MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: December 2, 1997

SUBJECT: General Groundfish Issues for Discussion

ESTIMATED TIME
6 HOURS

DISCUSSION ITEMS:

(a) Limited processing for catcher vessels: BSAI/GOA
(b) Overfishing amendments: BSAI/GOA
(c) Catch reporting accuracy/precision: BSAI/GOA (This item deferred to a later meeting).
(d) Gear storage/preemption issues: BSAI
(e) Salmon retention revisions: BSAI (This item deferred to a later meeting).
(f) Pollock 'B' season adjustments: BSAI
(g) Report on Groundfish Forum Experimental Fishing Project: Mesh Panel Openings

BACKGROUND

(a) Limited processing for catcher vessels: BSAI/GOA

When the Council approved the LLP in June 1995 catcher vessel and catcher/processor vessel designations were included, with a cutoff date of June 17, 1995 for qualification as a processor. The intent was to limit the ability of catcher vessels to upgrade into at-sea processing effort. At that time however, the Council directed staff to conduct an initial analysis, as part of the overall IR/IU initiative, of options to allow some limited amount of processing by those catcher vessels. Item D-4(a)(1) is a copy of the agenda item and discussion paper reviewed by the Council in December 1996 on this issue. At that meeting you took no action, but scheduled further consideration of this issue for the December 1997 meeting. A plan amendment would be required to change this aspect of the LLP. No additional analysis has been conducted on this issue, pending further direction from the Council.

(b) Overfishing amendments: BSAI/GOA

The Sustainable Fisheries Act made significant changes to the national standards for fishery management plans. Based on the proposed rule to amend 50 CFR part 600, it appears we may need to revise our overfishing definitions to comply with the guidelines for National Standard 1 (optimum yield). Revisions to the guidelines for national standard 1 center on the Magnuson-Stevens Act's definitions of "overfishing," "overfished," and "optimum yield (OY)"; the requirement for establishment of objective and measurable criteria for determining the status of a stock or stock complex; and the requirement for remedial action in the event that overfishing is occurring or that a stock or stock complex is overfished.

We have until October 11, 1998 to submit FMP amendments to the Secretary. As such, an Environmental Assessment/Regulatory Impact Review amendment package would need to be ready for initial review by the Council at its April 1998 meeting, with final action taken in June. We have requested the help of NMFS, in particular Dr. Grant Thompson, to prepare this amendment package and he, or other NMFS staff may be able to provide an update at this meeting.

(c) Catch reporting accuracy/precision: BSAI/GOA

This item has been deferred to a future meeting. (See letter from Steve Pennoyer, Item D-4 Supplemental.)

(d) Gear storage/preemption issues: BSAI

In December 1996, the Council reviewed a proposal requesting implementation of measures to reduce gear conflicts and minimize lost gear (proposal attached as Agenda Item D-4(d)(1)). These include: establishment of a government fund to replace lost gear; separation of gear types through time/area closures; and, wholesale closures of areas to specific gear types to protect habitat and eliminate gear conflicts. The Council recommended that these issues be further examined, and ADF&G agreed to hold a meeting with industry members to research these issues and possibly develop alternatives for resolution. Earl Krygier will brief the Council on their progress.

(e) Salmon retention revisions: BSAI

This item has been deferred to a future meeting. (See letter from Steve Pennoyer, Item D-4 Supplemental.)

(f) Pollock 'B' season adjustments: BSAI

In 1992, Amendment 14 apportioned the pollock TAC into a roe season ('A' season) and non-roe season ('B' season). The 'B' season opened on June 1 in 1991 and 1992. Beginning in 1993, the opening was delayed until August 15 to increase the size and value of pollock harvested and to allow additional processing of salmon by catcher-processors. In 1996, the 'B' season opening date was delayed to September 1 for both inshore and offshore sectors to further increase these processing opportunities. The opening includes a "stand down" provision, which mandates a seven-day waiting period for those vessels participating in other fisheries a week prior to the September 1 opening. The regulation also included a November 1 cutoff date for pollock fishing, regardless of whether the TAC has been taken.

In setting the September 1 date for the 'B' season opening, the Council considered the tradeoffs between an increase in the value of pollock harvested, processing and harvesting opportunities, and the potential for poor weather, marine mammal interactions, and bycatch problems (see attached executive summary from the last analysis, Item D-4(f)(1)). It was felt that a delay from August 15 to September 1 could potentially reduce bycatch of chum salmon, and increase bycatch of chinook salmon, but not significantly. Salmon bycatch taken in BSAI trawl fisheries in recent years is shown in the adjacent table. In both 1996 and 1997, bycatch of chinook salmon indeed increased relative to the previous few years, with the highest bycatch rates occurring in the last two weeks of the fishery. Chum salmon bycatch on the other hand has decreased overall (except when compared to 1995), with the higher rates occurring in the early weeks of the fishery.

Number of salmon taken as incidental bycatch in BSAI trawl fisheries, 1990-1997. Note that >95% of the "other" salmon is chum salmon.

Year	Chinook Salmon	Other Salmon
1992	37,372	38.919
1993	45,964	243,246
1994	44,380	96,431
1995	22,461	21,763
1996	63,179	77,926
1997	50,676	67,510

Item D-4(f)(2) illustrates the weekly bycatch for 1996 and 1997. These 'offsetting' bycatch impacts are consistent with the projections in the analysis for the September 1 opening date, noting once again that salmon bycatch peaks fluctuate significantly and are difficult to project across the two week season variations being considered. Item D-4(f)(3) is a letter from United Fishermen of Alaska supporting the current September 1 opening date.

(g) Report on Groundfish Forum Experimental Fishing Project: Mesh Panel Openings

Last April, the Council reviewed and recommended approval of an experimental permit for Groundfish Forum to test a trawl net design that could reduce bycatch. They tested an open top intermediate trawl net design as a way to reduce pollock catches in the yellowfin sole target fishery. The experiment was conducted last August in the Bering Sea using six head&gut catcher-processors. Preliminary results are provided in a report by John Gauvin and Craig Rose, attached as Item D-4 (g)(1). John Gauvin will be on hand to summarize their findings.

MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: November 27, 1996

ESTIMATED TIME

3 HOURS

SUBJECT: Improved Retention and Utilization (IR/IU)

ACTION REQUIRED

(a) Receive report from IR/IU Committee
(b) Review and define Gulf of Alaska IR/IU parameters
(c) Review options paper for 'limited processing allowance for catcher vessels' and provide direction

BACKGROUND

(a) Committee Report

The Council's IR/IU Committee met on November 14 in Seattle to discuss VIP program revisions, general IR/IU implementation issues, and specific elements and options for a GOA program (to be implemented concurrently with the already approved BSAI program). The majority of the Committee's time was spent on issues related to the VIP program. The Committee report is contained under Item C-5(a)(1) and will be presented by Committee Chair Joe Kyle.

