excerpted from ISER's project proposal.

not respond as it did historically. With this approach we can use multipliers which more accurately reflect the new structure of the community.

Modeling Framework

For each of the above types of modeling exercise, we propose a two-part modeling framework:

1. Estimation of coefficients to relate landings by species group to measurable basic sector economic data (employment and/or income in fishing harvesting and processing).

2. Estimation of base multipliers, or the ratio of support sector economic activity to basic sector economic data.

A simplified mathematical description of this modeling framework is as follows:

$F = C \times L$, *where;*
F = *BasicSector (fish harvesting & processing) employment,*
L = *BasicSector income from community based landings, &,*
C = *Coefficient relating Basic Sector employment to income.*

$S = M_f \times F + M_b \times B$, *where;*
S = *Support Sector employment,*
B = *Other (non-fisheries) Basic Sector employment,*
M_f = *Multiplier for fisheries Basic Sector employment,*
M_b = *Multiplier for other Basic Sector employment.*

Estimation of the coefficients C, Mf and Mb would provide a simple way of estimating the effect of a change in landings on fisheries basic employment/income as well as support employment/income.

E. SOCIAL IMPACTS

Potential social impacts can be viewed at two levels: (1) impacts which are primarily economic in nature, but are often referred to as 'social impacts' because they are assessed at the community level, and (2) impacts which are truly social in nature and which are often the result of economic changes. The second type of impact is much more difficult to quantify and our analysis will likely concentrate on the former. The following approach will be undertaken:

1. Assemble baseline community profile package

Letters have been sent to various Chambers of Commerce and Regional Development Organizations requesting socio-economic information on their community/region. Using the responses, along with the existing data from the State's Community Profile Data Base, previous Council studies, CDQ applications, and MMS Social Indicator Studies, we will try to cover all coastal communities with a 2-5 page community profile. The list will include 127 'recognized' coastal communities throughout Alaska and about 8 Pacific Northwest communities. Included in these profiles will be basic demographic and summary economic information, particularly relative to commercial fisheries.

2. Identify communities for further detail

A. Based on the information developed in Step 1 above, along with information from our database if necessary, we need to identify those communities which exhibit a significant degree of reliance on commercial fisheries (or expect to do so in the future). This cut will be based on whether the community is a port of landing for commercial fish harvest, has a processing facility on site or nearby, or has a resident fleet of commercial fishermen. More specific information for these communities will be developed. We will need to determine, for example, what percentage of the landings in this port is composed of groundfish or crab (as opposed to salmon and other species). Community profiles for these communities will be expanded to include other detail such as: Percentage of residents involved in commercial fishing; percentage of income derived from commercial fishing, by species; landings over time by residents of this community, by species; and other fishery related information.

B. From the initial profiles, 3-4 aggregate community 'types' will be developed. We will not be able to conduct extensive analysis on all communities, nor is this necessary. We need to really be looking closely only at communities significantly involved in fisheries. However, we may want to develop some representative community types which could then be entered into the economic base modeling exercise to estimate potential changes for these types of communities. This may be more useful than trying to estimate changes for each individual community, although we still want to conduct the economic base modeling exercise for some identified communities, as described in Step 3 below.

3. Identify communities for final analysis

A. We want to narrow the list of communities (or types) for detailed 'assessment' down to a dozen or less. This will not be difficult (likely) since halibut is not a species to be covered (directly) by this management proposal. The major commercial fishing ports, relative to other groundfish and crab, will be easy to identify. We will make this identification based on some criteria of 'significant involvement'. For example, those communities which have groundfish/crab landings which comprise 20% or greater of their fish landings (or processing). Additionally, those communities which have 20% or more of their residents involved in commercial groundfish/crab fisheries would be included (or have 20% of their total community income attributable to

commercial fisheries). This cut will necessitate some runs through the database, and will likely not be completed until late summer. We may wish to identify the extent to which the selected communities are representative of other communities, or, rely on the identification of community types for representative coverage.

B. These will be the communities/regions we will concentrate on in terms of more in-depth analysis such as measuring dependence on the fishery and estimation of potential impacts. One part of this further study may be to direct interview type questions to the fishermen's groups, and other groups as appropriate. We need to work at developing a list of questions to be asked and who they should be directed at. However, we know generally that they should be directed at gauging the impact of potential alternatives to various industry sectors and the community overall. For example, "What action are you (individuals) likely to take in response to the adoption of Alternative X ?" "Which sectors of the industry (and your community) are likely to be most impacted under this Alternative?" "What questions should we be asking to assess the impacts of these proposed management alternatives ?"

   We may want to put together an SIA 'review team' to advise on development of this analysis and to monitor progress throughout the year.

C. Based on information from the process described above, we will supplement our qualitative analysis with economic base modelling or the linear programming model discussed in the economic analysis section. Information gathered from the interview process may be used in parameterizing such models, or may be used independently in a qualitative assessment.

Part of the 'final analysis' should involve establishing bounds of potential change which might induce social changes. We would concentrate on those instances where the potential change (as estimated by initial analysis) falls outside those bounds. For example, TACs for various species have decreased by 10% or more in recent times without a social impact analysis being conducted, and without apparent social impacts of any significance in those areas where the decrease occurred. Therefore, we might concentrate our further analytical efforts on those instances where potential change (in processing or ownership of fishing rights) exceeds some assumed percentage.

The current CDQ pollock fisheries may provide us with some additional information in the social impact assessment, particularly with regard to the CDQ options. For example, the directors of these CDQ groups will be submitting progress reports detailing the use and benefits of their CDQ allocations. This type of information may be very useful in assessing potential community aspects of the CRP alternatives.

F. CONSIDERATION OF ELEMENTS AND OPTIONS (sub-alternatives)

Staff has begun, and expects to complete for the June meeting, a qualitative analysis of the possible elements and options within the broader alternatives of IFQs and License Limitation. Based on previous meetings and input from the industry, an initial list of those elements and options is provided in outline form in this section. Following this outline are some thoughts on the use of the qualitative analysis.

1. Outline of the Qualitative Analysis

I. Fundamental aspects of a limited entry fishery
- A. Nature of License Limitation fishing rights
  - 1. Allocated to Vessels or to persons
  - 2. Included Species
    - a. Fishery-wide licenses
    - b. Species specific licenses
  - 3. Allocated for specific areas
- B. Nature of IFQ fishing rights
  - 1. Allocated for PSC species only
  - 2. Allocated for target groundfish and crab species only
    - a. fully utilized species only
    - b. possible aggregations of non-target species
  - 3. Allocated for both target and PSC species
  - 4. Specific discussion of applicability to crab fisheries
  - 5. Area specific considerations

II. Initial allocation issues
- A. Assignment of fishing rights under License Limitation
  - 1. Licenses to vessels themselves
    - a. to all moratorium qualified vessels
    - b. to all vessels with 'X' minimum poundage over 'X' years
    - c. to all vessels making landings in last year of fishery (1995)
    - d. to all vessels making landings as of June 24, 1992
  - 2. Licenses to persons
- B. Assignment of fishing rights under IFQ program
  - 1. To whom
    - a. vessel owners at the time of harvest
    - b. vessel owners at the time of allocation
    - c. permit holders
    - d. leaseholders
    - e. specific vessels
    - f. processors or other fishery investors
    - g. coastal communities
    - h. user or gear groups
  - 2. By what criteria
    - a. vessel tonnage
    - b. historical landings (many sub-options possible here)
    - c. random to all applicants
    - d. weighted by recent history, past history, JVP vs DAP, gear, etc.
    - e. based on retained vs total catch
    - f. based on some measure of dependence, such as relative income
    - g. different criteria for different target fisheries/management areas

III. Transferability Considerations

A. License transfers.

1. Consolidation limits.
2. Leasing rights.

B. Transfers of QS/IFQs

1. Aspects of a non-transferable IFQ fishery
2. Aspects of a fully transferable IFQ fishery
3. Transferability options
   a. Permanent transfers (sale of IFQ)
   b. Temporary transfers (lease of IFQ)
   c. Vessel category designations
   d. ownership criteria (after initial allocation)
   e. ownership caps (or vessel or area caps)
   f. use it or lose it options

2. Use of the Qualitative Analysis

As a 'stand alone' document, this analysis will provide the Council with a 'nuts and bolts' perspective of how a comprehensive, limited entry management program might work. It should also lead to a better understanding of the logistics, and will enable the Council to make a more informed final decision at some point in 1994. The mechanics of the fishery and the administration of the program will hinge directly on such elements as whether or not IFQs are assigned to PSC species, target species, all species, or whether an IFQ program is combined in some form with a license limitation program. We hope this qualitative analysis will better assess the practical 'doability' of the various permutations of elements and options.

The stand-alone qualitative assessment should provide an opportunity to narrow the various elements and options down to a manageable number for more in-depth, quantitative analyses. When we get to the detailed analysis, we will have to run the allocation scenarios and economic base models for every alternative or combination of alternatives still under consideration. By narrowing the sub-alternatives for detailed analysis, staff will be able to conduct a more thorough and accurate analysis of the remaining alternatives. Industry is scheduled to make some proposals by June regarding the criteria for initial allocation. Options for initial allocation, as well as the other elements and options outlined in this section, need to be narrowed at some point. This section should provide the Council with one mechanism for sifting through the maze of potential sub-alternatives.

The results from this qualitative analysis will eventually be incorporated into the overall analysis of the alternatives for each of the four Cases. This will be primarily in Case 3 and Case 4 where we are evaluating the effects of the IFQ and License Limitation alternatives. For example, QS distributions and possible downstream effects such as consolidation of fishing rights will be different under various sub-alternatives for allocation and transferability. Simulation models of the fishery will have to be developed around each of the remaining sub-alternatives. Additionally, model assumptions and linkages will be developed taking into account the results contained in the initial qualitative analysis.

A spreadsheet format will be developed in conjunction with this section as a tool for summarizing and comparing the various sub-alternatives. Within the overall project schedule, we need to determine the appropriate timing for completion of this section. It may well be that June of 1993 is too soon for completion of this section and too soon to expect the Council and industry to arrive at decisions on the specific sub-alternatives. We are expecting recommendations from industry by the June meeting on initial allocation criteria to be considered by the Council. Any such recommendations will likely go through an iterative process and not be finalized until later in the year, perhaps by the September meeting. Because the Comprehensive Data Base (CDB) necessary for the quantitative analyses will not be ready until September, that may be the most appropriate time to expect some resolution on these elements and options. Because the CDB will not be ready until that time, this schedule would not delay the overall analysis, would provide staff with more time to prepare the analysis, and would allow the Council and industry additional time to develop consensus on the appropriate sub-alternatives to pursue further.

Under the current schedule, we will continue work on the Qualitative Analysis section after the April 1993 meeting. A draft document could be available for the June meeting which would then be completed based on additional input from the Council and industry which we expect to receive at that meeting. This Qualitative Analysis would be completed for the September meeting.

V. DISCUSSION OF ELEMENTS AND OPTIONS

This discussion section is comprised of five management options with each management option being divided into five sections. The management options are licence limitation, PSC IFQs, target species IFQs, IFQs for all species (target and PSC), and Bering Sea/Aleutian Islands King and Tanner Crab IFQs. Each management option has an "example system definition" which is one of many possible scenarios and only serves as a reference point for the discussion. The "example system definition" is not an endorsement for that option, instead it should allow participants to "work from the same page". Possible advantages and disadvantages of the management option are then listed, followed by questions which may need to be resolved if that option were selected to implement, and limitations in the available data.

LICENSE LIMITATION

Example System Definition:

- These are assumed to be fishery specific: Groundfish licenses, Crab Licenses.
- Vessels are permitted rather than owners or operators.
- Reduces the number of vessels from that of the current fleet.
- Increasing the length of vessel is disallowed.

Advantages:

- Restricts entry into the fishery which could help reduce the growth of over-capitalization.
- Could be designed to restrict increases in fishing power.
- Could be implemented even in fisheries with no measure of allowable harvest (TAC or HGL).

Disadvantages:

- There is still a race for fish between license holders.
- A deep cut in the number of fishers may be required to have the desired impact.
- Incentives remain for fishers to increase their fishing power.
- Individual fishing decisions would be reactionary to perceived industry actions (fishing pollock in the a-season before the roe was at its peak because of TAC considerations).

Questions:

- Who would be eligible to receive permits? (vessel owners, permit holders, crew, etc.)?
- What would be the duration of the permit (one, five, ten years, or permanent)?
- Would permits be transferable and if so to whom (vessel owners, crew, vessel classes, gear class, anyone)?
- Would leasing permits be permissible?
- Would permits be species specific (crab, pollock, species landed, groundfish, all species)?
- Would permits be for specific areas (Bering Sea, GOA, 511, J1, O, one by one-half degree blocks)?
- Criteria for allocating permits (landings before June 24, 1992, in 1995, minimum landings requirements)?
- Would the pain resulting from the implementation of license limitations out-weigh the benefits received?
- Would this system be a lead-in to target/PSC IFQs?
- Should people not receiving permits be compensated?

Data Limitations:

- Vessel ownership data may not be very good for 1977-78.
- Vessel owners could opt to register a vessel every two years.
- Coast Guard vessel registration data is only available for 1988-92.

PSC IFQs

Example System Definition:

- PSC IFQs allocated for Prohibited Species only.
- PSC IFQ allocation is a one time deal.
- Species included are King Crab, Tanner Crab, Misc. Crab, Halibut, Salmon, Herring, Steelhead, or only for species having a PSC limit.
- PSC IFQs allow catch but do not allow retention of PSCs.
- PSC IFQs will be fully transferable, sold or leased, across all vessels and gear categories.
- PSC IFQs on observed vessels will be reduced as observed.
- PSC IFQs on non-observed vessels will be reduced based on established by-catch rates.
- All non-prohibited species remain under open access.

Advantages:

- Fewer species to track.
- Would provide many of the positive aspects of the target species IFQs, if PSCs are a limiting factor in the fishery.
- There is incentive for observed fishers to fish "clean" in terms of PSC species.
- Persons holding PSC IFQs would have more flexibility in selecting target fisheries.
- PSC constraints could reduce incentive to high-grade and discard, because fishers will be charged for the PSC by-catch if species are caught or landed.
- If a permanent allocation were made, conflicts between user groups would be lessened in fisheries constrained by the PSC limits.
- May result in longer fishing seasons and reduced gear conflicts.
- Dead-loss, due to lost gear, may be reduced by fishing at a slower more relaxed pace and not using more gear than can be handled effectively.
- Product quality may increase as more emphasis is placed on quality as opposed to quantity.
- Safety may increase as fishers gain more control over when and where to fish.
- Excess harvesting capacity could decrease over time as equipment is not replaced when no-longer useful, or the opportunity cost of equipment is higher in other industries when quotas are traded and sold.
- May result in a market based system for fishers and processors to operate.

Disadvantages:

- NMFS would still need to use in-season management measures to close fisheries when the TAC is reached.
- Possible overages could result if fishing effort increased as the TAC level was approached, and NMFS was unable to close the fishery in time.
- Individual fishers would not be held accountable for exceeding the TAC.

- A race for fish would still exist in fisheries where PSCs were not a constraint.
- Fishers could race for species that have high profit levels and use all their PSCs for those species leaving less valuable fisheries unharvested after the PSC cap was reached by fishers.
- Fishers without observers would be required to have PSC quota deducted from their account based on past rates estimated by NMFS. Therefore, unobserved vessels would not have incentives to fish "PSC clean", and if new technology decreased PSC by-catch there would be at least a one year lag be before this efficiency was realized by unobserved vessels.
- Only vessels with observers would benefit from fishing clean.
- Fishers would operate under more uncertainty in how they should prosecute the fishery than would fishers in a target species IFQ system (there still may be a need to react to what other fishers are doing).

Questions:

- PSC catch rate information on areas, species, gears, etc.
- What criteria would be used to determine PSC species?
- What would be the allocation criteria for vessel size, vessel type, gear type, and processor delivered to?
- What areas would PSC IFQs be given out in (the more areas the more control managers have but enforcement is harder)?
- CDQ's (who, what species, what areas, seasons, enforcement)?
- Ownership rights (vessel owners, crew, processors, non-fishing interests)?
- Enforcement, regulations, and penalties?
- Duration of fishing rights?
- Transferability?
- What process would be used to add/delete species to/from the PSC list?
- Would movement between gear categories be allowed after the initial allocation of PSC IFQs? If yes, would the allocation to people changing gear be altered?
- Should there be ownership caps?