(b) Gulf of Alaska IR/IU program

As is reflected in the Committee report, the parameters for the GOA IR/IU analysis have the potential to be very straightforward, basically mirroring what was done for the BSAI, though the problem statement for the GOA may be different and could be clarified. We just need Council direction at this meeting to confirm the specifics for the GOA analysis, so that it may be completed for initial review in April, with a final decision scheduled for June 1997. Item C-5(b)(1) is a table showing major species discard levels in the GOA. Item C-5(b)(2) is a Draft Problem Statement for Council consideration.

(c) Limited processing allowance for catcher vessels

Part of the Council's June 1995 action on the groundfish and crab license limitation program was to create catcher vessel (CV) and catcher/processor (CP) license designations. A proposal to allow limited processing allowances for CVs was not included as part of the license program, though the Council directed that the proposal be considered as part of the IR/IU initiative. We need some feedback from the Council on a few specifics in order to complete an analysis of this proposal. In the original set of IR/IU alternatives approved by the Council, the following three options were identified:

Option 1: Allow processing of bycatch amounts of any groundfish species up to the directed fishing standards.

Option 2: Allow processing of targeted levels of species for which 'restricted market opportunities' exist.

Option 3: Allow processing of up to 5 mt round weight per day of any species for vessels under 60' and up to 18 mt round weight per day for vessels greater than 60' (the Council also requested that we examine a range of potential tonnages, up to and beyond 18 mt per day).

The IR/IU Committee discussed this issue briefly at their spring 1996 meeting (see Committee minutes from June of 1996) and advised that the analysis should focus on Option 3, which provides for a specific quantity of processing to be allowed. This was due largely to difficulties in estimating potential volumes of processing associated with Option 1 and Option 2. These are discussed in the attached paper (Item C-5(c)(1)), particularly the difficulty associated with defining when 'restricted market opportunities' exist. The attached paper discusses the following specific examples of this difficulty:

* The existence of a 'market' at any given point in time may be wholly in the eye of the beholder - would it require that some price is offered for the product? Would it be based on some minimum price offer for the species in question?

* If a given species is being purchased at any plant, located anywhere in the State, would that mean that a market exists, regardless of where the catcher vessel traditionally delivers its catch?

* Even if the above questions were answered and defined, markets for fish change from week to week, and from year to year - if markets become available in the future, would a catcher vessel then be precluded from processing that species, even though significant economic investments had been made?

It has been suggested that current discards could be used as a proxy for defining 'when no market exists'. To illustrate the difficulties in this approach, some preliminary numbers were aggregated on 1994 and 1995 discards from two perspectives: (1) fish which were reported harvested but not retained, when no poundages of that species were retained by anyone in that week; i.e., a proxy for 'no market must have existed', and (2) total discards of species associated with onshore deliveries by week. The amounts of fish are minimal, over the year, for weeks when no retention of that species was observed (when 'no market existed'). For example, the total amount of all species in the BSAI in 1995 (including pollock and cod) under this definition is only 760 mt, some of which is regulatory induced in any case. If we only look at CVs over 60', there are 271 which qualify in the BSAI, but which will receive a CV only designation (from the License Limitation data set). This calculates to 2.8 mt per vessel *for the entire year.*

When we examined all discards from onshore delivery vessels in 1995, the total amounts increase considerably, but are still nowhere near the 18 mt per day suggested in the proposal. In this instance we have excluded pollock and Pacific cod, under the assumption that these species have markets and will be required to be retained and delivered. The total amount of discards reported of all other species in 1995 (associated with all vessels in this sector) was 10,500 mt. Using this more liberal definition of 'non-marketable' results in 39 mt per vessel *for the year.* The current proposal is for up to 18 mt per vessel *per day.* These examples are offered simply to illustrate that discards cannot be viewed as a useful proxy for 'non-marketability'.

A final, and perhaps important consideration relative to both Option 1 and Option 2 above is that any allowance for processing by CVs will likely create incentives for targeting those species. With the investment in processing equipment, and the economic incentives to process fish instead of discard them, vessels may now target those species, resulting in increases in catch, and processing, of those species relative to historical discard estimate, and

bycatch rates, used for analysis. This incentive could result in a transfer of fish from target to non-target fisheries, and perhaps from onshore to at-sea processing.

These are some of the primary reasons that the analysis will be unable to deal, quantitatively, with the criterion of 'marketability' in the context of this proposal. We would be able to provide 'upper bound' estimates of the potential amount of processing which might occur under this proposal, based simply on the number of catcher vessels multiplied by mt of groundfish per day for which processing may be allowed. In this case, we would still need guidance on which species the Council intends to be considered for this processing allowance. Since pollock and cod are required to be retained and delivered, can we assume that these species are not to be included in the list for processing upgrade allowances? Can we assume that in five years yellowfin sole and rock sole will also be excluded from that allowance?

From an analytical perspective, we will have difficulty determining, quantitatively, (1) how many vessels would take advantage of this allowance, (2) whether those vessels would process up to the maximum allowed for each species, (3) whether the allowances would represent a *transfer* of processing activity (from onshore to offshore), as opposed to *additional* processing capacity (simply utilizing fish which would otherwise be wasted), and (5) what the costs and benefits are of that increased processing potential.

We can provide the Council with an analysis containing upper bound estimates of the additional processing capacity implied by this proposal - given the number of vessels which could potentially take advantage of the processing allowance (including under 60' vessels - GOA and BSAI combined), and assuming the lower bound 5 mt/day allowance, the additional at-sea processing capacity could be substantial, as much as 11,000 mt *per day* at the extreme. As another example, if we only look at vessels greater than 60', but use the 18 mt/day limit, the potential is still about 7,000 mt/day, for GOA and BSAI vessels combined. The actual amounts would depend on species for inclusion and a number of other factors mentioned in Dr. Queirolo's discussion paper. Clarification on the following issues will greatly facilitate the analysis:

1. The species for which CV processing will be allowed, and whether the mt allowed would differ between species and/or seasons.

2. Whether the primary intent of the proposal is to allow for value added processing by the CV sector, or to simply reduce the amount of fish which is currently discarded, regardless of the reason for discarding.

3. Whether the proposal is intended to apply to the BSAI crab fisheries, in addition to groundfish fisheries (the BSAI crab fisheries will present its own unique set of issues, for which we would likely request further guidance from the Council in February).