Data Limitations:

- Changes in area reporting requirements (allocating catch before 1985 to recently subdivided areas may not be possible).
- Vessel ownership data may not be very good for 1977-78.
- Vessel owners could opt to register a vessel every two years.
- Fish tickets don't have by-catch data.
- Fish tickets do have discard data.
- Vessel length changed to length overall in September 1989.
- King and Tanner crab were not separated on some fish tickets (code 920 in Kodiak).

TARGET SPECIES IFQs

Example System Definition

- Target IFQs allocated only for the target species listed below.

Gulf of Alaska IFQ Species	Bering Sea/Aleutian Islands IFQ Species
Pollock	Pollock
Pacific Cod	Pacific Cod
Sablefish	Sablefish
Deep Water Flatfish	Squid
Shallow Water Flatfish	Yellowfin Sole
Slope Rockfish	Arrowtooth Flounder
Demersal Shelf Rockfish	Rock Sole
Pelagic Shelf Rockfish	Greenland Turbot
Thornyheads	Pacific Ocean Perch
Flathead Sole	Other Rockfish
Arrowtooth Flounder	Atka Mackerel
Pacific Ocean Perch	Red Rockfish
Shortraker/Rougheye	Other Flatfish
Other Groundfish	Other Groundfish
Atka Mackerel	

- Target IFQs will be fully transferable, sold or leased, across all vessels and gear categories, with the exception of fixed gear sablefish and halibut IFQs.
- Accounting of target IFQ harvests will be based on all target species brought on board.
- Discards of target species will be allowed, but all will be counted against target IFQs.
- Existing PSC management regime remain in place:

  Prohibited Species Catch caps and by-catch rates will be established for each target.

  No target IFQs for prohibited species will be issued.

  All prohibited species catches must be discarded.
- Catches of miscellaneous species not managed by the Council will continue under open access.

Advantages:

- Fishers hold the rights to target species eliminating race for them.
- Over-capitalization should decrease over time as fishers balance capital and labor expenses by not replacing unnecessary equipment as it breaks or becomes obsolete. Replacing capital with labor should provide more year-round employment opportunities (in both the production and processing sectors) in the communities where there is or has been reliance on Alaska fisheries.
- Fishers will have the option of using their target IFQ based on their knowledge of market, weather, and fishing conditions. Increased fishing options would provide fishers more flexibility in

(target species IFQs continued

selecting when to fish and may increase ex-vessel prices, CPUE, and safety. Ex-vessel price increases would be related to increased product quality and deliveries being made to processors when demand is greater. (Note: would there be a tendency for the fishing and processing sectors become more vertically integrated under a target IFQ system?)

- A target species program would limit the number of target IFQ species. This may allow people that are not qualified to receive or purchase quota shares an opportunity to build a history for species that currently are not in the target IFQ category or they could build fishing time credits in order to meet the requirements for purchasing target IFQs.
- Individuals will be accountable for catch overages in target species. This also means there is individual accountability for exceeding the TAC's.
- Fishers could reduce by-catch levels for PSC species. This would be accomplished by fishing slower and fishing areas which have less by-catch.

Disadvantages:

- Species not under a target IFQ plan may be forced to support over-capitalization in the North Pacific fishery and there may still be a race for species not under target IFQs.
- Crab would need to use HGL in place of the TAC to allocate quota shares and there are some species/areas that do not have HGL's. In areas/species that have don't have HGL's set, no PSC IFQs could be issued.
- The more species that are under an Target IFQ system, the more fishers will need to transfer target IFQs to get the mix of species they need to operate in a fashion that uses all their target IFQs.
- Non-target species would require in-season management to close the fishery when the TAC was reached.
- Fishers may choose to speculate and fish for species not under the target IFQ system to gain the rights for those species when/if they are placed under a quota share system, based on catch history.

Questions:

- What criteria would be used to determine target species, target complexes, or target assemblages?
- What would be the allocation criteria for vessel size, vessel type, gear type, and processor delivered to?
- What areas would target IFQs be given out in (the more areas the more control managers have but enforcement is harder)?
- CDQ's (who, what species, what areas, seasons, enforcement)?
- Ownership rights (vessel owners, crew, processors, non-fishing interests)?
- Enforcement, regulations, and penalties?
- Duration of fishing rights?
- Transferability?
- What process would be used to add/delete species to/from the target species list?

- Would movement between gear categories be allowed after the initial allocation of PSC IFQs?
- Will by-catch/discards receive quota share credit?
- What would be the enforcement policy for fishers targeting non-IFQ species but catching a significant amount of target IFQ species for which they have no quota?
- What product recovery rates need to be determined (at-sea processors, shore-based processors, product forms, species, etc.)? For observed vessels will actual observed round weight be used in place of the those calculated with PRR's?
- Should there be ownership caps?
- Should all target IFQ species be retained?
- What about under utilized species?
- Should some of the species complexes be broken into smaller categories?

Data Limitations:

- Changes in species reporting requirements (what species/species groups were reported, and when they were reported will be an important consideration in determining catch history for particular species and species groups)
- Changes in area reporting requirements (allocating catch before 1985 to recently subdivided areas may not be possible)
- Vessel ownership data may not be very good for 1977-78
- Vessel owners could opt to register a vessel every two years
- Fish tickets don't have by-catch data
- Fish tickets do have discard data
- King and Tanner crab were not separated on some fish tickets (code 920 in Kodiak)
- Problems with product weights and not round weights being reported before 1985 (delivery codes).

IFQs FOR ALL SPECIES (TARGET AND PSC)

Example System Definition:

- IFQs allocated for the target species listed below and for all prohibited species.

Gulf of Alaska IFQ Species	Bering Sea/Aleutian Islands IFQ Species
Pollock	Pollock
Pacific Cod	Pacific Cod
Sablefish	Sablefish
Deep Water Flatfish	Squid
Shallow Water Flatfish	Yellowfin Sole
Slope Rockfish	Arrowtooth Flounder
Demersal Shelf Rockfish	Rock Sole
Pelagic Shelf Rockfish	Greenland Turbot
Thornyheads	Pacific Ocean Perch
Flathead Sole	Other Rockfish
Arrowtooth Flounder	Atka Mackerel
Pacific Ocean Perch	Red Rockfish
Shortraker/Rougheye	Other Flatfish
Other Groundfish	Other Groundfish
Atka Mackerel	

- Prohibited species included are King Crab, Tanner Crab, Misc. Crab, Halibut, Salmon, Herring, Steelhead.
- Target/PSC IFQs will be fully transferable, sold or leased, across all vessels and gear categories, with the exception of fixed gear sablefish and halibut IFQs.
- Discards of target species will be allowed, but all will be counted against target/PSC IFQs.
- IFQs for prohibited species will be classified as PSC IFQ and will remain separate from halibut and crab target IFQs.
- IFQs for prohibited species allow catch but do not allow retention.
- PSC IFQs on observed vessels will be reduced as reported.
- PSC IFQs on non-observed vessels will be reduced based on established by-catch rates.
- Catches of miscellaneous species not managed by the Council will continue under open access.

Advantages:

- There is no race for any species of groundfish, finfish, or shellfish managed by the NPFMC.
- A target/PSC IFQ system for all species has the least uncertainty for fishers of any IFQ program (fishers have more control over their own fishing patterns and other fishers choices may have less impact).
- Safety should improve as fishers are given more flexibility in when, where, and how to fish.

- Production costs should decrease due to changes in the capital to labor ratio, reduced gear loss, more efficient use of production resources (capital and labor), and possible higher CPUE.
- Higher ex-vessel prices may be realized as fishers place more emphasis on product quality as opposed to quantity and making deliveries to the processors/wholesalers at times when it is required and not only when the season is open (a market based system).
- More year-round employment, for local residents, in both the production and processing sectors. This will result in reduced training costs, greater efficiency, and improved safety. Safety improvements should be realized by people being familiar with the dangers of a job (experience) and less fatigue in a more relaxed fishing pace.
- Individuals will be accountable for overages in all species caught. This also means that there is individual accountability for exceeding the TAC's.
- Fishers could reduce by-catch for PSC and species with little or no commercial value. This would be accomplished by fishing slower and fishing areas which have less by-catch.
- Over-capitalization should decrease over time as fishers do not replace unnecessary equipment as it breaks or becomes obsolete. Replacing capital with labor should provide more year-round employment opportunities (in both the production and processing sectors) in the communities where there is or has been reliance on Alaska fisheries.
- A target species program would limit the number of target IFQ species. This may allow people that are not qualified to receive or purchase quota shares an opportunity to build a landings history in species that are currently not in the target IFQ category, or they could build fishing time credits to meet the requirements for purchasing target IFQs.
- Individuals will be accountable for overages in target species catch. This also means there is individual accountability for exceeding the TAC's.
- Fishers would need to fish in a manner that had low by-catch for PSC species. This would be accomplished by fishing slower and fishing areas which have less by-catch.
- A program could be designed which may or may not give fishers credit for landing non-IFQ species depending on Council objectives.
- Fishers would be responsible for balancing their catch of all commercially important species in the North Pacific.

<u>Disadvantages:</u>

- Species not under a target IFQ plan may be forced to support over-capitalization and there may still be a race for species not included the target IFQ categories
- Crab would need to use HGL in place of the TAC to allocate quota shares and there are some species/areas that do not have HGL's. In areas/species that have don't have HGL's set no PSC IFQs could be issued.
- Fishers may chose to speculate and fish for species not under the target IFQ system to gain the rights

for those species when/if they are placed under a quota share system, based on catch history. If this was thought to be a problem the Council could state up-front that credit wouldn't be given to fishers landing species for purely speculative purposes.

- The more species under a target IFQ system, the more fishers will need to transfer target/PSC IFQs to get the mix of species needed to operate in a fashion that uses all their target IFQs. Inefficiencies could result when fishers are unable to acquire the mix of quota shares needed. These fishers would then try to catch a specific species mix based on quota shares available to them and not market/biological conditions existing at the time.
- The more species (areas) for (in) which target IFQs are issued, the more difficulty with enforcement and setting TAC's, etc.

Questions:

- What criteria would be used to determine target species, target complexes, or target assemblages?
- What would be the allocation criteria for vessel size, vessel type, gear type, and processor delivered to?
- What areas would target IFQs be given out in (the more areas the more control managers have but enforcement is harder)?
- CDQ's (who, what species, what areas, seasons, enforcement)?
- Ownership rights (vessel owners, crew, processors, non-fishing interests)?
- Enforcement, regulations, and penalties?
- Duration of fishing rights?
- Transferability?
- What process would be used to add/delete species to/from the target species list?
- Would movement between gear categories be allowed after the initial allocation of PSC IFQs?
- Will by-catch/discards receive quota share credit?
- What would be the enforcement policy for fishers targeting non-IFQ species but catching a significant amount of target IFQ species for which they have no quota?
- What product recovery rates need to be determined (at-sea processors, shore-based processors, product forms, species, etc.)? For observed vessels, will actual observed round weight be used in place of the those calculated with PRR's?
- Should there be ownership caps?

Data Limitations:

- Changes in species reporting requirements (what species/species groups were reported and when will be an important consideration in determining catch history for particular species and species groups).
- Changes in area reporting requirements (allocating catch before 1985 to recently subdivided areas may not be possible).

- Vessel ownership data may not be very good for 1977-78.
- Vessel owners could opt to register a vessel every two years which may lead to problems determining who is the owner of quota shares.
- Fish tickets don't have by-catch data.
- Fish tickets do have discard data.
- King and Tanner crab were not separated on some fish tickets (code 920 in Kodiak).
- Problems with product weights and not round weights being reported before 1985 (delivery codes).

BERING SEA/ALEUTIAN ISLANDS KING AND TANNER CRAB IFQs

System Definition

- Target IFQs for directed crab fishing will be issued only for use with pot gear.
- Species will include Red King Crab, Blue King Crab, Brown King Crab, *C. bairdi, C. opilio.*
- Target IFQs for crab will be fully transferable.
- Target IFQs units will be in numbers rather than in pounds.
- Two types of target IFQs will be established. Type 1 target IFQs will be based on the Harvest Guideline. This will be used in place of TACs and will specify a low end (guaranteed) harvest level. Type 2 target IFQs will be issued if there is a in-season upward adjustment of the HGL.
- Type 1 and type 2 target IFQs will be separably transferable, e.g, one may own type 1 target IFQs without type 2 target IFQs and vice versa.
- Only areas and species with HGL will be under target IFQ system.
- No size limits.
- No closed seasons.
- All crab brought aboard will be counted against target IFQs

Advantages:

- Two-tiered target IFQ specification allows for in-season adjustments of harvest guidelines.
- Type 2 target IFQs will involve more risk, but should be less costly.
- Target IFQs given out in number of crab will force users to target only largest specimens.
- Soft shelled crab will be protected without seasons because the value of soft shelled crab is relatively low.
- Open seasons will allow users to fish at a slower pace with longer soak times eliminating by-catch of smaller specimens.
- Could lead to greater development of fresh or even live markets.
- Will not force crabbers to operate only during the harsh winter months.

Disadvantages:

- Access to species and areas without HGL will remain open. Any excess effort will likely find its way into these fisheries.
- Year round crab fishery could lead to increased gear conflicts with trawls in particular.

Questions:

- Should crabbers be given credit for deadloss?
- Is by-catch a consideration?
- Would areas and species not under target IFQs be under a different management system?

Data Limitations:

- King and Tanner crab were not listed separately on some fish tickets.
- Vessel ownership data before 1978.

AGENDA C-6(e)
APRIL 1993

To: NPFMC Members

From: Chris Blackburn, AGDB
Joe Blum, AFTA
Vince Curry, PSPA
Dave Fraser, AIF
Kate Graham, AHSFA
Steve Hughes, MTC
Beth Stewart, AEB
Doug Gordon, IFFFQ (observer)

Date: 14 April 1993

Re: Comprehensive Rationalization of the Fishery

Attached are the results of several months of work by our part of the industry on the comprehensive rationalization process you have been considering. The focus of our discussions has always been ITQs, so we have not addressed the option of license limitation as a group.

We have attempted to agree on as many points as possible in order to define more clearly which areas need more discussion.

The attached report is a basic list of items we all agree should be included in the analysis. We have also included a list of items that some of us believe should be included, but that we couldn't agree on as a group. In some cases we have specified a range of options, and we will each be testifying on behalf of our individual associations about which of those we prefer.

We had hoped to be able to include a broader range of industry groups in these discussions, but a lack of time has limited us to groups that have substantial trawl interests. In the coming months we look forward to expanding the representation at these meetings, believing that the more points of agreement the industry as a whole can identify, the easier your task will be.

We would like to emphasize that the attached strawmen proposals for analysis are intended to cover the range of objectives that different participants considered most important. They are presented in two different formats - as a list and as a chart.

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To CHRIS OLVER	From KATE
Co. NPFMC	Co.
Dept.	Phone #
Fax #	Fax #

COMPREHENSIVE RATIONALIZATION MEETING OF INDUSTRY GROUPS

13 April 1993

In attendance:

Chris Blackburn, AGDB
Joe Blum, AFTA
Vince Curry, PSPA
Dave Fraser, AIF
Kate Graham, AHSFA
Steve Hughes, MTC
Beth Stewart, AEB
Doug Gordon, IFFFQ (observer)

Points of Agreement for Analysis:

The goal of comprehensive rationalization is to eliminate the current irrational system, a result of regulatory schemes designed at different times with varying objectives, and to create an environment conducive to stability in the North Pacific fishery.

1. ITQs will be allocated for target groundfish and crab species and for PSC species. The target species will be identified, then NMFS will stipulate the average species composition including PSCs for each target. ITQs will be issued based on these proportions.

2. ITQs will be allocated to:
   a) the vessel; or
   b) the owner of a vessel at the time the ITQ is issued.

The provisions in the moratorium regarding eligibility and lost or destroyed vessels should apply. Estates of vessel owners are eligible to apply for and own ITQs.

3. Criteria to be used for allocating ITQs may include:
   a) historical landings;
   b) DAH catch weighted by: recent history; past history; JVP compared to DAP; etc.;
   c) retained and total catch.

4. ITQs will be fully transferable. Both leases and sales will be allowed.

5. The qualifying period will begin in 1976, depending on availability of accurate, reliable data.

6. The qualifying period ends on:
   a) 24 June 1992; or
   b) the date the Council approves the program.

7. PSCs must be included in the program. Caps and regulations would still apply. Boats should be allowed to pool their PSC ITQs during a season.

8. All species under Council jurisdiction should be included and treated by species assemblages where appropriate. Groundfish target species are: pollock, cod, Atka mackerel, rockfish, O. flats, and yellowfin sole and rock sole (BSAI) or deep flats and shallow flats (GOA). For purposes of allocation, sablefish, Greenland turbot, and thornyheads should be treated as bycatch within the other categories.