An Examination of Permitting Limited Processing Upgrades

prepared by

Dr. Lewis E. Queirolo
Alaska Regional Economist
Alaska Fisheries Science Center
National Marine Fisheries Service

October 31, 1996

An Examination of Permitting Limited Processing Upgrades

In the Council debate over License Limitation for the BSAI and GOA groundfish fisheries, the issue of allowing limited processing of groundfish by vessels designated "catcher" under the program was raised. The Council rejected a series of amendments to the License Limitation proposal and voted, instead, to restrict the ability of "catcher" vessels to add processing capacity. Nonetheless, several Council members expressed a desire to obtain additional information about the implications of allowing some at-sea processing by designated catcher boats, within the context of an "Improved Retention/Improved Utilization" program.

To this end, a preliminary analytical framework has been proposed which would permit an examination of the key questions raised in the Council debate, and identify any additional considerations which might accompany such an analysis. The Council posed the following questions (contained in a letter, dated October 19, 1995, from Clarence Pautzke to Richard Marasco):

1. Should processing upgrades be allowed?
2. How much processing capacity should be allowed; 10 mt/day; 18 mt/day; an unlimited quantity?
3. Which species may be processed; all species, all but "the target" species; or all species except pollock and P.cod?

Answers to these questions depend upon the policy objectives of the Council. An examination of historical catch and discard data, by fishery and vessel "category", may provide insights necessary for Council consideration of this issue. At a minimum, a preliminary examination of the available data will indicate whether the policy questions can, at present, be addressed, or whether additional information will have to be collected in order to evaluate the implications of each.

An analysis of the economic implications of allowing or prohibiting catcher vessels to upgrade would, perhaps, frame the initial enquiry as follows: "Assume that catcher boats are permitted to process some amount of their groundfish catch at-sea. What are the probable economic costs and benefits?"

To answer such a question empirically, one would turn to the historical catch record. By examining the data from the NMFS-observer program, Alaska fish ticket files, the Region's "Blend" files, and NMFS Weekly Processor Report files, it may be possible to create an empirical profile of each groundfish target fishery. This profile would contain the available information on:

1. The analytical "universe" of catcher boats, in the specific target fishery, for the period of analysis.

That is, how many catcher boats participated in a given target fishery, in a given period of time? It is this number which will define the initial population of "potentially affected entities," upon which the analysis would be based.

2. The number of catcher boats in each of three size categories (based on LOA).

These categories would coincide with the length thresholds for required observer coverage; i.e., vessels greater than or equal to 125'; vessels less than 125' but greater than or equal to 60'; and vessels under 60'.

3. The aggregate catch (estimated total catch if possible, landed catch if not) of all catcher vessels in the analytical "universe", by target fishery, by area, by vessel size category, by at-sea or onshore.

These data will provide an indication of the relative contribution to total harvest attributable to the "catcher boat" segment of the fishery.

4. The number of catcher vessels, by size category, by target fishery, which had observer coverage, during the base-period under analysis.

That is, what proportion of the total number of catcher vessels in the "universe" were observed, and at what level of coverage (e.g., 30%, 100%)?

5. The total catch of the observed vessels, by target fishery, by size category.

When compared to the total catch of the analytical "universe," a judgement can be made as to the proportion of the total catch by catcher vessels which is documented by observer coverage, and how much is not.

6. The composition, by species or species group, of the total catch of observed vessels, by fishery and vessel size category.

Any assessment of how much processing might be feasible by upgraded catcher boats (and for which groundfish species) is, in large part, dependent upon the availability of data on species composition and quantity in their individual total catch, by target fishery. Because observer data contain detailed information on catch composition, retention, and discards for the catcher boat sector, the relative size of the "observed" portion of the sector to the total size of the sector may suggest how much confidence one should place in the analytical findings. For example, if only 1 in 10 catcher vessels in a given target fishery had any observer coverage, the strength of the conclusions reached in an analysis might reasonably be expected to be lower than if, say, 9 of 10 boats had observers on-board. If, on the other hand, numerical coverage was relatively low, say 4 in 10, but those vessels with observers accounted for a significant portion of the total catch in that fishery, then somewhat greater confidence might be placed on the analytical findings. Thus, it becomes important to compare not only numbers of vessels but the relative share of the total catch between "observed" and "unobserved" segments.

A decision will have be made as to the "appropriateness" of extrapolating from the data on observed vessels to unobserved vessels (or observed hauls to unobserved haul). This decision may vary by vessel size category within a given fishery, as well as from target fishery to target fishery. Once a judgement has been made about the adequacy of these empirical data (assuming that judgement supports proceeding to an analysis) an examination of the quantity and species mix of "bycatch" and "discards" in the respective fisheries can be made.

Ideally, by examining the historical patterns of bycatch and discards, by target fishery and vessel size category, judgements may be possible concerning the "appropriate" size of processing upgrades to be authorized under the proposed action.[1] This may also vary, by target fishery, catcher vessel size category, area, and (perhaps most importantly) the programmatic objectives of the Council. For example, assume that the objective of the Council is to provide an economic opportunity for traditional *catcher-only* vessels, in a given target fishery, to increase the "value-added" utilization of previously under- or unutilized bycatch species, thus reducing discards of whole fish, while discouraging excessive growth in (especially at-sea) groundfish processing capacity. Then, if the historical record indicates that, for a given target fishery, the

[1] The necessary daily catch data with which to assess these options are not available. Indeed, reliable individual catch, discard, and retention data on a boat-by-boat basis for the catcher vessel fleet is, for the most part, lacking in existing data sets. If some relatively 'heroic' assumptions about fishing behavior are made, the average weekly catch data could be used to derive an approximate daily rate, for some non-existent 'average' operation. This obviously diminishes the precision of any estimate made on the basis of these data.

bycatch and discard of a given species with "value-added potential" to catcher boats is, on average, say, five tons per day, round weight, a provision limiting processing upgrades on catcher vessels in this target fishery to 18 tons (or even 10 tons) per day may be inappropriately high. Depending upon the number of catcher vessels in the fleet, such a provision may be contrary to the objective of discouraging excessive growth in processing capacity, and may be "unnecessary" to provide the value-added economic opportunity (and thus, reduction in discards) desired by the Council.

On the other hand, if the historical record indicates that, on average, these boats have bycatch and discard levels of under/utilized species with "value-added potential" on the order of 20 tons per day, and the number of operations is relatively small, then limiting the processing upgrade to five tons per day probably will not produce the economic opportunity or reduction in discards potentially available through a more appropriate (i.e., some what higher) upgrade threshold.

Once again, ideally, these data would also reveal, for a given target fishery, which "under/unutilized" species are present, and in what relative quantities, in the historical catch composition record. If available, this information could indicate what discard savings might potentially be realized by the proposed action. But in addition, the relative quantities of these "under/unutilized" species could be an important consideration in establishing the parameters of the "processing upgrade" program, for any given target fishery. If a given species, or species complex, is not present in significant quantities historically in a target fishery, the Council may wish to consider whether or not to authorize processing of that species by *catcher-only* vessels. To do so could induce covert targeting on a species not traditionally taken in that specific target fishery, perhaps increasing bycatch and discard of other species beyond historic levels by these vessels. In addition, if the species in question is utilized by other fisheries, authorization of its processing by catcher vessels not traditionally dependent on its catch could have unanticipated distributional impacts on other sectors of the domestic industry. The effective result could be a net increase in at-sea processing capacity, unrelated to the objective of providing some modest opportunity for *catcher-only* vessels to utilize their traditional bycatch discards.

The probable level of participation in an upgrade program cannot be precisely anticipated, *a priori*. Participation would likely vary, by target fishery, depending on, 1) the species or species groups authorized to be processed, 2) the authorized daily quantity of processing, 3) the average abundance of the "authorized" species or species groups present in the catch, 4) the presence of potential markets for the "authorized" species or species groups, 5) the unit value of the processed output, 6) the age, size, and configuration of the existing catcher boat fleet, 7) the regulatory constraints on "upgrading" the processing capacity of the specific vessel in question [e.g., class and loadline certifications], and 8) the cost of acquiring, installing, operating, and maintaining the necessary equipment to permit "limited processing" of under/unutilized bycatch.

It may only be possible, given information currently available on these operations, to project the "upper bound" of the potential increase in at-sea processing (and thus reduction in bycatch discarding) by catcher vessels. It is implicit in the Council's questions that by reviewing the catch, retention, and discard data for the "catcher" vessel fleet, by target fishery, the "appropriate" processing upgrade threshold will emerge. This may not be the case, given available data on this sector of the domestic fishing industry.

In the absence of these data it will be very difficult to determine, on the basis of objective historical data, *"Whether processing upgrades should be allowed?"*, for a given target fishery; *"How much processing capacity should be allowed, 10 mt per day (round weight equivalent), 18 mt per day, or unlimited amounts?"*; and *"Which species may be processed...?"*

Under these circumstances, alternative approaches will be needed to establish the "upgrade" thresholds. These may range from conducting surveys of catcher vessel operators to establish "characteristic" bycatch

patterns and rates (OMB issues may arise here), ... to making some fundamental structural assumptions about these catch and discard relationships, by vessel categories, then applying these to the raw catch records to derive 'proxy' variables for the missing data. Either approach will have strengths and weaknesses that must be assessed before a rigorous analysis (e.g., like that required of an RIR) could be initiated.

Preliminary Findings on the Issue of "Upgrading

A very *"preliminary"* examination of the available data on BSAI groundfish catcher vessels was undertaken. Alaska fish ticket data files show the most complete "by vessel" catch data for this fleet. Using 1994 as the base year, a profile of catcher vessel activity in BSAI groundfish target fisheries was prepared (see Tables 1.0 and 1.1).

The cursory profile selected only records of catcher boat deliveries to "on-shore" processors, under the assumption that at-sea deliveries were "unsorted" codends, precluding the opportunity to undertake "value-added" processing of unused bycatch species, as proposed for the "upgrade" action. Only catch in the EEZ was included. All trawl gear types were combined into a single category. Prohibited species bycatch and non-TAC species were omitted. The "target" designation was made using the Alaska Region formula, but based upon vessel, processor, week, and gear-level of aggregation. Week ending date was derived from reported "landing date."

The calculation of "observed" percentages was obtained by flagging those fish ticket records that matched inseason observer data, by vessel, processor, week, BSAI, and gear. To these data was added "vessel length" information from Federal permit data or Alaska vessel registration files. The estimates of observer coverage were measured in two ways. First, as the percentage of total weeks fished by the "target" catcher boat fleet and, second, as the percentage of total metric tons of catch for that fleet. The tonnage represents the fish ticket landed weight, expanded to round weight equivalent catch, using the Alaska Region's standard product recovery rates.

The "match" of inseason observer data to corresponding fish ticket records was *not* 100%.[2] Therefore, the reported "observed percentages" will potentially be slightly lower than the actual statistic. In categories where the number of weeks is relatively high, the difference may be 0-3 percentage points. For categories where there is less data, the difference may be 0-20 percentage points. At the same time, it must also be acknowledged that the "observer" statistics are *estimates*. Hauls which are observed are "sampled" and this sample is extrapolated to the balance of that particular haul. The fraction of the total haul sampled can be very small. In addition, on average, approximately 60% of all hauls made by a "100% observed" vessel are actually sampled. (The percent of total hauls sampled from the "30% fleet" is substantially lower, although the percentage of sampled hauls while the observer is on-board any given vessel may be more than 60%.) Therefore, on the basis of the extrapolated catch and composition estimates for *observed hauls*, an additional extrapolation is made to the balance of the hauls of the "observed" vessel which were unobserved. It is a measure of this latter "estimate" which appears in the tables.

As these preliminary data indicate, the level of observer coverage, either as a percentage of the number of vessels in the fleet or as a percentage of the total catch, varies significantly by target fishery and vessel size. For example, in the BSAI pelagic pollock fishery in 1994, approximately 61% of the catcher boat fleet's total weeks of operation were "observed". These "observed" weeks accounted for roughly 73% of the total catch. For the bottom pollock target, the "weeks observed" dropped to about 52%, while total catch "observed" was approximately 68%. In other fisheries, the available catch and composition data are much more limited.

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[2] The actual match between these two data sets was on the order of 89%.

It will be necessary to use these estimates on catch and composition to extrapolate from the "observed" to the "unobserved" segments of each target fishery, in order to empirically address the "Catcher Boat Upgrading" questions, posed by the Council. It must be understood that, in order for any quantitative evaluation to be conducted, a number of strictly limiting assumptions will have to be articulated and adopted.

NOTE: It would be necessary to know with some certainty the cost structure (certainly before, but perhaps also after adoption of the amendment) of each potentially affected operation in order to predict the economic response to the regulatory change. It would also be necessary to have some knowledge of the required physical plant changes that would be necessary for the vessel to take advantage of the limited processing opportunity, as well as the associated design, engineering, installation, operating, and maintenance cost of the new processing capacity.

Table 1.0. -- Observer Coverage, by Target, BSAI, On-shore Delivery, 1994.
(Catch in thousand metric tons).

Category	Number of vessels	Weeks fished	Weeks observed	Percent weeks observed	Catch	Observed catch	Percent catch observed
Pollock							
bottom	25	33	17	52%	9.5	6.5	68%
pelagic	77	891	547	61%	423.8	310.5	73%
Sable fish	48	87	6	7%	.4	.1	17%
Pacific cod	148	871	300	34%	59.9	34.3	57%
Rock sole	1	1	0	0%	-	-	-
Turbot	23	33	10	30%	.9	.3	36%
Yellowfin	16	42	25	60%	10.1	6.7	66%
Flat, other	2	2	1	50%	-	-	-
Rockfish	2	2	0	0%	-	-	-
Atka mack	1	3	0	0%	-	-	-

Note: Where categories contain 3 or fewer vessels, catch amounts are not reported.