9. A quota share history should be based on the total DAH catch, rather than on the TAC.

10. ITQs should be awarded for the area they were earned in (BSAI, or BS and AI; GOA by subareas), to be used in proportion to current subarea TACs. ITQs for Bogoslof pollock will be issued proportionate to BS ITQs. ITQs for Gulf pollock will be issued proportionate to the TAC in the subareas.

11. There should be an initial moratorium on sales of ITQs for 2 years (with a specific sunset date). Leasing of ITQs will still be allowed, with no lease lasting beyond the sunset date. This will allow an initial adjustment period. An appeals board should be appointed by the Secretary of Commerce, with an advisory panel composed of industry members.

12. There should be no waiting period on transfers or leases other than the minimum needed for administrative or enforcement purposes.

13. Penalties for harvesting more than the ITQs held should be <u>very</u> severe. Matching quota shares with the actual harvest needs to be done in a timely manner while still allowing an individual the flexibility to deal with unforeseen circumstances, such as natural fluctuations in stock size.

14. ITQs should be issued by species, irrespective of vessel class or gear.

15. Catcher vessels should have no restriction on where they deliver their catch.

<u>Points of Disagreement</u>:

1. Under Point #2 above, include:
   a) processors or other fishery investors;
   b) coastal communities: the concept of CDQs should be evaluated after more experience with the current program.

2. Under Point #3 above, include:
a) DAH catch weighted by gear type;
b) different criteria for different target fisheries or areas;
c) criteria other than catch histories; e.g., processing activity, gear type.

3. Under Point #4 above, include:
a) transfers may be limited by vessel size categories;
b) transfers may be limited to those who demonstrate an intent to use the ITQs by showing ownership or lease of a vessel with suitable capability;
c) transfers may be limited to ensure some level of deliveries are made to shoreside processors.

Other Points of Note:

* It is absolutely critical that NOAA General Counsel provide a detailed analysis and legal opinion regarding the status of foreign ownership of ITQs, particularly in light of NAFTA. We need to know: 1) what constitutes a US entity; 2) whether there is an ability to constrain the program to US entities; and 3) whether this can be used in a weighting system.

* Regarding the question of ownership caps, NOAA General Counsel needs to provide a legal opinion on existing restraints of concentration of the resource; e.g., anti-trust laws, vertical integration situations.

* NMFS is now saying they can't give a boat its own catch history until they resolve who gets the data - the current owner, the owner at the time it was earned, the skipper, or someone else. We see this situation as absurd. The catch history of a boat that has had only one owner should be released immediately. Current owners who have waivers from previous owners should also be allowed immediate access to the records of their vessels. Resolving this situation should be a high priority for NMFS.

STRAWMEN PROPOSALS FOR ALLOCATION CRITERIA

These are proposals for analysis that cover the range of objectives that different participants considered most important.

Option 1. a) All years weighted equally
b) Discount JVP catches by 50%

Option 2. a) Give credit only for years that were fully DAP, with the date varying by fishery
b) Give credit only for years up to full DAP, with the date varying by fishery

Option 3. Give greater credit for early years of participation:
- determine the first year in which JVP took 10% of the TAC and the first year in which DAP took 10% of the TAC;
- give 100% credit for this year, the following two years, and all prior years;
- years of JVP history following this period will receive only 50% credit and years of DAP history following this period will receive only 60% credit.

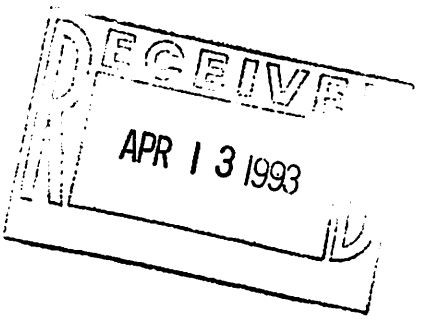
Example: for Bering Sea pollock:
JVP took 10% in 1983: DAP took 10% in 1987
JVP receives 100% credit for catches up to and including 1985; from 1986 on it receives 50% credit for catches
DAP receives 100% credit for catches up to and including 1989; from 1990 on it receives 60% credit for catches

To be included as part of the options above:
Give greater credit for higher percentage of American ownership: 100% US = 100% credit
90% US = 90% credit
80% US = 80% credit
and so on

Chart of Strawmen Proposals for Allocation Criteria

	Base Years	JV Weight	DAP Weight
Option 1. a)	1976-1992	100%	100%
b)	1976-1992	50%	100%
Option 2. a)	full DAP, by fishery	0%	100%
b)	1976 to full DAP, by fishery	100%	100%
Option 3.	1976-1992, by fishery	100% before trigger; 50% after trigger	100% before trigger; 60% after trigger

All options: include sub-option of weight given to US ownership percentage



APRIL 7, 1993

MR. BOB ALVERSON
CHAIRMAN
COMPREHENSIVE RATIONALIZATION COMMITTEE

DEAR BOB,

I WOULD LIKE TO TAKE THIS OPPORTUNITY TO PRESENT A CONCEPT OR AN IDEA FOR CONSIDERATION AT YOUR UPCOMING COMMITTEE MEETING.

THE TASK THE COUNCIL FACES OF COMING UP WITH A PLAN TO RATIONALIZE THE FISHERIES IS A MONUMENTAL ONE. IT COULD EASILY MAKE THE IFQ BATTLE THE COUNCIL JUST WENT THRU SEEM LIKE A FIREFIGHT.

RATHER THAN TRY TO TACKLE THE WHOLE SPECTRUM OF HOW TO DO ALL THE FISHERIES AT ONCE AND TRY TO COME UP WITH A PLAN THAT IS GOING TO BE WORKABLE TO ALL INVOLVED, I THINK YOU SHOULD FIRST DIVIDE UP THE FISHERIES BY GEAR TYPE.

BY ALLOCATING EACH SPECIES TO A PARTICULAR GEAR TYPE, YOU HAVE TAKEN THE DEVISIVENESS THAT HAS BEEN IN THE INDUSTRY OUT OF THE EQUATION.

WHAT YOU WILL HAVE CREATED IS A SYSTEM WHERE EACH TYPE OF FISH IS CAUGHT BY A PARTICULAR TYPE OF GEAR. THIS PUTS PEOPLE TOGETHER THAT HAVE COMMON INTERESTS AND GOALS. HOPEFULLY, THIS WILL ALLOW THE INDUSTRY TO SPEND THEIR TIME WORKING ON CONSTRUCTIVE SOLUTIONS IN OUR RESPECTIVE FISHERIES, RATHER THAN SPENDING OUR TIME IN A FIGHT TO GET ENOUGH FISH TO SURVIVE.

I SEE THIS AS A FIRST STEP IN A PROGRESSION TOWARDS AN IFQ OR SOME OTHER TYPE OF LIMITED ENTRY SYSTEM. I BELIEVE THAT THE BATTLE FOR AN IFQ OR SOME OTHER TYPE OF LIMITED ENTRY SYSTEM IS GOING TO BE A LONG ONE. HOWEVER, I BELIEVE THAT BY ALLOCATING SPECIES TO A PARTICULAR GEAR TYPE, THOSE OF US IN THE INDUSTRY WILL HAVE SOME SENSE OF SECURITY ABOUT OUR FUTURE UNTIL AN IFQ OR SOME OTHER TYPE OF LIMITED ENTRY SYSTEM IS IN PLACE. RIGHT NOW EVERYONE OF US (NO MATTER WHAT FISHERY YOU ARE IN) HAS A VERY DARK FUTURE.

ONCE THE DECISION IS MADE TO DIVIDE THE "FISH PIE" BY GEAR TYPE, I SEE THE FOLLOWING STEPS BEING TAKEN:

1. IDENTIFY THE FISHERIES THAT ARE ALREADY BEING HARVESTED BY ONE GEAR TYPE. SOME OF THESE ARE POLLOCK, CRAB, AND FLAT FISH.

2. IDENTIFY THE SPECIES THAT ARE HARVESTED BY MULTIPLE GEAR TYPES.
   A. ESTABLISH CRITERIA TO DETERMINE WHICH GEAR TYPE WILL HARVEST THESE SPECIES. THE GEAR TYPE CATEGORIES COULD BE BOTTOM TRAWL, MIDWATER TRAWL, FIXED GEAR, LONGLINE, POTS.

AT THE TOP OF THE CRITERIA LIST SHOULD BE BYCATCH. THE GEAR THAT CAN CATCH THE MAXIMUM AMOUNT OF TARGET SPECIES WITH THE LEAST AMOUNT OF BYCATCH WOULD BE ALLOCATED THAT SPECIES. THE AMOUNT OF BYCATCH IS DETERMINED BY THE TONS OF TARGET SPECIES TAKEN WHILE TAKING SO MANY TONS OF BYCATCH. RATES ARE PURPOSELY NOT MENTIONED AS A TOOL FOR DETERMINING THE CLEANEST GEAR TYPE BECAUSE I BELIEVE THE CLEANEST WAY OF FISHING IS TAKING THE MAXIMUM TONS OF TARGET SPECIES FOR THE LEAST TONS OF BYCATCH. YOU ARE WASTING ANOTHER MAN'S LIVING WHEN YOU ARE CATCHING AND THROWING BACK A FISH THAT IS DEAD AND YOU CAN'T KEEP.

FULL UTILIZATION. THE GEAR TYPE THAT UTILIZES THE HIGHEST PERCENTAGE OF THE TARGET SPECIES WOULD BE ALLOCATED THAT SPECIES. THERE ARE CURRENTLY THOUSANDS OF TONS OF FISH BEING DUMPED THAT COULD BE UTILIZED BY ANOTHER GEAR TYPE.

DO NOT NECESSARILY BASE YOUR ALLOCATION DECISIONS ON MAXIMUM EFFICIENCY. THIS IS AN OFTEN USED ARGUMENT THAT CAN BE DEFINED TOO MANY WAYS TO BE USEFUL. IF WE WERE ALL AS EFFICIENT AS WE REALLY WANTED TO BE, WE WOULD BE TIED TO THE DOCK MOST OF THE YEAR AND THE COASTAL COMMUNITIES DEPENDENT ON THE FISHERIES WOULD BE GHOST TOWNS. THERE IS SOMETHING TO BE SAID ABOUT NOT BEING THE MOST EFFICIENT.

HISTORY, DEPENDENCY, AND THE ABILITY OF VESSELS TO BE ABLE TO CHANGE TO OTHER FISHERIES SHOULD THEY BE PREEMPTED, ARE IMPORTANT CRITERIA.

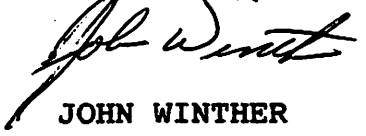
AFTER EACH SPECIE AND GEAR TYPE HAS BEEN IDENTIFIED, THE COUNCIL SHOULD THEN LAY OUT MANAGEMENT OPTIONS. THIS IS THE PART THAT I SEE AS BEING THE MOST DIFFICULT. BUT BY ALREADY HAVING ALLOCATED EACH SPECIE TO A GEAR TYPE, I BELIEVE YOU WILL HAVE PEOPLE MORE WILLING TO WORK TOGETHER BECAUSE THEY HAVE A COMMON DENOMANATOR- THE SAME GEAR TYPE.

I ALSO THINK BY DOING THIS GEAR-SPECIE ALLOCATION SYSTEM FIRST, YOU COULD MAKE THE COUNCIL MEETINGS SPECIE SPECIFIC AND THEN YOU WOULD HAVE ONLY THOSE PEOPLE THAT ARE INVOLVED IN THAT FISHERIES AT THE MEETING. I THINK THIS WOULD IMMENSELY STREAMLINE THE COUNCIL MEETINGS. I FIRMLY BELIEVE THE MEETINGS WOULD BE SHORTER AND MUCH MORE PRODUCTIVE. THE WAY IT IS NOW, EVERY MEETING IS ATTENDED BY EVERYONE INVOLVED IN EVERY FISHERY. EVERYONE IS TRYING TO MAKE IT THE BEST FOR THEMSELVES AND IT IS A WONDER ANYONE WALKS OUT OF A MEETING WITH ANY SENSE OF ACCOMPLISHMENT!

ALSO, BY HAVING GEAR SPECIFIC FISHERIES, IT WOULD ENCOURAGE THE PARTICIPANTS TO WORK TOGETHER TO DERIVE THE GREATEST BENEFIT FROM THAT FISHERY, INSTEAD OF LIKE IT IS NOW IN THE FISHERIES THAT ARE HARVESTED WITH COMPETING GEAR TYPES WHERE THE FISH ARE HARVESTED NO MATTER WHAT THE PHYSICAL CONDITION OF THE FISH, WHAT THE MARKET CONDITIONS ARE, OR HOW BAD THE BYCATCH IS.

I WOULD HOPE YOU WOULD GIVE THIS SERIOUS CONSIDERATION BECAUSE I REALLY BELIEVE THAT BY TAKING THIS APPROACH, IT WILL MAKE YOUR TASK MUCH EASIER AND AS A PARTICIPANT IN THE FISHERIES I FIRMLY BELIEVE THE PATH TO THE END PRODUCT WILL BE MUCH SMOOTHER AND EASIER.

SINCERELY,.



JOHN WINTHER

IDENT SEAFOODS CORPORATION
The American Connection

5303 Shilshole Ave. NW, Seattle, WA 98107 • (206) 783-3818 • Fax: (206) 782-7195
Domestic Sales: (206) 783-3474 • Fax: (206) 782-7246
Export Sales: (206) 783-3818 • Fax: (206) 782-7195

March 30, 1993

Mr. Robert D. Alverson, Chairman
Comprehensive Rationalization Committee
North Pacific Fishery Management Council
Post Office Box 103136
Anchorage, Alaska 99510

Dear Bob:

After many years of analyzing alternative fishery management measures, the economic theories supporting an Individual Transferable Quota (ITQ) fishery management system are well known by the seafood industry. All of the studies, however, have focused on the economic advantages that an ITQ management system would have over the existing open access system. No serious economic theory has been presented which discusses the important question of how quota shares should be allocated. Instead of reanalyzing how privatized fisheries compare to the Olympic system of fishery management, I urge the Comprehensive Rationalization Committee to begin analyzing the theoretical basis upon which quota shares may be allocated to the industry.

I recently received information, for example, on a meeting of trawl vessel representatives where they expressed strong opinions about proposals which would establish an ITQ system for groundfish. Not surprisingly, investors in harvesting capacity are opposed to any allocations of groundfish ITQs being made to investors in processing capacity. Investors in trawl vessels argue that if groundfish ITQs are allocated to vessel owners with a requirement that a certain percentage of groundfish be delivered inshore (for example, 35% as required by the current inshore/offshore pollock allocation) shorebased processors will be no worse off than they are today. Further, if shorebased processors really are more "efficient" than the offshore processing fleet, shorebased operators can "out-bid" factory vessels for deliveries of pollock and therefore prevail over the factory fleet.

My understanding of economic theory, however, leads me to a completely different conclusion. The recipients of quota shares will receive all of the rents from the resource. The fact that the processing sector, like the harvesting sector, overcapitalized based on the existing open access system of fishery management, will also allow quota share holders to "use for free" investments that people have made in the processing sector. This outcome is not changed by requiring 35% of the resource to be delivered inshore.[1] The issue of whether the inshore or offshore processing sector is more "efficient" is irrelevant if the

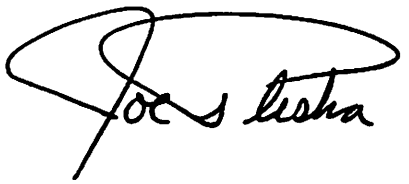
[1] If the percentage that was required to be delivered inshore was so great as to equal the full capacity of the shorebased processing sector, then investors in harvesting vessels, as quota share holders, would not be given the ability to expropriate investments made in the shorebased sector "for free." Investors in harvesting vessels, as quota share holders, would still receive the entire economic rent from the fishery resource.

inshore processing sector does not receive allocations of quota shares.[2] If the shorebased sector is more efficient, it only means that the value of the investments which will be expropriated by investors in harvesting capacity (as quota share holders) will be greater.[3]

The sablefish and halibut ITQ program justified its allocation of quota shares to owners or leaseholders in fishing vessels by stating that these investors were principally responsible for the financial risk undertaken in developing the fishery. Simply stated, there is no economic rationale for allocating groundfish ITQs to investors in the harvesting sector of the fishery while disenfranchising investors in the processing sector. Both sectors incurred risk developing the fishery. With regard to the Comprehensive Rationalization Committee's consideration of a groundfish ITQ system, if there is a sociological theory (or some economic theory of which I am unaware) for an allocation of groundfish quota shares to only one sector of investors, that theory should be articulated and a study justifying that rationale should be undertaken.