Table 1.1. – Estimated Observer Coverage, by Target and Vessel Length, for BSAI, On-shore Delivery, 1994.
(Catch in thousand metric tons).

Category	Number of vessels	Weeks fished	Weeks observed	Percent weeks observed	Catch	Observed catch	Percent catch observed
Pollock							
bottom							
> 124	8	14	11	79%	5.2	4.6	88%
60-124	17	19	6	32%	4.3	1.9	44%
pelagic							
> 124	26	325	267	82%	216.6	194.9	90%
60-124	51	566	280	49%	207.2	115.6	56%
Sable fish							
> 124	1	1	0	0%	-	-	-
60-124	24	44	6	14%	.3	.1	22%
< 60	23	42	0	0%	.1	.0	0%
Pacific cod							
> 124	22	87	47	54%	13.2	7.8	59%
60-124	80	500	253	51%	45.3	26.5	59 %
< 60	46	284	0	0%	1.4	.0	0%
Rock sole							
60-124	1	1	0	0%	-	-	-
Turbot							
> 124	1	1	1	100%	-	-	-
60-124	17	24	9	38%	.8	.3	41%
< 60	5	8	0	0%	.1	.0	0%
Yellowfin							
> 124	6	16	10	63%	4.3	3.2	76%
60-124	10	26	15	58%	5.8	3.5	60%
Flat, other							
60-124	2	2	1	50%	-	-	-
Rockfish							
60-124	1	1	0	0%	-	-	-
< 60	1	1	0	0%	-	-	-
Atka mack							
> 124	1	3	0	0%	-	-	-

Note: Where categories contain 3 or fewer vessels, catch amounts are not reported.

Under the status quo, catcher boats are permitted to add processing capacity, subject to vessel stability requirements, loadline restrictions, etc. Therefore, the following observations may apply equally to the "with" and "without" license limitation situation.

How "Upgrading" Might Interact with BSAI IR/IU[3]

* Only the retention of pollock, P.cod, (and subsequently rock sole, and yellowfin sole) are regulated under the IR/IU Program, as currently proposed.

* "Catcher-only" boats are not directly regulated under the proposed IR/IU, beyond the universal prohibition on discarding any whole fish of an IR-regulated species.

* If, under provisions of and consistent with the 'upgrading' proposal, a designated "catcher-only" boat adds processing equipment, it, in effect, becomes a "catcher/processor" (C/P), ***at least for reporting and IR/IU compliance purposes.***

    * This presumably implies that the vessel would [at a minimum] be required to; 1) maintain all records currently mandated in regulation for a C/P, including catch and production records; 2) comply with all observer coverage requirements *[including (if adopted) the "double coverage" proposed under IR/IU Option 2 for all processors]*; and 3) meet all other applicable legal and regulatory requirements for C/P operation, e.g., EPA discharge requirements, U.S. Coast Guard class, safety, and loadline certification, etc.

* The Council's 'upgrade' proposal strongly suggests that, *"... only groundfish species for which there is no market for the delivery of raw catch"...* would be made available for processing at-sea by *'upgraded catcher boat operators'* (U/O). It would seem to follow then, because provisions of the IR/IU amendment **require** that shoreside (and, for that matter, mothership) processors accept any pollock, P.cod (and subsequently yellowfin, or rock sole) offered for delivery, no catch of these IR-regulated species would qualify as available for U/O authorized processing. ***If this is not the intent of the Council, explicit clarification is required before an EA/RIR analysis can be performed.***

* There appears to be some confusion and uncertainty on this point. Some of the discussion of the 'upgrade' proposal conducted by the AP (in December 1995) suggested that, at least in the minds of some on the panel, "... any amount of a groundfish species, bycaught in the prosecution of a 'target' fishery, that would not justify retention and delivery along with the target catch, (e.g., because the bycatch would not hold in-the-round as long as the target species) should be made available for processing at-sea by the U/O catcher vessel." That is, for example, even though a market for, say, P.cod exists onshore, if a U/O catcher boat, operating in the rock sole target fishery, took P.cod as bycatch, but did not believe it could hold it in-the-round along with its rock sole until it could be delivered onshore, that P.cod should be made available to the U/O for processing at-sea. ***If this is the intent of the***

[3] Under the status quo, catcher boats are permitted to add processing capacity, subject to vessel stability requirements (e.g., loadline certification). Therefore, the following observations may apply equally to the "with" and "without" license limitation situation.

Council, it must articulate this preference in order for the analysis to proceed appropriately.

If this is the direction the Council intends, then several potential complications emerge with respect to monitoring and enforcement (see references below to covert targeting, redistribution of catch among fisheries, transference from onshore to at-sea processing, etc.).

* Note that, while the IR/IU amendment (as proposed) is expected to **require** a processor to accept any delivery of pollock, P.cod (and subsequently, yellowfin, or rock sole) offered, it does not address the details of the "sales" agreement. That is, some have suggested that deliveries of undersized, or otherwise unwanted, catches of the species of concern, might be accepted by a processor only at a "zero" price. Others have gone even farther to suggest that, under these circumstances, the catcher boat might actually have to "pay" the processor to take the catch off their hands. Neither IR/IU nor the 'upgrade' proposal address these potentialities. It does, however, raise the question, "how does one define when... *no market exists*?" ***This is a subject the Council must address before an EA/RIR analysis can be performed.***

* If U/O **are permitted** to process any of the four species of concern (i.e., pollock, P.cod, yellowfin or rock sole) at-sea, they would presumably be subject to all the IR/IU provisions, e.g., must retain all pollock, rock sole, yellowfin sole, and P.cod present in their catch; must produce specific product forms, proportions, and amounts prescribed by IR/IU.

* Monitoring could be a problem, since, for some target fisheries, the level of current observer coverage on *'catcher-only'* boats is relatively low (see Table 1.1). *[However, if adopted, provisions of the (proposed) IR/IU amendment could effectively double the required level of observer coverage for all IR/IU regulated operations, i.e., two observers on all vessels 125' or greater; one observer onboard during 60% of a vessel's fishing/processing activity for vessels > 60' but < 125'; no change for vessels under 60'.]*

  But, because the U/O are not 'technically' full-time catcher/processors (e.g., as defined under License Limitation), how would observer coverage requirements be accommodated? It is the "opportunity" to process (small?) amounts of "non-target" bycatch, in the event it becomes available in the course of prosecuting a fishery for another species for delivery in-the-round onshore, that is to be provided under the 'upgrade' proposal. If these fish are truly non-target bycatch, they may not be present at all times and in sufficient numbers in the catch to justify processing. Thus, to require the presence of an observer onboard a U/O vessel so that, *if* it acquires a bycatch of an authorized species sufficient to process, processing can be observed, may be economically burdensome. It could induce an operation to 'covertly' target these heretofore non-target bycatch species to assure that it is at least able to recover the cost of the mandated observer(s).

* Under the situation wherein U/O are permitted to process the four species of concern under IR/IU, the upgrade provision could increase total at-sea processing capacity for these species and reduce the total supply of unprocessed pollock, P.cod, yellowfin or rock sole to shoreside processors.

* Depending upon the number of vessels participating, the quantity of processing authorized, the capacity added, and the specific species approved for processing, U/O could have unanticipated impacts on existing target fisheries for some species or species groups.

* While the intent of the 'upgrade' proposal appears to be to permit *catcher-only* boats to process a modest amount of their (heretofore unmarketable) groundfish bycatch, as suggested, authorization to process any given species or species group could, in the absence of restrictions to the contrary, induce targeting of that (those) species. This could, 1) increase total catch of that [those] species, 2) redistribute the catch among participating operations - from traditional harvesters to U/O harvesters, 3) reduce revenues to operations traditionally targeting these species, 4) increase at-sea processing of that [those] species, and 5) reduce supplies of raw materials to shoreside processors.

* Use of the concept of an *"absence of a market"* as the triggering mechanism for authorization for U/O processing for a given species could be very difficult to define, monitor, verify, and enforce. Absence of a market will, presumably, have multiple dimensions, e.g., geographic, temporal. If anyone will accept a delivery, at any price (or cost), is there a market? If not, what is the "minimum" compensation that must be offered? Who will monitor this (as well as how)?

How far is too far from a "buyer" for a market to be available? Will this vary by vessel size, sea condition, weather, season, species? If so, who will set these standards and how will they be monitored and enforced? Consider the following hypothetical case:

If a "buyer" for a given species of groundfish is available in, say, Kodiak, but not, for example, in Dutch Harbor, "does a market exist" for a catcher vessel operating, say, on the Bering Sea side and northeast of Unimak Island?

If not, assume the same boat, fishing the same location, discovers that there is a "buyer" at Dutch Harbor, but not at Akutan which would be closer. Does a market exist, i.e., would the U/O be prohibited from processing its bycatch?

If no "buyer" is accepting deliveries of a given species during, for example, the first week of an opening, but one is subsequently willing to accept deliveries (e.g., due to a change in markets) beginning in the second week, how shall a U/O determine this? Whose responsibility is it to determine whether or not the "market availability" has changed? Since catch and production reports are based on a "reporting week", does the absence of a "buyer" on the first day of the accounting week mean that the operator is free to process all catches of the authorized species (up to the maximum limit) for that entire week, even if a buyer becomes available during the week? If not, what is the governing rule? How will this be monitored and enforced, and by whom?

Assume Atka mackerel is, for this example, one of the species authorized for processing by a U/O... *"in the absence of a market"*. Assume further that, in a given geographical area, there has been no market for Atka for several seasons. Subsequently, an onshore buyer, in a relatively nearby port, decides to begin buying unprocessed Atka mackerel for $0.03/lb, thus, "a market does now exist...". However, a *catcher-only* boat that has fished this area for several seasons, and bycatches a relatively small but consistent amount of Atka mackerel, discovered and then developed a market opportunity in Korea for IQF Atka mackerel fillets, at $1.00/lb...(incidently, a price which nets the operator substantially more than would delivering raw fish to the local processor at $0.03/lb). Having made that (perhaps significant) investment in U/O processing capability specifically to respond to such "value-added" opportunities, is the U/O nonetheless **obligated**, under the 'upgrade' proposal, to

deliver all of its Atka bycatch, in the round, to the newly available domestic onshore buyer at $0.03/lb.?

If not, one may ask, "what purpose is served by the stipulation that bycatch processing by U/O is authorized only ... *when no market exists*"? Doesn't then the 'upgrade' proposal simply authorize the conversion of any and all *catcher-only* boats into small catcher/processors?

If, alternatively, the operation would, under the 'upgrade' proposal, always be required to deliver its bycatch to a willing domestic processor, where is the economic incentive to the catcher boat operator to risk the investment in U/O, since that investment could be made useless (and therefore unrecoverable) by any offer, by any shoreside plant (or mothership) operator. ***The Council will need to provide guidance on this issue if it wishes an analysis to proceed.***

The forgoing is a brief summary of the preliminary examination which has been undertaken in response to the Council's request for information on its "Limited Processing Upgrades" proposal. All of the programmatic and structural issues identified in this initial assessment will require explicit attention by the Council before a formal EA/RIR/IRFA analytical process can begin, should the Council chose to proceed with an FMP amendment.

F/V Sea Star
1110 N.W. 50th
Seattle Washington 98107
(206) 286-9234 office
(206) 782-0408 facsimile

From: LARRY HENDRICKS
1110 N.W. 50th
SEATTLE WASHINGTON
98107

To: COUNCIL MEMBER
OR STAFF MEMBER

DEAR COUNCIL MEMBER,

I AM WRITING THIS LETTER OUT OF CONCERN TO PROTECT DIFFERENT USER GROUPS CHASING AFTER THE SAME OR DIFFERENT SPECIES OF FISH WITH DIFFERENT GEAR TYPES. I AS A CRAB AND GROUNDFISH POT FISHING VESSEL HAVE BEEN LOSING GEAR TO THE TRAWL GROUP TO THE EXTENT THAT MY VESSELS INCOME AND LIVELIHOOD HAVE BEEN SERIOUSLY DAMAGED. I APPEAR TO HAVE NO RECOURSE YET KNOW WHICH VESSELS WERE IN THE AREA, AND ALL DENY TRAWLING through MY GEAR YET I END UP WITH NO WAY TO PLY MY TRADE WITH MY SIGNIFICANT GEAR LOSS.

FOR YOU TO UNDERSTAND WHERE THE PROBLEM LIES YOU NEED TO UNDERSTAND THE CONCEPTS OF HOW DIFFERENT GEAR GROUPS CATCH THERE FISH.

TRAWLER GROUPS; TO CATCH FISH, TRAWL GROUPS DEPEND UPON THE SCHOOLING EFFECT OF DIFFERENT SPECIES TO CATCH THERE FISH. THIS SCHOOLING EFFECT IS CREATED BY THE INNATE NATURE OF SCHOOLING FOR SPAWNING, SCHOOLING FOR PROTECTION FROM PREDATORS, AND SCHOOLING WHILE SEARCHING FOR A COMMON FOOD SOURCE. I ALSO SUSPECT A POSSIBLE SOCIAL EFFECT OF INTERMIXING BETWEEN CERTAIN SPECIES TO TRAVEL TOGETHER FOR PROTECTION FROM COMMON PREDATORS CREATES SCHOOLING. IN ESSENCE THE SUCCESS OF THE TRAWLER DEPENDS ON SPECIES BEING GROUPED TOGETHER TO MAKE THERE METHOD OF CATCHING EFFECTIVE AND BY-CATCH REDUCED WITH PROPER ELECTRONICS TO DIFFERENTIATE BETWEEN SPECIES.