In conclusion, the ITQ system is controversial and the Comprehensive Rationalization Committee has done an excellent job of studying the impacts of an ITQ system in comparison to open access. The allocation of quota shares is likely to be even more controversial, however, and I urge the Committee to begin studying the economic theory upon which it will base its recommended allocation decisions.

Sincerely,



Joseph T. Plesha

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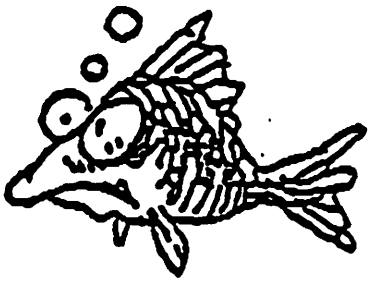
[2] Investors in shorebased and mothership processing are the one sector of investors at risk of being disenfranchised. Factory trawl vessels, of course, harvest and process fish. A significant portion of the fleet's harvesting capacity is a result of the fact that vessels do not have to deliver their catch to another processing platform. (If a factory trawl vessel had to take the time to deliver its catch to another processor, the vessel's total tonnage of harvest would be reduced.) Therefore, allocations of ITQs made to investors in factory trawler vessels based on the vessels' harvest history is, to a large degree, an allocation made to investment in processing capacity.

[3] This is an interesting side issue. Because factory trawlers catch the fish they process, if allocations of ITQs are given only to investors in harvesting capacity, owners of factory trawlers would receive a large portion of the allocations of ITQs for groundfish in the North Pacific. The value of these quota shares could be used to finance technological improvements that could make factory vessels more efficient. Shorebased processors, on the other hand, would have the value of their investments greatly diminished, thereby making it difficult to finance technological improvements. Further, economic rent resulting from technological development would be transferred to the quota share holders anyway, reducing the incentive for shorebased processors to make such investments. If ITQs are allocated only to investors in harvesting capacity, the offshore processing sector will *become* more efficient than the shorebased processing sector, regardless of whether it is currently.

North
Pacific
Longline
Association



April 19, 1993

Mr. Bob Alverson, Chairman
Comprehensive Rationalization Committee
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK 99510

RE: Comprehensive Rationalization

Dear Bob:

We have not developed a detailed IFQ proposal for freezer-longliners, though John Winther and Ron Hegge are submitting proposals which should be given careful consideration. Rather, we have submitted comments (attached) which express certain facts and principles that we feel should guide such development of such a program:

1. Freezer-longliners have traditionally played a significant role in the fisheries of the North Pacific. Recently American-owned freezer-longliners have replaced those owned and operated by the Japanese. These vessels produce a premium product with conservation-oriented fishing technology - continuation of these practices should be encouraged;

2. The Council has developed a careful release program to ensure that longliners inflict minimal mortality on halibut bycatch. It is considering proposals for a change in the opening date for the BSAI cod fishery, seasonal apportionment of cod TAC, and gear restrictions. These proposals should be implemented before IFQ's are considered (please see attached proposal by John Winther);

3. IFQ programs for fisheries in different stages of development and accessable by different gear types may require different qualifying criteria and implementation schedules - no single formula will accommodate these complexities;

4. A true test of contemporary "dependence" on a fishery for any species should be developed, and IFQ allocations weighted accordingly. DAP participation should take priority over JVP participation in determining credit towards IFQ's - national policy has encouraged DAP

development, and joint venture participants paid for their vessels many times over during the statutorily-created transition from TALFF to DAP;

5. Artificial cutoff dates for catch history qualification should be approached cautiously, as "fully utilized" fisheries continue to develop and become more conservation-oriented, yielding greater benefits to the nation;

6. Credit towards IFQ's should be given for retained catch, only; no credit should be given for discards;

7. The advantages of conservation-oriented fishing for species other than cod, such as turbot, sablefish and rockfish should be considered by the Council in developing IFQ programs; and

8. The Council may wish to develop policies towards auctions or extraction of economic rent from the IFQ fisheries - environmental/public interest groups have expressed concern about windfall gains and conflicts of interest in this regard.

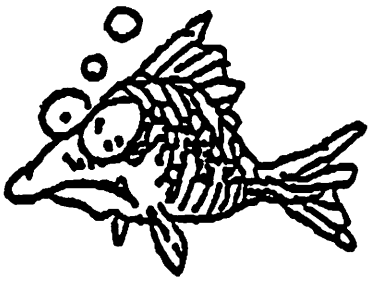
We thank you for your attention.

Sincerely,

Thorn

Thorn Smith

North
Pacific
Longline
Association



November 10, 1992

Mr. Robert D. Alverson, Chairman
Comprehensive Rationalization Committee
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK 99510

RE: Comments and Recommendations, Comprehensive Rationalization

Dear Bob:

The North Pacific Longline Association represents freezer-longliners which fish for cod and sablefish in the Gulf of Alaska and Bering Sea/Aleutian Islands area. Having reviewed the discussion paper on "comprehensive rationalization", we would like to offer the following comments and recommendations.

We share the view that no single management technique or simple formula is likely to resolve the great variey of issues which arise in the management of a number of fisheries in different stages of development. Fisheries which are "fully utilized" may not be "fully developed" in the sense that optimal harvesting and processing techniques may still be evolving. Any management regime should encourage this continuing development. We hope the Council will exercise care in this regard as it seeks to "rationalize" the fisheries under its jurisdiction.

Background - Freezer-Longliners

Although freezer-longliners have traditionally played a significant role in the fisheries of the North Pacific, it is only in recent years that American-owned freezer longliners have appeared. Prior to that time Japanese longliners were dominant in our waters and in the marketplace. With the elimination of foreign longliners came access to markets which pay premium prices for longline-caught, frozen-at-sea product. Growth of the American longline fleet has been encouraged further by the substantial surpluses of cod left unharvested by the trawl fleet each year; longliner harvest of cod in the BSAI has increased from 47,000 mt in 1990 to 90,000 mt in 1992. Demand for high quality longline-caught cod continues.

This trend is reflected in other countries where cod stocks are managed - Norway, Iceland, and Canada. There it is recognized

that proper management of fish stocks should be based not only on total catch quotas, but also on how the quotas are taken - what gear types are used. The use of hook-and-line gear is encouraged because it is species and size selective, minimizes bycatch and discards, yields product of the highest quality, avoids accelerated fishing on spawning stocks*, and has little or no destructive effect on the environment. Recognizing the potential advantages of such conservation-oriented fishing, the Council has approved analysis of a gear preference proposal - BSAI Amendment 24.

Traditional Management

IFQ systems may not be necessary or appropriate for some fisheries. Traditional management approaches have not yet been fully explored. For example, authorities now being developed by the Council may be sufficient for management of the cod fisheries. These include seasonal cod TAC apportionment, gear preference, careful halibut release, and a change in the opening date of the cod season (new proposal - see attachment, "Table 1"). Such measures could assure a long winter season when cod are in prime condition, access by all gear types, high product quality, high prices, and limited fishing pressure on spawning stocks.* We feel that these proposals should be implemented and the fisheries allowed to develop along conservation-oriented lines before IFQ's are considered.

IFQ Program

If the Council wishes to include all species in an IFQ program, it should consider the following:

A. Different Species May Require Different Treatment

While some species are available only to a single gear type (pollock, crab), others are harvested by multiple gear types (cod, turbot, rock fish). Harvesting and processing techniques for some species (particularly cod) are still evolving in response to bycatch, discard and market considerations - even though they are "fully utilized" (note that BSAI cod was fully utilized for the first time in 1992). Development of IFQ programs for these species may be considerably more complicated than for a species like pollock. Such programs may require different qualifying criteria and different time schedules for development and implementation.

B. Fixed Gear Preference

Council Document #13 (April 1981) suggested that significant savings of prohibited species could be achieved through the exclusive use of hook-and-line gear for bottom species such as cod, sablefish, and large flounders (turbot). A considerable body of scientific, academic and descriptive material has emerged since that time which stresses the value of conservation-oriented fishing. In response the Council has ordered analysis of a proposal to give fixed gear operators preferential access to BSAI

cod. Should the Council respond favorably to this proposal, logic would suggest that IFQ's for the directed cod fishery would go only to fixed gear operators.

C. Dependence on the Fishery

"Dependence" has been a key concept in developing theories on how IFQ's should be initially distributed. A long "catch history" does not necessarily indicate "dependence" on a fishery, particularly where the vessel has been amortized over time and has participated in other fisheries. Freezer-longliners now fish almost exclusively for cod, and are in every sense dependant on that fishery. We feel that a true test of "dependence" should be developed. The percentage of a vessel's total income which is derived from the fishery for a certain species should weigh heavily in the distrubution of IFQ's for that species.

D. Catch History

Another key concept in the distribution of IFQ shares is "catch history." With regard to the BSAI fishery for cod, freezer-longliners have been taking fish which were not taken by other gear types, and which would not have been harvested but for freezer-longliner participation in the fishery - some 90,000 mt in 1992. There is no reason to deny them IFQ's for at least that share of the available quota.

The central purpose of federal fishery management is to maximize benefits to the nation derived from our marine fisheries. Maximization may be in sight when DAP is harvested for the first time - though it may not yet have been fully achieved. Fisheries continue to evolve, guided by conservation and market considerations. Benefits to the nation grow. There is no good reason not to take this further evolution into account in devising an IFQ system. Artificial cutoff dates should be approached with caution.

E. Discards

Discards present a difficult managment problem. This year the BSAI cod fishery was closed because it was belatedly discovered that some 22,000 mt of cod - worth approximately $20,000,000 in the marketplace - had been discarded. Hopefully this sort of waste can be reduced. In any event, it would be unreasonable to give anyone positive credit towards ITQ's for having harvested and discarded cod or any other species.

F. Other Species

Other groundfish species may be harvested with hook-and-line gear, such as turbot, sablefish, and rock fish. Using hook-and-line gear to harvest those species will bring the same conservation advantages as are presently achieved in the cod fishery. We are

hopeful that the Council will consider these advantages in any IFQ system it may develop.

G. Auction

In testimony before the Senate Commerce Committee at a recent hearing on the Magnuson Act amendments of 1990, the Center for Marine Conservation describes the council system as being "rife with conflict." It continues:

"Perhaps even more disturbing is the notion that marine fish - a public trust resource - stand out as the only commercially exploited natural resource in America that is not subject to sales, leases, license, or any mechanism to compensate the public for their taking or to charge the user for their use. The FCMA does not provide any mechanism for compensation of the public trust in cases where a council decides to limit access to a fishery through a form of transferrable property rights. The Act forces the councils to enact a windfall; a giveaway of valuable public resources..."

The Center recommends creation of mechanisms to collect economic rents.

It seems inevitable that environmental and public interest groups will focus on this issue. Rumor has it that bids for CDQ pollock are being taken as indicators that there is a surplus which could be recovered by the public. The Council's discussion paper contains a forthright statement of the possible use of auctions, and concludes that "...if it is determined that it clearly is forbidden by the Act, there will be an opportunity to change this part of the Act during the Congressional reauthorization that is scheduled for 1993." The Council may wish to develop a specific policy towards such an amendment, to avoid later claims that the fishing industry which dominates the Council is "giving itself public property."

Conclusion

Some of the fisheries under the jurisdiction of the Council are still developing, in the sense that optimal conservation-oriented harvesting and processing techniques continue to evolve. Freezer-longliners provide this sort of capacity in the BSAI cod fishery, and have the potential for doing so in other fisheries. Traditional management authorities now being analysed by the Council may eliminate the need for IFQ programs for these fisheries. These management techniques should be implemented and the fisheries allowed to develop along conservation-oriented lines before IFQ programs are considered.

If the Council should choose to develop IFQ programs for all fisheries under its jurisdiction, the following points should be considered:

1. IFQ programs for fisheries in different stages of development and accessable by different gear types may require different qualifying criteria and implementation schedules - no simple formula is likely to accommodate these complexities;

2. Should the Council elect to give fixed gear operators preferential access to cod and other species, IFQ's for directed fishing for those species should go only to fixed gear operators;

3. A true test of "dependence" on a fishery for any species should be developed, by determining what percentage of a vessel's annual income comes from that fishery; allocations of IFQ's should be weighted accordingly;

4. Freezer-longliners should be given full credit for their current harvest of BSAI cod; artificial cutoff dates for catch history qualification should be approached cautiously, as "fully utilized" fisheries continue to develop and yield greater benefits to the nation;

5. Vessels should not be given positive credit towards IFQ's for amounts of any species which they have discarded in the past;

6. The Council should consider the advantages of conservation-oriented fishing for species other than cod, such as turbot, sablefish, and rockfish; and

7. The Council may wish to develop a specific policy regarding amendment of the Magnuson Act to allow auctioning of IFQ's at the outset.

Thank you for your attention. We hope these comments are helpful.

Sincerely,

Donald C. Iverson

President

* NMFS and the Council have expressed concern about fishing on spawning stocks repeatedly:

"The Secretary finds also that the roe-season catch limit may help prevent adverse effects on the ecosystem and on future pollock productivity from intensive fishing mortality during the roe

season...there is uncertainty about the actual effects of such fishing. The complexity of the ecosystem can easily mask any statistical relationship between the abundance of pollock eggs and larvae, and the future abundance...of harvestable stocks of pollock. Given this uncertatinty, conservative limitation of the roe-season pollock harvest is reasonable." 56 FR 6292, February 15, 1991; and

"Concentration of effort on aggregated stocks raises concerns of overharvesting...and possible disruption of the spawning process...<u>This admonition is equally appropriate to the evaluation of concentrated fishing on aggregations of pollock and cod of the Bering Sea/Aleutian Islands and Gulf of Alaska</u>." (emphasis added) DRAFT Environmental Assessment, BSAI Amendment 18, Section 2.3.2.

comprat2

INDEPENDENT FISHERMEN FOR FAIR QUOTAS
2420 26th Avenue West
Seattle, Washington 98199

Phone (206) 286-8969 ***Fax (206) 286-0591***

MEMBER VESSELS

ALASKAN BEAUTY	ALEUTIAN MARINER	ALSEA
AMERICAN EAGLE	ARCTIC EAGLE	ARCTIC MARINER
ARCTIC WIND	ALEUTIAN I	ARGOSY
BERING STAR	CAPRICE	DENALI
ENTRANCE POINT	FIERCE ALLEGIANCE	FLYING CLOUD
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NEPTUNE	NORDIC FURY	NORTH WESTERN
NORTHWEST MARINER	NORSEMAN II	OCEAN FURY
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INDEPENDENT FISHERMEN FOR FAIR QUOTAS
2420 26th Avenue West
Seattle, Washington 98199
Phone (206) 286-8969 ***Fax (206) 286-0591***

Statement of Principle, Objective and Purpose

Introduction

Under the present management system all commercial fisheries in the Exclusive Econimic Zone have become over-capitalized and fishery resources are over utilized. Fishery management has become increasingly politicized and inequitable, particularly with regard to allocation decisions. These trends are likely to intensify under either open access or license limitation. This in turn generates further destabilization of the resource and of the small fishing businesses and the lives of those who depend upon that resource.

The Principle

Accordingly, fishing vessel owners from across the various fisheries have formed a coalition founded upon the following principle:

The first preference in allocation should be granted to those individuals first and longest in the fisheries.

We believe this is consistent with the requirements of the Magnuson Act regarding allocation found in National Standard #4 and further elaborated in section 303 (b) (6)B.

The Coalition believes such preferential allocation is best implemented through an Individual Transferable Quota (ITQ) system.

The Objective

The objective of this Coalition is to work toward adoption of an ITQ system which would:

be a grant of ownership,
be based upon harvest history,
be to the harvesting vessel owner,
be expressed as a percentage of the TAC or Harvest Guideline,
be perpetual in tenure,
be fully and freely transferable among US entities

The Purpose

It is the desire and intent of this Coalition to participate in the wider ongoing discussion and negotiations concerning ITQs, both before the Council and within industry.

In doing so we recognize that other legitimate calls upon the resource may be made. However, before any particular claim is included in an allocation formula we would ask that the principled basis for it's inclusion be clearly defined and weighted by merit.

We believe that legitimacy of our claim rests upon our history of dependence, past to present, upon the resource. It is the purpose of this Coalition to educate the decision makers and the US public to endorse these principles as the first basis for allocation and ensure that if compromises become necessary, the position of those first and longest in line be compromised last and least.