CRAB AND BOTTOMFISH POT FISHING GROUPS; TO CATCH FISH OR CRAB, WE ENTICE VARIOUS ANIMALS WITH THE USE OF FOOD TO BE TRAPPED WITHIN THE CONFINES OF THE POT. WE RESTRICT ENTRY OF CERTAIN SPECIES, AND CULL SMALL OR JUVENILE SPECIES BACK OUT. OTHER METHODS TO RESTRICT BY-CATCH IS TO GRIND UP AN UNWANTED SPECIE FOR BAIT, WHICH WILL WORK FOR BAIT FOR TARGET SPECIE, YET KEEP OUT UNWANTED SPECIES SINCE MOST SPECIES ARE NOT CANNIBALISTIC OF THERE OWN. ESSENTIALLY WE ENTICE MOST OF THE CREATURES IN THE AREA WITH FOOD AND RESTRICT ENTRANCE DUE TO SIZE OR CHARACTERISTIC OF SPECIE, OR CULL OUT THE UNWANTED SPECIES OR JUVENILES BACK OUT WITH MESH REGULATION OR ESCAPEMENT RINGS.

HOOK AND LONGLINE USER GROUPS; AGAIN VARIOUS SPECIES OF FINFISH AND CRUSTACEANS ARE ENTICED TO THE HOOK WITH THE USE OF FOOD, THE SIZE OF HOOK AND BAIT DETERMINES SPECIE TO BE CAUGHT. BOTTOM CHARACTERISTICS, DEPTH, AND TIME OF DAY ALSO DETERMINES WHICH TYPE OF FISH WILL BE CAUGHT. HOOKS RARELY CATCH CRUSTACEANS YET ARE SUSCEPTIBLE TO LOSS OF PRODUCT TO MARINE MAMMALS DURING RETRIEVAL OF GEAR. ALL IN ALL THE FEEDING OF FISH ENTICES ALL OF THE MARINE CREATURES TO THE AREA WITH ONLY CREATURE CAPABLE OF BITING THE HOOK TO BE CAUGHT.

JIG GEAR; SMALLER VESSELS TEND TO JIG IN FRONT OF DEVELOPED COMMUNITIES OR VILLAGES. THERE METHOD OF FISHING USES DRIFT & CURRENT, DEPTH, HOOK SIZE AND AN INNATE CREATURE CURIOSITY TO FLASHY OBJECTS. DEPENDENT OF TARGET SPECIE, JIGGING DEPTHS FISHED RARELY EXCEEDS 50 FATHOMS IN DEPTH YET DRIFTS INCLUDE DEEPER WATERS WITH SCHOOLING FISH FOLLOWING JIG GEAR.

HEREIN LIES THE PROBLEM, WITH FUTURE COMPETITION TO HARVEST OUR VAST PROTEIN RESOURCES, GEAR ENTANGLEMENT BETWEEN USER GROUPS WILL CONTINUE TO ESCALATE WITH POSSIBLE HARD FEELINGS BETWEEN FIXED GEAR GROUPS, JIG VESSELS AND TRAWL GROUPS FISHING FOR ALL SPECIES OF FISH.

TRAWL GROUPS ARE FRACTURING SCHOOLS OF THERE TARGET FISH WHILE FISH ARE CONGREGATING IN AMONGST THE FIXED GEAR OR JIG FISHING VESSELS. WITHIN TIME WE AS FIXED GEAR FISHERMAN WILL ENCOUNTER TRAWL GROUPS TARGETING SCHOOLED FISH DANGEROUSLY CLOSE TO OUR GEAR AND LOSE OUR GEAR TO TRAWL GROUPS TRAWL WARPS. JIG VESSELS WILL ENCOUNTER FIXED GEAR GROUPS, TANGLE AND JIG GEAR HOOKED IN BUOY LINE OR POTS. WE AS FIXED GEAR POT FISHERMAN ARE LOSING OUR GEAR PRIMARILY AT NIGHT TO TRAWL GEAR GROUPS AND ARE HELPLESS AFTER THE GEAR IS LOST.

WE AS DIFFERENT GEAR TYPE USERS ALL HAVE OUR INDIVIDUAL GEAR / SPECIE INTERACTION PROBLEMS AND INTERRELATE WITH THE ENVIRONMENT IN DIFFERENT WAYS. EACH GEAR TYPE HAS A PRACTICAL AND PASSIVE MEANS OF HARVESTING CERTAIN TARGET SPECIES WITHOUT DISTURBING THE MARINE ENVIRONMENT. WITHOUT SOME TYPE OF SYSTEM OR PROTOCOL BETWEEN GEAR TYPES, WE WILL BE CREATING AN ENVIRONMENTAL DISASTER DUE TO GEAR CONFLICTS AND LOST GEAR.

I AM SURE THERE WILL BE MANY PROPOSED REMEDIES AND VIEWPOINTS BY DIFFERENT GEAR TYPES. LISTED BELOW ARE SOME CONCEPTS WHICH MIGHT WORK FOR THE POT GEAR IN COMBINATION OR INDIVIDUALITY.

PROPOSAL #1

IN THE MID-SEVENTIES WE AS AMERICAN FISHERMAN HAD A GOVERNMENTAL FUND FINANCED BY THE FOREIGN FLEETS TO REPLACE LOST GEAR WITH PROPER DOCUMENTATION. WITH A SYSTEM SIMILAR TO THIS, ALL GEAR GROUPS WILL HAVE ACCESS TO ALL FISHING GROUNDS. FUNDS CAN BE ESTABLISHED ACCORDING TO AREA FISHED AND TAX ADMINISTERED EQUALLY BY SEASON TO OFFENDING GEAR GROUPS TO REPLACE LOST GEAR AND REVENUE. **12**

PROPOSAL # 2

TIME OR AREA CLOSURES BETWEEN CONFLICTING GEAR TYPES. SUCH AS WHEN FIXED GEAR GROUPS ARE FISHING FOR COD OR CRAB THEN A MINIMUM DEPTH CANNOT BE BREACHED BY AN OFFENDING GEAR GROUP. SEPARATION OF DIFFERENT GEAR TYPES WILL SOLVE MUCH OF THE PROBLEMS OF GEAR LOSS AND POSSIBLY PROTECT SPECIES WHICH ARE NOT TARGET SPECIES CONGREGATING AMONGST FIXED GEAR. THE PROBLEM WITH THIS APPROACH WITH BOTTOM TRAWL GEAR, IS CAN WE DISRUPT PLANT AND BOTTOM LIFE ONE MONTH AND EXPECT SOME TYPE OF NORMALITY THE NEXT? **13**