AMERICAN FACTORY
TRAWLER ASSOCIATION

A

COMPREHENSIVE RATIONALIZATION PLAN

FOR

THE NORTH PACIFIC FISHERIES

Submitted to the
Comprehensive Rationalization Committee
of the
North Pacific Fishery Management Council
by the
American Factory Trawler Association
April 19, 1993

4039 21st Avenue West • Suite 400 • Seattle, Washington 98199
Telephone: 206-285-5139 • Fax: 206-285-1841

The membership of the American Factory Trawler Association (AFTA) was one of the first groups of fishermen to support Individual Transferrable Quotas (ITQs) as the preferred tool for rationalization of the North Pacific EEZ fisheries. This position paper identifies AFTA's views on the essential ingredients required to implement a successful groundfish ITQ program in the North Pacific.

1.0 Basis for Calculating Initial Transferrable Quota Shares

- All JV and DAP harvests since the implementation of the FMCA should be recognized in terms of their duration and relative contribution to the successful "Americanization" of the North Pacific fisheries. Provided that reliable government records are available to document each vessel's catch, vessel catch histories should be based on the period January 1, 1976 through the Council-adopted "Moratorium" of June 24, 1992.

- JV and DAP harvests must be recognized for their disparate contribution in achieving the FMCA goal of developing a domestic seafood industry. To achieve this end, all harvest processed domestically must be weighted by the relative contribution the activity made to the United States relative to JV deliveries to foreign processors. The ratio of value for domestic caught and processed groundfish products to foreign over-the-side sales has been estimated to be at-least 3.5 to 1.

- There should be no preference to harvests which occurred at different points of the "Americanization" process. For example, one metric ton of DAP harvests in 1985 would count the same as one metric ton of DAP harvest in 1992. Early JV sales would count equally to later JV sales.

- Vessel catch histories for all non-PSC groundfish must be based on total catch. Absent comparable information on discards and meal production from all JV, foreign mothership, and catcher boats -- total catch calculations represent the best basis for deriving all initial quota shares. All directed and indirected catch above a vessel's quota must be purchased in an open market. This aspect of the ITQ program is essential for improving utilization of the resources.

- Initial allocations of prohibited species by-catch must be "awarded" as part of the initial ITQ quota shares. These initial allocations should be based on 3-year fleet average historical rates.

2.0 Basis for Attribution of Quotas

- Tradable quota shares should be based on each vessel's catch history.

- Initial quota shares would accrue to a vessel, not to various historical owners of a vessel. Provisions would be made for a limited number of predefined exemptions, such as vessels lost at-sea.

- To promote the desired reduction in the number of operating units, the initial quota shares must be distributed to the vessel's "owner of record" at the time of the initial distribution. Vessel creditors would not be eligible for the initial distribution of quota shares. After distribution, quota shares would be totally independent of individual vessels.

- Because, ITQs are a tool for allocating fishing efforts, all DAP harvest must be credited to the fishermen, not to processors. Processing plants should not directly receive initial quota shares.

3.0 Breadth and Organization of Program

The rationalization program should be comprehensive and implemented for the broadest number of species complexes and regions. The individual quotas, however, must be organized around species complexes and their associated subpopulations needed to support effective biological supervision. The species management units for which individual ITQ's should be created are:

- Pollock;
- Atka mackerel;
- Pacific cod;
- "all" rockfish;
- rock sole;
- sablefish;
- yellowfin sole; and
- "other" flatfish (The creation of a Greenland turbot quota is being researched and would be adopted if subsequently shown to be a viable independent fishery).

Geographic subareas should consist of the:

- Bering Sea;
- Aleutian Islands;
- Eastern Gulf;
- Central Gulf; and
- Western Gulf.

The historically larger harvests of pollock in the Aleutian Islands should initially be treated as Bering Sea catch history, until such a time as these quota shares could be transitioned to this subarea.

In general, the rationalization must eliminate regulations which are rendered obsolete by an ITQ program (i.e., "inshore operational area"). Core conservation regulations, such as mesh size, should remain.

4.0 Requirements to Establish Competitive and Liquid Market for Quota Shares

Virtually all the biological, economic and social benefits of ITQs are inseparable from the tradeability of the quota shares created. To achieve this end, a competitive and liquid market within each of the subquota areas (i.e., P cod: Central Gulf) must be created and maintained. The following positions are supported to achieving this objective:

- Limits of trading quota shares between gears, user groups and vessel sizes will directly erode the benefits of an ITQ program.

- To assure short-term benefits, there should be no waiting period to consolidate or lease quota shares. AFTA does, however, recognize the need for a two year moratorium on the outright sales of shares to allow for the appeals process to be completed.

- Artificial limitations on where quota share holders deliver or sell catch must be avoided since they directly interfere with the intended rationalization process.

- There should be no limits imposed on the leasing or sale of quota shares as long as no firm, or group of firms, obtains excessive shares which jeopardize the competitive market for these quota shares.

- While the initial allocations would be exclusively to fishermen, processing plants, communities, or other interested parties would be eligible to participate in the fishery by acquiring outright or leasing shares.

5.0 Program Administration

- Because the benefits of an ITQ program accrue over an extended period, the duration of the program must approach a perpetuity.

- Oversight by the Council should be limited to traditional resource management tasks such as the annual setting of TACs.

- It is recognized that some type of Appeals Board will be required. The opportunities for appeal to the Board should be minimized and the Board should exist for no

more than two years. Further, custody of this Board must reside with a designate of the Secretary of Commerce.

- The need for strong enforcement and appropriate penalties is recognized and applauded.

6.0 Role of Community Development

Community development programs are recognized as an important role for the State of Alaska. The experience with the current programs should be evaluated before considering additional programs.

4/19/93

Statement on Comprehensive Rationalization

We, the undersigned Community Development Quota organizations, jointly endorse the following statement regarding Comprehensive Rationalization for North Pacific fisheries.

1. We continue to encourage the North Pacific Fishery Management Council to consider Comprehensive Rationalization as a conservation measure while reserving our position on specific management systems. The proper management and protection of the North Pacific ecosystem is of far greater importance to the nation than any short term economic interests. The communities of the Bering Sea coast, Aleutian and Pribilof Islands have depended on a healthy ecosystem for centuries, and always will.

2. As the council considers management alternatives in the Comprehensive Rationalization planning process, Community Development Quotas must remain within the scope of the council's deliberations. Community Development Quotas are an effective management tool that meet the national standards of the Magnuson Fishery Conservation and Management Act and the comprehensive fishery management goals of the council.

Aleutian Pribilof Island Community Development Association

Bristol Bay Economic Development Corporation

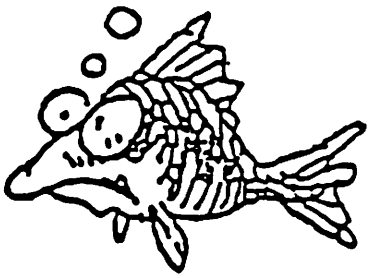
Central Bering Sea Fishermen's Association

Coastal Villages Fishing Cooperative

Norton Sound Economic Development Corporation

Yukon Delta Fisheries Development Association

North
Pacific
Longline
Association



TESTIMONY
NPFMC Comprehensive Rationalization Committee
April 19, 1993

Chairman Lauber, members of the Council, my name is Thorn Smith. I am Executive Director of the North Pacific Longline Association, which represents freezer-longliners who harvest and process groundfish off Alaska.

Freezer-longliners have traditionally played a significant role in the fisheries of the North Pacific, particularly in the cod fishery. In recent years American-owned freezer-longliners have replaced foreign-owned vessels in the fishery, and have harvested large amounts of cod which in previous years had been left unharvested by DAP trawlers - enabling American fishermen to achieve OY in the fishery for the first time. Freezer-longliners employ modern conservation-oriented technology to produce high-quality products for a demanding market. We sincerely hope that the Council will encourage continuation of these practices in any IFQ program it may develop.

Over the last two years the North Pacific Fixed Gear Coalition has brought to your attention the many conservation advantages of fixed gear fishing. Fixed gear operators using modern equipment are able to harvest considerable quantities of groundfish while inflicting minimal mortality on bycatch species. The gear is species and size selective, has little or no destructive effect on bottom topography or fauna, and does not present a threat to spawning stocks or the spawning environment.

We are confident that as time goes on the fleet will continue to make improvements in its operations. In the video tapes we have distributed you have seen that when fish are taken one at a time, it is possible to carefully release bycatch species without serious injury - and you are aware of our extensive efforts to implement these practices. You have also seen in the longline research video a variety of gear modifications which can improve our conservation - oriented performance under varying conditions.

Changes and improvements in processing techniques and product forms continue, as well. While most freezer-longliners were originally designed to produce high quality head-and-gut product, they can easily be modified to produce

4209 21st Avenue West, Suite 300, Seattle, Washington 98199
TEL: 206-282-4639; FAX: 206-282-4684

other product forms. One of our vessels is now producing fillets with Baader machines, and others have indicated an interest in this development. We are also investigating markets for cod heads and collars. Any management decision respecting this fleet should anticipate further improvement in our conservation practices and economic output. As Dave Little stated in earlier testimony, "You haven't begun to see what this fleet can do."

As a practical matter, the great bulk of the groundfish resource is available only to trawlers. Just a few species, comprising a small percentage of the overall groundfish OY, are available to fixed gear fishermen (cod, turbot, sablefish, rock fish). On the other hand a large proportion of bycatch and other conservation problems arise in the harvest of these latter species, and we believe that fixed gear should play a predominant role in the fisheries for them (please see Council Document #13, "REDUCING THE INCIDENTAL CATCH OF PROHIBITED SPECIES IN THE BERING SEA GROUNDFISH FISHERY THROUGH GEAR RESTRICTIONS"). If that is to be the case, certain considerations will have to come into play in designing IFQ programs for these fisheries.

Having approved a careful release program for halibut bycatch in the hook-and-line fisheries, the Council is now considering improvements in the management of the BSAI cod fishery - a change in the opening date for the fishery, seasonal apportionment of cod TAC (much like the pollock management authorities now in place), and gear restrictions. We feel that the Council should complete this work before developing an IFQ program for the fishery. John Winther has submitted a proposal which suggests that the Council should determine what gear should be used in the fisheries for all species, before developing IFQ programs for them. This would eliminate the "gear wars" aspect of IFQ development, and would enable fishermen within the different gear groups to work cooperatively. We agree with John.

It seems evident that fisheries for different species, in different stages of developoment and available to different gear types, will require different IFQ qualifiying criteria and implementation schedules. No single formula will accommodate these complexities. In developing IFQ programs for species accessible by fixed gear, the following should be kept in mind:

1. A true test of contemporary "dependence" on a fishery should be developed, and allocations weighted accordingly; dependence should outweigh historic participation in the fishery;

2. Only DAP participation should count towards IFQ credit. National policy as expressed in the Magnuson Act has encouraged DAP development - the harvesting and

processing of fish by Americans. Joint ventures were a statutorily-created transition from TALFF to DAP. Joint venture participants paid for their vessels many times over, and were well-rewarded for their efforts. A logical starting date for granting IFQ credit for a species would be the first year in which TAC for that species was entirely taken by DAP fishermen;

3. Artificial cutoff dates for IFQ qualification should be avoided. Our fisheries continue to develop and to become more conservaiton-oriented, yielding greater benefits to the nation. This further development should be encouraged and rewarded with IFQ credit;

4. IFQ credit should be given only for retained catch; no credit should be given for discards; and

5. The Council would be wise to develop some kind of specific policy to avoid windfall profits in the awarding of IFQ's, and to provide for the extraction of a reasonable amount of economic rent from the subsequent fisheries. There are many incidations that others will do this for us, if we don't - and we may not like what they do.

Thank you for the opportunity to testify. We hope that these comments are of help to the committee as it moves ahead.

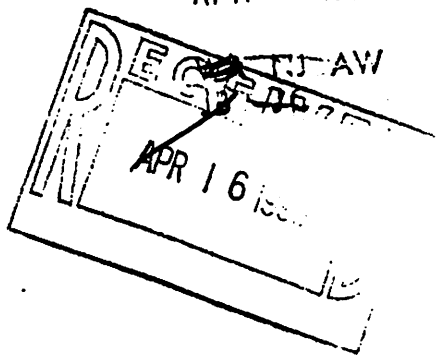
AGENDA C-6
Supplemental

CC
RACE
REFM
ABL
PAUTZKE
pls return
Cdy

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

APR 7 1993

APR 1 1993



MEMORANDUM FOR: Distribution*

FROM: Michael P. Sissenwine
Mike
Senior Scientist for Fisheries

SUBJECT: ITQs

The attached paper by Sissenwine and Mace (1992) is being cited widely by opponents of ITQs as (1) an example of the "failure" of ITQs in New Zealand, (2) to support the view that ITQs do not enhance conservation and (3) to argue that ITQs are expensive to implement. Since you may find yourself in the midst of the ITQ debate, it may be useful for me to provide my view about the implications of the paper for ITQ management.

(1) I think New Zealand's implementation of ITQs has many positive attributes, but they made some critical mistakes. Two of the most serious mistakes were "fixed quota in perpetuity" (note this is highlighted in the title of the paper) and an inadequate scientific basis for setting TACs (they had almost no stock assessment capability). I do not think we would be naive enough to make the first mistake. Inadequate stock assessments are a problem for TAC management in general with or without ITQs. Overall, the stock assessment situation in the U.S. is much better than in New Zealand.

Enforcement and the quality of fisheries statistics are also problems in New Zealand. These problems are exacerbated by ITQs. In my opinion, these are the most difficult aspects of ITQs for most fisheries.

The bottom line is that many of New Zealand's problems could have been avoided. Most of the problems have little to do with ITQs.

The U.S. should learn from New Zealand's mistakes. That is the reason the paper was written.

(2) In theory ITQs are not any more effective for conservation than open access TAC management or some other forms of management. This is indicated in Table 5 (if anyone wants to discuss the technical arguments give me a phone call). But, as the table indicates, ITQs may be better for conservation for a number of practical reasons. The paper cites the possibility that with ownership there may be greater

incentive for industry cooperation. I think it is even more likely that ITQs will lead to conservation because of improved economic health of fisheries (a benefit indicated in Table 5). Marginal fisheries cannot afford to cut their catches in the short term to increase long term benefits, whereas economically healthy fisheries can. That is, overcapitalization and dissipation of rent increase industry and political pressure to set current TACs as high as possible.

(3) In general, ITQ's are more expensive to implement than other forms of management. The costs of implementation must be balanced against the benefits. In theory, ITQs are the only one of the common forms of fisheries management that produce positive net benefits in the long term, in spite of the cost of implementation. But generalizations and theory are not enough as a basis for decisions about individual fisheries. The costs and benefits need to be compared on a case by case basis.

As the paper indicates, ITQs are not a panacea, and we should not mislead people to believe otherwise. But we should keep in mind that there is overwhelming evidence that open access leads to economically and biologically unhealthy fisheries. I believe strongly in some form of access control for virtually all fisheries. I also believe that fisheries management should explicitly control fishing mortality through either TACs or limits on effort units (e.g. days of fishing by types of fishing gear). Transferrable rights should be assigned to individuals to enhance efficiency (the definition of efficiency can account for social as well as economic values). Transferrable quotas are better (more efficient) than transferable effort units in theory, but in practice, the conclusion may vary for specific fisheries.

Of course these are only one persons views on a very complex subject. Feel free to share them, particularly with anyone who implies that I am against ITQs.

Attachment

Distribution*

Regional Directors
Science Directors
Office Directors
Foster
McKeen
Bane

cc: Swartz
Mace
Rosenberg

ITQs in New Zealand: The era of fixed quota in perpetuity

Michael P. Sissenwine
Headquarters, National Marine Fisheries Service, NOAA, Silver Spring, Maryland 20910

Pamela M. Mace
P.O. Box 7357, Silver Spring, Maryland 20907

Abstract.—On 1 October 1986, New Zealand introduced Individual Transferrable Quota (ITQ) management for most of its fisheries. ITQ management was implemented to address overfishing, overcapitalization, and excess government regulation. Quotas were based on catch histories, with a quota "buyback" (costing $42.4 million NZ) and prorated cuts to achieve total allowable catch (TAC) levels indicated by preliminary stock assessments. Fixed amounts of quota (defined by weight) were issued in perpetuity. Annual stock assessments are conducted. Government stated that it would buy or sell quota at market-determined prices in order to adjust TACs. On 1 April 1990, ITQs were redefined as proportions of annual TACs (known as "proportional ITQs"). Government extracts resource rent.

To date, there is little evidence of improvement in the condition of the fisheries resources. It is difficult to determine the economic effects of ITQ management; however, economic conditions have worsened due to factors which are unrelated to ITQ management. Revenues to government from the ITQ system have exceeded total costs, but there would have been a deficit if government had purchased quota to reduce TACs to the levels indicated by stock assessments. Government regulation has not been reduced.

Although there is general support for ITQ management in New Zealand, many problems have been encountered: quota overruns resulting from bycatch; inadequate stock assessment capability; disagreement over the level of resource rentals; and failure of government to enter the marketplace to reduce TACs when necessary.

Manuscript accepted 16 December 1991.
Fishery Bulletin, U.S. 90:147–160 (1992).

The idea of managing fisheries by Individual Transferable Quotas (ITQs) is not new. Christy (1973) suggested the method, and Maloney and Pearce (1979) provided the economic rationale for it. Until recently, there were only a few applications of ITQ management (e.g., southern bluefin tuna, Geen and Nayar 1988; Lake Erie freshwater fisheries, Muse and Schelle 1989). One application that has received considerable attention is the ITQ management of fisheries in New Zealand. Two reasons for this attention are that (1) New Zealand is applying ITQ management on a more comprehensive national scale than ever before, and (2) New Zealand officials have done a good job of describing their ITQ system to the rest of the world (e.g., Clark et al. 1988, Crothers 1988). New Zealand's early experience with ITQ management is of interest to the United States because ITQ management is being planned or discussed for several fisheries (e.g., Pacific sablefish and halibut, South Atlantic wreckfish, and East Bering Sea groundfish). It has recently been implemented for Mid-Atlantic surf clams and ocean quahogs. This paper reviews the potential benefits and problems of New Zealand's ITQ management system based on firsthand observations of the authors.[1] The main body of the paper was completed in mid-1990. A postscript has been added to reflect more recent events through 1991.

Before describing the fisheries management situation in New Zealand, the authors want to caution that by pointing out problems, they are not condemning the ITQ system. Despite problems, there seems to be a general acceptance that ITQs are the way New Zealand fisheries will be managed. There is no widespread sentiment, either within government or the industry, to repeal ITQs. A regional poll conducted shortly after implementation of the ITQ system (Dewees 1989) found that the majority of the fishing industry favored it. It would be interesting to repeat the poll nationwide now. The authors are of the opinion that the industry would not want to return to the fisheries management situation (or lack thereof) that preceded ITQs.

New Zealand fisheries setting

Fisheries have always been important to New Zealand. Legend has it that a Maori (the native people of New Zealand) pulled up the North Island of New Zealand from the sea on a hook-and-line while fishing. Fishing was so important that the

[1] The authors of this paper were fortunate to have the opportunity to observe ITQ management in New Zealand firsthand. The first author made six trips to New Zealand during the first three and a half years of ITQ management, including approximately seven months employed by the New Zealand Fisheries Research Centre. The second author was employed by the New Zealand Fisheries Research Centre from August 1986 until May 1989. Both authors maintain contact with the fisheries management situation in New Zealand through their previous affiliations.

Treaty of Waitangi between the Maoris and the British, signed in 1840, deeds the Maoris' rights to their traditional fisheries.[2]

Although New Zealand is a small nation in terms of population and land area, its Exclusive Economic Zone (EEZ) of 1.3 million nm^2 (more than 15 times the land mass) is the fourth largest in the world. Most of the EEZ is deep; 72% of the zone has waters deeper than 1000 m, so it is difficult to judge the total potential yield.

Historically, New Zealand fisheries were restricted to coastal waters (<200 m in depth) and yielded less than 50,000 tons annually (Fig. 1). Deepwater fisheries (to 1500 m) developed during the 1970s, and the yield increased rapidly to a peak of about 500,000 tons in 1977. Most of the increase was due to foreign fishing. In 1978, New Zealand extended its jurisdiction to 200 miles. The yield decreased sharply for a few years, but it has since returned to about 500,000 tons. Since extended jurisdiction, domestic fishing has replaced almost all of the foreign fishing. However, it should be noted that much of the catch recorded as domestic is actually taken by foreign vessels and foreign crews under contract to New Zealand firms. In 1987, the first sale value of the catch was about $350 million NZ.[3] The export value of New Zealand fisheries products increased from $50 million NZ in 1977 to $676 million NZ in 1987. The 1987 figure represented about 6% of New Zealand's total exports (Bevin et al. 1989).

Fisheries management began with the Fisheries Act of 1908 which established authority for input controls, such as limited entry licensing, closed areas and seasons, controls on minimum fish sizes, and requirements for vessels to land at specific ports. The actual basis for the number of licenses allowed in the fisheries is unclear. Restrictive licensing was repealed in 1963.

New Zealand established authority for output controls (i.e., total allowable catches, or TACs) in 1978 when it extended jurisdiction. At the same time, a moratorium was placed on new fishing permits for rock lobsters and scallops. In 1980 the moratorium was extended to finfish permits. In 1983, a Deepwater Enterprise Allocation system was established. Deepwater Enterprise Allocations were a forerunner of ITQs. Quota for each of the species fished in deep water (below about 200 m) was allocated to nine companies which had already invested in deepwater harvesting and shoreside processing capability. The motivation for the Deepwater Enterprise Allocations was not overfishing or overcapitalization. It was intended to prevent these ills from occurring (Clark et. al. 1988) Presumably, it also encouraged investment in the deepwater fisheries and hastened the replacement of foreign fishing activity by domestic fishing. The quotas were initially awarded for a period of ten years, but were made permanent in 1985. Although the government had no authority to make quotas transferable, there was considerable de facto trading and leasing of shares among the nine companies.

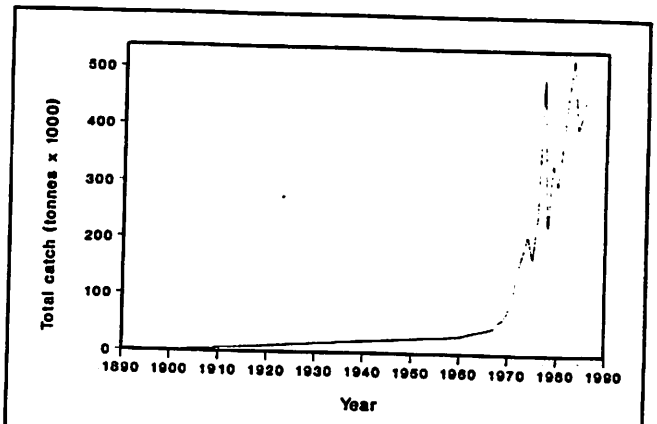


Figure 1
Annual yields from New Zealand EEZ, 1890–1990.

New Zealand implemented ITQs for most of its fisheries in October 1986. The Government gave several reasons for introducing ITQs. According to Crothers (1988), "Fishery managers were faced with an open access inshore fishery under severe biological and economic pressure... many of the prime species were experiencing growth and probably recruitment overfishing... and the industry was overcapitalized, crippled by excessive government management intervention, and rapidly declining economic performance." A government publication titled "Inshore Finfish Fisheries: Proposed Policy for Future Management" (Anonymous 1984) stated that "...a broad description of the problem of the inshore fishery is that the major fish stocks are too low as a result of overfishing... there has been a moratorium on new entries to the inshore... part-time fisherman were removed administratively... this had a negligible effect on fishing effort or catch... the harvesting sector remains overcapitalized."[4] In summary, the government turned to

[2] The fishing heritage of the Maori people and the Treaty of Waitangi are more than a matter of passing interest. As will be discussed later in the paper, the Treaty of Waitangi has complicated implementation of ITQ management.

[3] Economic values are expressed in New Zealand dollars which equal about $0.58 U.S.

[4] While the removal of part-time fishermen may have had a negligible effect on fishing effort or catch, it did have social ramifications. Many of the part-time fishermen were Maoris. It could be argued that their removal was one of the factors that stimulated them to attempt to regain access to the fisheries through the courts under the Treaty of Waitangi.

ITQs because of perceived overfishing, overcapitalization, and crippling excess regulation.

Undoubtedly, the success of the Deepwater Enterprise Allocation system contributed to the decision to use ITQs to solve the perceived problems in the inshore fisheries. Clark et. al. (1988) labeled it as a model for inshore fisheries management. There was also a belief that problems could be solved only by applying some form of output controls (Sandrey and O'Donnell 1985), and that input controls had already been attempted and had failed (Crothers 1988). In fact, it is unclear how seriously input controls had been attempted, or how severely the fisheries were overfished or overcapitalized.[5] Of course, the failures of input controls or overfishing and overcapitalization are not prerequisites for ITQ management. It is better to put in place a property rights system, such as ITQs, before problems occur.

Implementation of ITQ management in New Zealand

The idea behind ITQ management of fisheries is quite simple. ITQs are intended to conserve the fisheries resource by setting a TAC. They increase economic efficiency by assigning ownership of portions of the TAC, thus eliminating competition between harvesters to obtain the largest possible share of the TAC. By making quota transferable, ownership should eventually rest with the most efficient harvesters, since they should be able to afford to pay the highest price to purchase quota. Excess capital is likely to be removed from the fishery as more efficient operators buy up enough quota to make optimal use of the capital that remains in the fishery.

In New Zealand, implementation of the ITQ management system began with stock assessments of all of the fisheries resources to be managed. Initially, this involved assessments of 153 management units, composed of 26 species-groups in up to 10 management areas per species-group. By April 1990, there were 169 management units, composed of 29 species-groups (45 species) and 10 major management areas. Forty-seven of these management units are of minor importance (in terms of amount of quota) with TACs established for administrative purposes only. There are insufficient data to conduct meaningful assessments for most management units. Initially, most of the TACs were based on one of two methods of estimation: (1) They were equated to landings in the most recent year(s) for which information was available, or (2) they were equated to the product of a trawl-survey biomass estimate and a stock productivity value in the range 0.05–0.15. The first method probably produced overly-optimistic estimates of sustainable yields since recent landings were often the highest on record. On the other hand, the second method may have resulted in overly-conservative estimates, since biomass estimates were conservative (due to conservative assumptions about the vulnerability of fish to trawl gear) and a maximum productivity level of 0.15 is low (although there are notable exceptions such as orange roughy). Other methods used to estimate a few of the initial TACs may have produced reasonable results. These included use of tagging data, yield-per-recruit analysis, and stock reduction analysis.

For the deepwater fisheries, TACs generally matched the sum of quota allocations under the Deepwater Enterprise Allocation system. These Deepwater Enterprise Allocations were converted directly to ITQs. In the inshore, a provisional maximum allocation was determined separately for each fishing permit holder as the average catch of that individual's best two out of the three fishing years of October–September 1981–82, 1982–83, and 1983–84. These catch histories were the basis for the initial allocation of quota defined in fixed amounts by weight. Since the allocations were based on the average of the best two-out-of-three years, it was likely that the "Sum of Catch Histories" (SCH) would exceed the maximum annual catch that had occurred during the base period. In addition, fishermen were given the right to appeal their allocations if they felt it did not represent their true share of the fisheries. Of the 1800 fishermen notified of their catch histories, about 1400 appealed, and many of these have subsequently increased their allocations. The appeals process is still ongoing even though the ITQ system has been fully implemented for more than three years.

If the SCH was equal to or less than the TAC, permit holders were allocated their catch histories as ITQ in perpetuity. TACs in excess of the SCHs were offered for sale. When the SCH exceeded the TAC, there was

[5] It is interesting that there were virtually no input controls on New Zealand fisheries during 1963–78 for rock lobsters and scallops and 1963–80 for finfish. Even after moratoria on new licenses were implemented in 1978 and 1980, there were no additional direct controls on fishing effort (e.g., limits on the number of days that could be fished), although there were some indirect controls (e.g., closed areas).

With regard to overcapitalization, the government estimated that the harvesting sector was overcapitalized by $28 million NZ in 1983, although details of how overcapitalization was defined and how it was estimated are lacking (Anonymous 1984). Investment (book value) in the harvesting sector in 1983 was estimated as $142 million NZ (Bevin et al. 1989). This indicates that the harvesting sector was overcapitalized by about 20%, which is almost certainly less than some North American fisheries (e.g., Mid-Atlantic surf clams, New England groundfish, Pacific halibut).

Clearly some inshore resources were overfished (e.g., snapper), but it is difficult to evaluate how serious the overfishing problem was in general. Stock assessment information is quite limited, as will be discussed later in this paper.

a Government buyback of quota. Crothers (1988) indicates that the buyback was to facilitate an orderly "rationalization" of the industry, and to help create a climate of support for ITQ management. Clark et al. (1988) indicates the buyback was to reduce the mismatch of fleet capacity to available catch. If the Government was not able to buy back as much quota as was necessary, prorated cuts in quota were made. This threat of proration probably encouraged permit holders to be more reasonable in determining the selling price of their provisional allocation of quota.

The buyback cost the Government $42.4 million NZ to purchase 15,700 tons of quota (the annual amount the owners would have been entitled to catch in perpetuity). Prorated cuts were made to reduce quota by an additional 9500 tons. Presumably, the Government felt that the potential increase in value of the fishery when overfished stocks recovered merited the cost of the buyback and the short-term losses that resulted from prorated cuts.

Relatively few stocks accounted for most of the cost of the buyback. Table 1 indicates that more than 85% of funds spent on the buyback were used to buy quota for four species (mostly in one management area where traditional inshore fisheries are prosecuted). Nearly 50% were used for the snapper fisheries. The total reduction from SCHs to TACs for the 1986–87 fishing year (which began 1 October 1986) was 6%. For the 21 species that were involved in the buyback and prorated cuts, the reduction was about 24%. For the four primary species involved, the reduction was 54%.

Table 2 gives detailed information for the four primary species affected by the buyback and prorated costs. It is noteworthy that, in all cases, the SCH greatly exceeded the actual catch in the year just prior to ITQs (1985–86). This means that a portion of the quota that was bought back probably would not have been caught. In fact, in all cases the actual catch in the first year of the ITQ system (1986–87) was lower than the TAC. This suggests there may have been a declining trend in the resource condition from the base period when SCHs were established to the point in time when ITQs were implemented. It also seems likely, in the authors opinion, that SCHs were inflated by the industry (i.e., a moral hazard phenomenon) in anticipation of ITQs. As a result, the government may have spent much of the $42.4 million NZ to buy back quota which would not have been caught; therefore, the buyback may have had relatively little effect on fishing mortality rates.

Since ITQ management was implemented in 1986, stock assessments have been conducted annually for each management unit, to the extent that the available data allow. These assessments are conducted in Fisheries Assessment Meetings (FAMs) during the middle of the fishing year (April or May) in order to recommend TAC adjustments for the next fishing year (beginning in October). New Zealand law requires that the TAC be set to produce the maximum sustainable yield (MSY), as qualified by relevant factors including economic and environmental considerations and regional or global standards. Methods for estimating yields have been refined since 1985 when the initial TACs were calculated. New Zealand scientists now interpret MSY in two alternative ways: a static interpretation in which MSY is the maximum constant yield (MCY) that can be taken year after year from a fishery, and a dynamic interpretation in which MSY is the maximum average yield (MAY) that can be attained by varying the current annual yield (CAY) in response to fluctuations in stock size (Annala 1989 and 1990, Mace and Sissenwine 1989). MCY estimates are based on historic estimates of stock biomass from resource surveys, stock production models, or landings statistics. CAY estimates are generally based on recent estimates

Table 1
Buybacks and prorated cuts for implementation of New Zealand ITQ management.

Species	Tons reduced (1000s)	Payments ($NZ millions)	% Total $
Snapper	5.7	19.4	45.7
Rig	3.0	7.7	18.1
School shark	3.7	4.3	10.0
Hapuku bass	1.7	5.1	12.0
17 other	11.0	5.9	14.2
Total	25.1	42.4	100.0

Table 2
Relevant information for the four main species included in the buyback and prorated cuts under New Zealand ITQ management. Values in thousands of tons or $millions NZ.

	Hapuku bass	Rig	School shark	Snapper
Tons reduced	1.7	3.0	3.7	5.7
Cost of buyback	5.1	7.7	4.3	19.4
SCH (sum of catch histories)	3.3	4.4	6.0	12.2
TAC 1986–87 (total allowable catch)	1.7	1.4	2.4	6.5
Catch 1985–86	1.7	2.9	3.7	8.6
Catch 1986–87	1.1*	1.1*	1.9*	5.4*

* Provisional

of stock biomass and a target level of fishing mortality which is expected to produce MAY. Although the dynamic (CAY) strategy leads to higher average yields, the static (MCY) option has received the most attention for two reasons. First, the ITQ system was initially specified in terms of fixed weights of quota, valid in perpetuity. In practice, most TACs were constant. Second, the facilities for fisheries research are inadequate for providing frequent updates of stock status for all but a few of the more important fish stocks.

It should be recognized that FAMs are only part of the process of determining the level of TACs. The actual advice to the Minister of Fisheries on the setting of TACs is given by senior government officials who integrate stock assessment information with other considerations, including an evaluation of the risk to the resource of not adjusting a TAC. But the authors consider FAMs the best source of information on the condition of the fisheries resources, since they are open scientific meetings which formally document their deliberations and conclusions.

When ITQ management was implemented, the government stated that it would adjust the TAC by entering the market to buy or sell quota at market-determined prices. Government also reserved the option to make prorated cuts in quota. During the first three years of ITQ management, government either sold quota in perpetuity or leased annual quota for barracuda, hake, ling, orange roughy, hoki, and stargazer (Table 3). Most transactions were in the first year. A total of $84.2 million NZ was collected in quota sales and lease fees. But since the initial buyback when ITQs were implemented, government has not entered the marketplace to reduce any TACs,[6] despite the fact that the need for reductions has been indicated by several stock assessments (Annala 1989 and 1990; see next section).

Since ITQ management should increase resource rent, government charges an annual royalty (known as a resource rental) on quota holdings. In order to discourage speculation on quota (i.e., owning it without using it), resource rentals are charged on quota holdings rather than landings. This practice is an implied guarantee that fish are abundant enough for all quota to be caught without dissipating rent, which may not be the case due to assessment errors, failure to adjust TACs when assessments indicate TACs are too high, and because of varying economic conditions.

Gilbert (1988) estimated that the ITQ system could result in resource rents (referred to as surpluses in his paper) of 15–45% of the first sale value of the catch, depending on the species. His estimates reflect only the benefits of reducing effort relative to the open-access equilibrium (although the validity of an open-access equilibrium baseline is questionable for some of New Zealand's fisheries). They do not include the benefits of eliminating competition for shares of an overall TAC. If the average rent is 25% of the first sale value of the fishing, then there is the potential for government to extract at least $90 million NZ annually (i.e., 25% of the 1987 first sale) as resource rentals. Resource rentals averaged about $20 million NZ annually during the first three years of ITQ management.

Table 3
Revenues from sale/lease of quota under New Zealand ITQ management, 1986–89.

Species	Tons (1000s)	$NZ (millions)	% Total $
Barracuda	1.7	1.7	2.0
Hake	1.3	2.2	2.6
Ling	2.1	2.2	2.7
Orange roughy	7.8	23.4	27.8
Hoki	131.0	53.2	63.2
Stargazer	1.8	1.5	1.8
Total	145.7	84.2	100.1

On 1 April 1990, ITQs were redefined as portions of annual TACs. This eliminated the need for government to adjust TACs by entering the marketplace to buy and sell quota, and makes it more practical to vary TACs in response to the inherent variability in fisheries resources, and other factors (e.g., new scientific information). The change to proportional ITQs came at a time when government was facing a large liability (discussed further below) to buy quota to adjust TACs. Therefore, government agreed to freeze the rate of resource rentals for five years and redistribute the resource rentals to industry as compensation for TAC reductions.

What has happened under ITQ management

It is probably too early to conduct a formal evaluation of ITQ management in New Zealand. A transition period of 3–5 years, or longer, is to be expected. Many of the species in New Zealand are long-lived, and it is likely that adjustments in the condition of the resource, which ultimately affect the economic benefits, will be protracted. However, since some authors have already declared New Zealand's ITQ management a success

[6] The TAC for orange roughy on the Chatham Rise was reduced by exchanging quota in that area for quota on the Challenger Plateau. This was a temporary reduction for 1988–89, although stock assessments indicated that a permanent reduction was necessary.

(Clark et al. 1988), it is worth considering what has happened to date, to the extent this is possible given limitations in available information. As discussed earlier, government authors and government publications indicate that the ITQ system was put in place to address three problems: (1) conservation, (2) economic performance, and (3) government intervention. The initial effects of the ITQ system with respect to these problems are discussed below.

Conservation

There is little evidence of improvement in the condition of fisheries resources; but since stock assessment information is limited, it is difficult to know. The increase in TACs that lead to the revenues reported in Table 3 resulted from a reassessment of the stocks, and not an increase in abundance.[7] There is evidence that some stocks have declined, most notably orange roughy, which has been found to be much less productive than previously believed (Mace et al. 1990). The current TAC for the largest stock of orange roughy exceeds even the most optimistic estimates of long-term sustainable yield by a factor of three. ITQs are not responsible for the problem, but have done little to resolve it.

There are several species in addition to orange roughy in need of TAC reductions. There is accumulating evidence that TACs are too high in the long term for valuable species such as hoki, squid, paua, and rock lobster (Annala 1990). At the 1989 FAM (Annala 1989), MCY was estimated for 110 management units. Twenty-one of the estimates were within 10% of the TACs, 82 were less than 90% of the TAC, and only 7 were greater than 110% of the TAC. CAY was estimated for nine management units. One estimate was within 10% of the TAC, seven were less than 90% of the TAC, and one was greater than 110% of the TAC. In 36 cases, yield estimates were less than 50% of the TAC. Reductions in TACs, either immediate or gradually toward MCY or CAY estimates, were recommended for several species. In other cases, reductions were not recommended because of uncertainty in MCY or CAY estimates, because accumulated biomass was still being fished down (in new or developing fisheries), or because recent catches indicated it was unlikely the TAC would be reached. It should also be noted that "actual" TACs are now almost invariably higher than "official" TACs, mostly as a result of successful appeals to the Quota Appeals Authority. Some of the differences are trivial, but a comparison between actual and official TACs from Annala (1989) indicates that of the 122 scientifically-based TACs (i.e., excluding the 47 administrative TACs), 25% of the actual TACs exceeded the official TACs by more than 10%, and 6% were higher by more than 20%.

There are also many species for which the TAC greatly exceeds the catch. For example, in the 1987–88 fishing year, the TAC was undercaught by more than 10% in 122 (out of 169) management units (including 47 "administrative" management units that have TACs of only 10–30 tons), and by more than 20% in 104 management units (Annala et al. 1991). For the 1988–89 fishing year, the total catch for all management units was 66% of the sum of the actual TACs. In situations in which TACs are nonrestrictive, they have little conservation benefit. In these cases, the stocks are either being overfished (because TACs are too high), or they would not be overfished without the ITQ system. There are other cases in which TACs have been overrun (17 of the 169 management units exceeded the TAC by more than 10% in the 1987–88 fishing year; Annala et al. 1991). There are a number of mechanisms by which fishermen can legally exceed their quota. Most of these mechanisms were established in order to deal with bycatch in multispecies trawl fisheries.

The general conclusion is that TACs are not closely tied to the best available assessments of the fisheries resources, nor are catches strongly controled by the TACs. Some valuable stocks have probably declined in abundance. To date, the track record of ITQ management with respect to conservation is not good.

Economic effects

There is even less information on the economic effects of ITQ management. ITQ management could increase economic benefits through several mechanisms: (1) Conservation could lead to an increase in resource abundance and a decrease in harvesting costs; (2) the initial buyback of quota and prorated cuts might have caused some excess capital and labor to move to segments of the economy where they could add production; (3) transfer of quota might have led to consolidation of ownership by the most efficient operators, and resulted in some excess capital being removed from the fishery; and (4) elimination of competition for TACs might have resulted in a more efficient harvest and an increase in the value of product.

As discussed earlier, it is unlikely that ITQ management has resulted in an increase in population

[7] In the case of hoki, the increase in TAC from 100,000 tons in 1985–86 to 250,000 tons in 1986–87 was controversial. Some components of industry were skeptical of the assessment which was in part based on a single hydroacoustics survey. The hydroacoustics survey results were later found to be gross overestimates. So far, the hoki resource has sustained the increase in TAC, but stock assessment results (Annala 1990) suggest that a catch of 250,000 tons may not be sustainable over the longer term. Government is giving high priority to monitoring the stock.

abundance. On the other hand, the decline in the abundance of orange roughy probably has not increased harvesting costs so far. Although orange roughy abundance has decreased considerably, the catch has been stable. Since orange roughy are fished in dense, spatially and temporally predictable aggregations, the catch rate is probably relatively insensitive to overall population size (see Paloheimo and Dickie 1964, for a general discussion of the phenomenon).

It is difficult to determine whether the initial buyback of quota and prorated cuts reduced excess capital, but it seems unlikely. As noted earlier, it probably did not reduce fishing mortality in most cases because the quota that was bought back would probably not have been caught. Fishing mortality is a function of capital investment in the harvesting sector (e.g., number of vessels), labor inputs (e.g., number of days the vessels are operated), and technology. It seems unlikely that capital would have been removed from the fishery unless fishing mortality were reduced.

There is evidence that quota holdings have been consolidated, presumably to more efficient owners.[8] During the period October 1986–April 1988, there were 15,580 quota sales involving 453,000 tons, and 3417 leases of quota involving 253,000 tons, the sum of which exceeds the total amount of quotas (494,000 tons owned privately and 64,000 owned by government); therefore, some quota was involved in multiple transactions (Muse and Schelle 1988). According to Bevin et al. (1989), the total number of quota holders decreased by 5.7% during the first two years of ITQ management. The amount of quota held by the top ten quota owners increased from 57% to 80% of the total. The number of quota holders with more than 50 tons decreased by 37%. This consolidation in ownership of quota does not necessarily mean that vessel ownership has also been consolidated. Apparently, a number of vessel owners who have sold their ITQ allotments to fishing companies have also entered contracts to fish that quota for periods of several years.

Unfortunately, the authors have not been able to obtain reliable data on the number of vessels in the fishery prior to and since ITQ management. There are some data available (e.g., Anonymous 1987, Bevin et al. 1989), but the information is inconsistent. There are data that indicate a slight decrease in investment in the harvesting sector in 1987, after several years of steady growth (Bevin et al. 1989). On the other hand, the data indicate that employment and investment in the fisheries increased steadily through 1987 (Table 4).[9]

Table 4

Investment and employment (in harvesting sector and total; processing-sector values can be obtained by difference) in New Zealand fisheries, 1983–87 (from Bevin et al. 1989). Values are in $millions NZ (book-value) and numbers of employees.

	1983	1984	1985	1986	1987
Investment					
Harvesting	142	170	182	223	213
Total	353	405	437	510	550
Employment					
Harvesting	3700	4000	4450	3800	4240
Total	7500	8000	8650	9200	10240

It is also difficult to evaluate the effects of eliminating competition for TACs, but there are some positive signs. In informal discussions with members of the fishing industry, the authors have been told that harvesters have modified their fishing practices to reduce costs and/or increase the market value of their catches.

At this stage, it is unclear what economic effects ITQ management has had. But, all other things being equal, it seems reasonable that ITQ management should have increased economic benefits. Unfortunately, all other things are not equal.

Two events unrelated to ITQ management have adversely affected the economic condition of the New Zealand fishing industry. They are a weakening of the price of product in export markets (particularly orange roughy in the USA) and unfavorable exchange rates. As a result, the industry had only a 4.3% return on investment (before income taxes) during the one-year period beginning 1 April 1987 (Bevin et al. 1989).[10]

While the overall economic benefit of ITQ management to New Zealand is unclear so far, it was profitable for the government. As noted earlier, the government's revenues from sale or lease of quota was $84.2 million NZ. It also collected about $60 million dollars in

[8] There is a legal limit to how much consolidation can occur. It is illegal for a company to own more than 35% of the quota for a species in any management area, or more than 20% of the quota for a species overall. It is interesting that some segments of the fishing industry have viewed the potential of consolidation of ownership of quota negatively, while government fisheries managers have generally viewed it as part of the process of increasing economic efficiency (i.e., efficient harvesters can afford to buy quota from less efficient harvesters). New Zealand government officials also note that consolidation should reduce the cost of managing the ITQ system.

[9] Note that there was a high rate of inflation during this period (3.6, 9.4, 15.3, 18.2, and 9.6% in 1983–87, respectively, or 69% overall) which approximately offsets the increase in nominal value of capital investment.

[10] It should be recognized that the economic condition of the New Zealand industry is a controversial matter because of resource rentals and fuel excise taxes. Bevin et al. (1989) indicate that in 1987 the industry paid $55 million NZ in resource rentals and fuel excise taxes which reduced the rate of return on investment from 16.2% to 4.3% (before income taxes).

resource rentals during the first three years of ITQ management. This income exceeds the cost of the buyback ($42.4 million NZ) and the entire cost of the government's fisheries research, management, and enforcement programs (about $30 million NZ per year). And there is the potential for resource rentals to increase substantially (see previous discussion). On the other hand, the authors are of the opinion that government should increase fisheries research considerably if it is to produce adequate stock assessments to support ITQ management (i.e., to conserve without being too restrictive). Furthermore, if government had entered the marketplace and purchased quota to implement the reductions suggested by yield calculations performed at the 1989 Fisheries Assessment Meetings (Annala 1989), the cost would have far exceeded the revenue from the ITQ system (e.g., the reductions for orange roughy alone would have cost in the range of $60–150 million NZ).

Government intervention

The third problem that ITQ management was intended to solve was excess government intervention. To date, it has not reduced government intervention except by removing the moratorium on new licenses. The moratorium was replaced by the requirement to own quota. In addition, there are new recordkeeping/reporting requirements and complicated rules that are intended to cope with bycatch (Annala et al. 1991).

One form of government intervention that probably hampered the fishing industry was restrictions on the port at which harvesters were allowed to land their catch. However, this restriction was removed prior to ITQ management. Other forms of input controls, such as minimum fish size restrictions and closed areas or seasons, have usually not been removed. Some of these restrictions are necessary, in addition to a quota, in order to conserve the fisheries resources and to prevent potential yield from being wasted.[11] In other cases, regulations were put in place to aid one segment of the fishing industry relative to another. For example, large factory trawlers are restricted from fishing within 25 miles of the coast, which reduces direct competition with smaller vessels.

General reaction

It is not surprising that implementation of ITQs in New Zealand has been accompanied by controversy. The newspapers report numerous charges by the industry against the government. The industry is upset about the level of resource rentals. There are complaints about the fairness of the Quota Appeals Authority. There were complaints that government had overestimated the productivity of the hoki resource when it sold quota, and there are complaints that it has overestimated the severity of the problem with orange roughy now that it is attempting to reduce the quota. Although there is strong support from industry and government for ITQ management, many specific aspects of implementation are unpopular. This is probably unavoidable for a system that is relatively complex and so radically different from previous management.

Potential problems

From a theoretical perspective, ITQ management is an ideal method which generates maximum net economic returns, under some simplifying assumptions; but as Copes (1986) points out, there are many potential problems. Instead of reviewing Copes' list of potential problems that apply to ITQ management in general, this paper reviews actual and potential problems that apply specifically to New Zealand. They are (1) problems arising from redefinition of quota ownership, (2) implications of the Treaty of Waitangi, (3) inadequacy of the scientific basis of TACs, (4) bycatch, (5) high-grading, (6) enforcement, and (7) an adequate basis for setting resource rentals.

Redefinition of quota ownership

The need to redefine ITQs from fixed quantities in weight to proportions of the TAC resulted from government's failure to enter the marketplace to reduce TACs when necessary. Early versions of the proposed ITQ system included a "revolving fund" that would be administered by the New Zealand Treasury. Resource rentals and revenues from the sale of quota would have gone into the fund which could then be used to buy back quota as necessary. In fact, Crothers (1988) actually reported that the revolving fund existed. However, the fund never materialized and revenues paid to government by the fishing industry were used for other government functions. When faced with the overwhelming cost of buying back quota to reduce the TAC for orange roughy, the government announced its intention to change the ITQ system from fixed to proportional ITQ. The authors were surprised at how rapidly government was able to obtain the legal authority from Parliament to make such a fundamental, and economically significant, change in the system. It took approximately one year from the time that

[11] Fisheries management needs to consider two control variables: the fishing mortality rate which can be regulated by a quota, and the age- or size-at-first-capture which can be regulated by gear restrictions, area/season closures, or minimum fish size (Sissenwine and Shepherd 1987).

government announced its intentions to convert the system to proportional ITQs until the change became effective on 1 April 1990.

The actual details of how the conversion will be implemented had not been determined at the time this paper was written, but some difficulties are almost certain to be encountered. In order to gain industry acceptance of the change, government agreed to freeze resource rental rates for five years, and redistribute these funds to compensate industry for quota reductions. Industry may have misjudged the amount of compensation it will receive, since several of the species that are most likely to have large quota reductions are also the species that generate most of the resource rentals (e.g., orange roughy, hoki, squid). Therefore, the greater the reductions, the smaller the pool of funds available for compensation.

One implication of converting from ITQ in fixed amounts to proportional ITQ is that there will be pressure to change the method of yield estimation from an MCY strategy to a CAY strategy, with consequent increases in the amount and variety of assessment information required. With quota as a fixed amount, there was little change in TACs from year to year. With ITQs as a proportion of the TAC, there will be greater pressure from the industry to change TACs (particularly to increase them when stock size is perceived to be high).

Treaty of Waitangi

The Maori people have sued for rights to the fisheries under the terms of the Treaty of Waitangi. There are several related cases which had not been settled at the time this paper was written, but it appears that the Maori people are entitled to a significant amount of quota. Prior to the ITQ system, when there was no ownership of the fisheries, there was less incentive for the Maoris to exercise provisions of the Treaty of Waitangi. But when property rights were established, and many Maoris were excluded from the system because they were part-time fish harvesters who had already been removed from the fishery, it was inevitable that a controversy would follow. Bevin et al. (1989) reported that industry has delayed major investments in the fisheries because of uncertainty about Maori fishing rights. Industry is concerned that the eventual settlement with the Maoris will be at their expense (i.e., they will not be compensated for quota that is transferred to Maori ownership). The dispute over the Treaty of Waitangi has also caused government to delay adding important species into the ITQ system.

Stock assessments

The scientific basis for assessing fish stocks, setting TACs, and evaluating the overall performance of the ITQ system is generally inadequate. New Zealand had relatively little need for stock assessment capability prior to ITQs. For the most part, their fisheries management was laissez-faire. In the case of data for assessing deepwater species, New Zealand relied heavily on foreign research vessels. When ITQs were implemented, they were ill-prepared, in the opinion of the authors, to conduct stock assessments for all of the management units included in the system. The situation has improved since the implementation of ITQ management as New Zealand scientists have developed and refined the scientific basis for stock assessments, but they have had inadequate support (e.g., research vessels, data collection systems, and personnel). Inadequate assessment databases mean that the ITQ system is operating under high levels of uncertainty. The price of uncertainty is either conservative quotas or a high risk of stock collapses.

Bycatch

Some bycatch is inevitable in multispecies fisheries. This means harvesters will catch some fish for which they do not own quota. New Zealand planned to manage bycatch with a taxation scheme (referred to as surrendering catch to the government or "Crown"), which was intended to produce a neutral incentive for bycatch. The tax was supposed to be high enough so that harvesters would have no incentive to catch species for which they did not hold quota, but if they caught them as bycatch, it would be worth their while to land them for sale. The problem is knowing what the proper tax level is in order to result in a neutral incentive. In some cases, even taxing 100% of the ex-vessel value does not discourage fishing for species for which harvesters do not hold quota. This is because of vertical integration in the fishing industry and a very high value added during processing.

There are several other provisions for dealing with bycatch. Quota holders may overcatch by up to 10% in exchange for next year's quota. They may trade retrospectively for quota to cover catch they have already taken. They may trade quota of certain species to cover bycatch of certain other species (for specified combinations of species, often involving one-way trades only).

Another aspect of the bycatch problem is that it is difficult to distinguish between bycatch problems that are a conservation threat to the bycatch species and those that result from setting the wrong TAC, as a result of imprecise assessments. Regardless of whether

it is a conservation problem or not, bycatch constitutes a management problem. It also constitutes a problem for members of the fishing industry when they try to adjust their portfolios of quota holdings to match their landings. In theory, this can be done by buying and selling quota, assuming that the overall TACs match the relative catch rates experienced by the fishing industry in aggregate; but this may not be so.

Annala et al. (1991) reviewed the bycatch situation in detail. In the 1987–88 fishing year, the quota was overcaught for 33 (out of 169) management units, by up to 74%. Nine management units were overcaught by more than 20%. The frequency and magnitude of overcatching increased from 1986–87 to 1987–88.

Highgrading

Highgrading is the discarding or dumping of a lower valued size or species of fish, in favor of keeping more valuable fish. Although highgrading is illegal under the New Zealand ITQ system, it is known to occur (Annala et al. 1991). For example, it probably occurs in the snapper fishery where there is a premium paid for high quality fish for the Japanese "iki jime" (killed by spiking the brain) market, and in the oreo dory fishery where three species (spiky, and black and smooth oreo dory) with significantly different values are managed by a combined TAC. The amount of highgrading in New Zealand fisheries has not been quantified.

Clark and Duncan (1986) felt that highgrading would be "...a short term, transitional problem and should disappear once the fishery recovers and product value differential within the same stock diminish..." There is little evidence that the fishery has recovered. Nor should recovery of the fishery eliminate the incentive for highgrading, unless the ITQ system is administered such that TACs do not limit catch. If so, then other advantages of ITQ management would be undetermined. Nor are the authors aware of reasons why ITQ management should reduce value differences between species or levels of quality.

Enforcement

ITQ management is potentially difficult to enforce. New Zealand has some advantages over the United States when it comes to enforcement. First, the population is small, and therefore there is less scope for the development of a domestic black market, although black markets may be significant for some inshore species consumed domestically. Second, the country is remote, so that it is difficult to smuggle fish elsewhere. Third, most fish are exported, which involves recordkeeping that helps to check the accuracy of quota reports. Finally, fisheries enforcement is carried out entirely by a single, coordinated agency.

New Zealand placed a high priority on establishing enforcement capability when it implemented ITQs. It reoriented enforcement from at-sea operations to shoreside investigations. The emphasis moved from conservation officers to accountants and investigators and "electronic surveillance" (computerized data recording). The industry is required to maintain and submit several different types of records that are necessary for monitoring catch and product flow. Penalties for quota violations are heavy. They may involve forfeiture of catch, vessel, and quota holdings, in addition to fines of up to $10,000 NZ. A second offense within seven years may result in prohibition from participation in any aspect of the fishing industry for up to three years. In addition, the fisheries enforcement agency passes information on to the tax department, which may then be used in income tax prosecutions. It is difficult to assess how well this enforcement approach is working.

Resource rentals

The New Zealand fishing industry is concerned about the basis of setting resource rentals, although it does not seem to dispute them in principle. The government planned to gradually increase resource rentals[12] until the fair market value of quota was reduced to approximately zero. In theory, government is extracting all of the resource rent from the fisheries at the point in time that there is no longer incentive to enter the fisheries. The industry argued that not all of the resource rent should be extracted, since investment in fishing is inherently risky.

It is arguable whether the market value of quota reflects resource rent in the fisheries. The price paid for quota should reflect the buyer's estimate of its net present value. However, the buyer's estimate may be incorrect (i.e., a bad investment). Even if the price paid for quota is correct, it may not reflect rent in a particular year. In practice, the price paid for quota has been extremely variable (e.g., from $13 per ton to $16,500 per ton for snapper; Bevin et al. 1989) for a variety of reasons (e.g., imperfect knowledge, inclusion of other assets in the price of quota, different discount rates, noncompetitive price setting). This makes it difficult to use the sales price of quota as a criterion for setting resource rentals.

[12]The law limits increases in resource rental rates to 20% per year.

Table 5
Problems and benefits of fisheries management by input controls, quotas (Q), and ITQs. The symbol "0" is used as the standard. The symbol "+" means a more difficult problem or greater benefit than "0." The symbol "++" means even greater problems or more benefit than "+."

	Type of management		
	Input	TACs	ITQs
Problems			
Stock assessments	0	+	+
Catch statistics	0	+	++
Enforcement	0	+	++
Bycatch	0	+	++
Benefits			
Conservation	0	0	0(+)
Economics	0	0	+

General Issues

Many potential problems of ITQ management are problems associated with TAC management in general. In some cases they are exacerbated by individual quotas. Table 5 compares the problems and benefits associated with input controls (e.g., effort limits, closed areas or seasons), TACs, and ITQs. TAC management requires more frequent and timely stock assessments than management by most input controls (Sissenwine and Kirkley 1982). The problem is particularly severe for short-lived species (Copes 1986). The problem of providing stock assessments for ITQ management is about the same as that for TAC management. Catch statistics are one component of stock assessments. The need for catch statistics is generally greater for TAC management than for management by input controls. The need is even greater for ITQs because statistics on individual quota holders are the basis of management. Both TAC and ITQ management encourages "data fouling" or misreporting (Copes 1986), although the incentive is greater for ITQs. Similarly, enforcement is generally more of a problem for TAC management (although this is not universally true) because the catch has to be accurately enumerated. For ITQs, it must be accurately enumerated for individual quota owners, some of whom may have developed successful methods for circumventing the system. The bycatch problem is more difficult for TAC management than for input controls. For ITQs, the bycatch problem is even more difficult because individual quota owners must adjust their portfolios to match their multispecies catch rates.

In terms of the conservation benefits, input controls, TACs, and ITQs are all potentially effective (Sissenwine and Kirkley 1982). ITQs may have a potential advantage over TAC management because, with ownership, there should be greater incentive for the industry to cooperate. But limited-entry licensing (a form of input control) also conveys privileges that may encourage industry cooperation. In terms of economic benefits, ITQs are superior in theory. Both input controls and TAC management eventually allow dissipation of resource rent. For both forms of management, there is an incentive for fishermen to increase their cost of fishing, in order to gain a larger share of the resource, until the rent is dissipated. In practice, the actual economic benefits of input controls, TACs, and ITQs are probably fishery-specific.

Learning from New Zealand's experience

There is much to be learned from New Zealand's experience with ITQ management. New Zealand took a systems approach. Comprehensive new legislation was introduced. Enforcement needs, penalty schedules, reporting and recordkeeping requirements (including wholesalers and retailers), a quota trading system, a process for appealing initial allocations, a buyback scheme for "rationalization" of some fisheries, mechanisms for controling bycatch, the principle of resource rentals, and public and fishery industry education were all considered. New Zealand made some mistakes, but it would have probably made more if its approach had been piecemeal.

The authors are of the opinion that one mistake made by New Zealand fisheries managers was to establish ITQs in fixed amounts, valid in perpetuity. This method was used because it was thought that ITQs in fixed amounts would create a more certain environment for industry; they would provide a mechanism for government revenue-raising, since government believed TACs were conservative and future quota sales were likely; and the trading price for fixed amounts of quota would be the most effective method to obtain information to set resource rentals (Clark et. al. 1988).

Apparently, the government did not recognize how uncertain TACs might be (due, for example, to errors in stock assessments) or how often TACs might need to be adjusted (due, for example, to the inherent variability in the size of fish stocks) by entering the market to buy and sell quota, since the revolving fund (or some other method) was not established. It is also possible government did not expect the price of quota to be so high as to make it prohibitively expensive for the government to buy it to reduce quotas. In fact, the sales price of quota may not have been economically rational, in which case government would not want

to overpay to adjust TACs downward. But it should be noted that the Government did sell quota for similarly high prices. In any case, it seems more practical to define quota as a portion of the TAC, in an uncertain and dynamic environment.

In the authors' opinion, New Zealand fisheries managers underestimated the complexity of the bycatch problem. In a multispecies setting, the apparent independent fluctuations of each species complicate the bycatch problem. In general, insufficient information, variability between harvesters, and the complex organization of fisheries mean that it will be difficult to solve the bycatch problem by adjusting a tax on bycatch. Many fisheries are essentially single-species (e.g., surf clams, herring, scallops, lobsters). These are the best candidates for ITQ management with respect to bycatch. If ITQ management is to be applied to multispecies fisheries (e.g., New England groundfish), it might be better to exclude some of the minor species from the scheme, or to recognize that they may need to be "sacrificed" in order to optimize fishing on the more valuable species.

New Zealand lacked adequate stock assessment data for a quota-based management system such as ITQs. And, unfortunately, it will take time to develop appropriate time-series of data. In addition, there is much that needs to be learned about the basic biology of the deepwater species, many of which have only recently been discovered in commercially viable quantities. The basis for stock assessments is better in some other places (e.g., throughout North America and Europe), but the expectations for a high degree of precision may still make stock assessment capability problematic.

ITQ management requires adequate monitoring and enforcement capability to track individual catches. New Zealand's enforcement of ITQs is geared towards investigations by accountants and auditors, instead of traditional fisheries officers. In order for these investigators to be effective, the New Zealand fishing industry is required to maintain detailed "paper trails" for products. Penalties for violations are severe. It is too early to say whether this scheme is working, but it is obvious that it will be necessary to impose additional recordkeeping to enforce ITQs in most cases in the United States.

It is unclear how serious the overcapitalization problem was in New Zealand, but there are U.S. fisheries that are severely overcapitalized (e.g., New England groundfish). The buyback scheme in New Zealand probably did little to reduce overcapitalization. If a buyback scheme is intended to reduce overcapitalization, funds should be used to reduce capital, and not hypothetical catches that might not have been taken anyway.

A positive lesson that should be learned from New Zealand is the need to be clear about objectives when applying an ITQ system. Clearly, one of the intentions of New Zealand's fisheries managers was to increase resource rent in the fisheries and to extract the rent (through annual royalty payments[13]) for the general benefit of the country. What will be the objective for applying ITQ management elsewhere? If the objective is conservation, then quota management (or other forms of management) is sufficient in theory, although pressure from an overcapitalized fishing industry may prevent TACs from being set conservatively enough. If the objective is economic efficiency, then it is important to address distributional issues (resource rents, producer surplus, and consumer surplus).

There is a great potential for ITQ management, but it is not a panacea. When ITQ management is applied, it is important that it be approached with realism and based on adequate experience and data.

Postscript

Approximately 20 months have passed since New Zealand converted its ITQ program from one of fixed quota valid in perpetuity to one based on quota specified as a proportion of an annual TAC (also referred to as a percentage ITQ system in New Zealand or a percentage quota share system in the United States). As predicted in this paper, the transition has been controversial, in part because compensation available to the industry in the form of resource rentals has not been as large as anticipated. As a result, the fishing industry filed a $150 million NZ court action against the government. The lawsuit has since been settled out of court.

In spite of the change from fixed to variable quota, most TACs have remained unchanged from one year to the next. This is partly a result of inadequate information for stock assessments. However, there have been three notable reductions in TACs. The total hoki TAC has been reduced from 250,000 to 200,000 tons, Challenger orange roughy from 12,000 to 1900 tons, and Chatham Rise orange roughy from 32,800 to 23,800 tons. The reduction in hoki quota was a reflection of new stock assessment results suggesting that then-current TACs were unlikely to be sustainable; the reductions in orange roughy TACs resulted from assessment results suggesting that stock collapse was imminent.

The anticipated need for large reductions in the Chatham Rise orange roughy TAC was one of the

[13] At present, a legal basis for resource rentals in an ITQ system is lacking in the Unites States.

major factors that precipitated the change from fixed to variable ITQs, since it could have cost the government more than $100 million NZ to buy back sufficient quota to reduce the TAC to the estimated long-term sustainable level. After the change, it was agreed that the quota would be reduced at the rate of 5000 tons per year to the sustainable level, the latter being recalculated periodically as new data became available. Recent assessments (Francis and Robertson 1991) indicate a sustainable level of 7000–9000 tons and show that the risks of stock collapse under the proposed reduction schedule have increased due to the accumulation of new data which has resulted in a decrease in the point estimates of stock size and a decrease in uncertainty of the estimates. The results clearly indicate the need for a faster rate of reduction. However, the fishing industry continues to oppose quota reductions, and at this point in time the government has postponed the 5000-ton reduction schedule. The discovery of new orange roughy aggregations in the southern portion of the management area may alleviate the problem in the short term, but the low productivity of orange roughy stocks means that any accumulated biomass can be quickly fished down. Long-term sustainable yields from orange roughy stocks are estimated to be only about 1.5–2.5% of the recruited virgin biomass.

The problem of not reducing quotas when reductions are indicated by assessments is exacerbated by widespread rumors of quota busting, in spite of New Zealand's efforts to tailor enforcement to ITQ management. Some of these rumors have been confirmed by government sources.

New Zealand is now considering further evolution in its fisheries management system towards a form of co-management. Topics being debated include the need to incorporate recreational fisheries into the management system, the need to include all remaining exploited species-stocks, and the pros and cons of eliminating the current limits on aggregation of quota (Pearse 1991). One objective is to transfer the costs of management and responsibility for the resource to the users of the resource, under the assumption that with ownership comes motivation for conservation. Stay tuned.

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