PROPOSAL #3

WHOLESALE CLOSURES OF AREAS TO DIFFERENT GEAR TYPES FOR PROTECTION OF HABITAT DEPENDENT OF SPECIES. MUCH OF THE MARINE PLANT LIFE AND ROCKS CREATE HABITAT FOR JUVENILE CREATURES AND FOOD FOR OTHER SPECIES. A PERFECT EXAMPLE IS THE PRIBLOF ISLAND AREA WHICH CRAB RESOURCES ARE STARTING TO BUILD DESPITE PREDATORY FISH MIGRATING IN AND OVER THE UNDISTURBED BOTTOM. THE LONG LINE VESSELS HAVE BY INTERNATIONAL TREATY A HALIBUT SAVINGS AREA IN THE BERING SEA WHICH LONGLINERS CANNOT BREACH WHEN TAKING HALIBUT QUOTA YET TRAWLERS ARE ALLOWED TO SCOUR THE BOTTOM DURING COD SEASON IN THE HALIBUT SAVINGS AREA. THIS ALSO HOLDS TRUE WHEREAS IN THIS SAME AREA, TRAWLERS BY-CATCH IN NUMBER OF BARIDI CRAB CAUGHT, ARE IN NUMBERS GREATER THEN POT GEAR FISHERIES DECLINING HARVEST NUMBERS. HABITAT PROTECTION SHOULD BE THE KEY TO ALL FISHERIES TO GUARANTEE FUTURE PROTECTION OF OUR RENEWABLE RESOURCES. IF A DOLLAR IS TO BE MADE, EMERGING HABITAT FRIENDLY TECHNOLOGY WILL SOON PREVAIL. THE NEXT 100 YEARS OF TECHNOLOGY WILL FAR EXCEED THE LAST 100 YEARS WORTH. DESPITE THE SHORT TERM CONSEQUENCES OF ECONOMIC SHOCK TO COMMUNITIES, LONG TERM PROSPERITY FOR MANY COMMUNITIES WILL BE DEPENDENT ON HABITAT PROTECTION. PROTECTION OF OUR RENEWABLE FOOD RESOURCES IN THE FUTURE WILL AGAIN PLAY A HAND IN WORLD POLITICS SUCH AS OUR GRAIN RESOURCES DID IN THE MID-SEVENTIES.

I AM SURE MY PROPOSED REMEDIES WILL BE CONTROVERSIAL AND BE FOUGHT BY DIFFERENT USER GROUPS YET SOMETHING WILL HAVE TO BE DONE. MANY OF THE FIXED GEAR AND JIG GEAR VESSELS ARE SMALL INDEPENDENT OWNERS WITHOUT THE FINANCIAL RESOURCES TO DEAL WITH ORGANIZED GROUPS OR THE COUNCIL PROCESS. ANY HELP YOU AS COUNCIL CAN GIVE WILL BE MUCH APPRECIATED.

THANK YOU

LARRY HENDRICKS

EXECUTIVE SUMMARY

Original ISER Analysis

Pollock fishing patterns, weather implications, and duration of fishery

Relative to earlier dates studied, the September 1 date is likely to concentrate fishing activity into areas east and southeast of the Pribilofs, at least during the latter part of October - this is partially due to seasonal weather patterns. Generally, safety and weather concerns increase, particularly for smaller vessels, the later the fishery extends into fall/winter months, though a two week delay is not expected to have significant impacts, particularly if applied only to the offshore fleet. Overall, due to slightly lower quota, fishery would still end at about the same time as in previous two years.

Pollock Resource

Later opening dates would increase catch of larger size fish, resulting in potentially fewer discards, and lower numbers of fish taken to reach TAC. Better flesh quality and higher recovery rates also likely, which greatly impact expected economic benefits.

Marine Mammals

September 1 date was found to be least optimal (relative to earlier dates considered) from marine mammal perspective because of temporal compression of overall fishery and importance of late fall/winter feeding of juvenile sea lions. However, an additional two week delay is not likely to have significant impacts; fishery is likely to end at about the same time as in previous two years. CVOA considerations are discussed in subsequent section.

Bycatch of PSC species

September 1 date was found to be least optimal from overall PSC perspective, particularly for herring bycatch implications (three-fold increase relative to June 1 opening). Effects of two-week delay was difficult to assess, but not likely to result in significant impacts. Chum salmon implications relative to CVOA are discussed in subsequent section.

Overall Finding of No Significant Impacts (FONSI) for environmental (NEPA) considerations.

Economic Analyses

An industry canvas was utilized to determine likely industry responses and changes in yields, prices, etc. Information was used to drive models that were used to predict changes in bycatch patterns, net benefits, and distributional incomes. Assumed 40/60 roe/non-roe split, inshore/offshore allocations, and CVOA.

Yield increases from pollock are single most important factor determining outcome of analysis - based on ISER analysis, the extrapolated yield increase of a two-week delay could be as much as 17,000 mt of incremental product, based on TACs at the time and assuming delay is applied to both sectors. Additional revenues associated with that yield increase as high $15 million, **assuming 1992 prices for various product forms.** Actual increase will be mitigated by currently lower prices/TACs. Local and national direct income expected to also increase proportionally with season delay. These estimates would be slightly offset by incremental costs shown by the bycatch modeling exercise (PSC impacts from halibut bycatch changes).

Supplementary Analysis

Salmon Bycatch Considerations

Chum salmon bycatch over last two years peaks during last two weeks of August in the pollock fisheries - moving the season two weeks later appears likely to move the fishery out of period of highest bycatch, and into period of lower bycatch. Two week delay may make it less likely to trigger chum salmon closure area.

If applied to only offshore sector, may allow offshore fleet into CVOA for last 7-10 days of their fishery. This could increase chum bycatch relative to status quo situation, but would only impact CVOA closure until October 14 under worst case scenario, and inshore pollock fisheries would be over anyway.

Generally pushes fishery into later months when chinook salmon bycatch increases, but overall chinook bycatch is very low and pollock fishery would still occur throughout September, when most of the chinook are taken. In summary, not likely to impact chinook significantly.

Magnitude and incidence of salmon bycatch vary dramatically from year to year, so difficult to make future projections with much confidence.

Marine Mammals

As previously found, delay compresses fishery temporally, and into a time when juvenile sea lion foraging is critical. However, delay is only for two weeks and fishery will end about same time as previous two years. November 1 shutoff provides additional safeguard, but would not likely come into play in any case.

CVOA overlaps considerably with Critical Habitat Foraging Areas for Steller sea lions; this was not found to be a significant concern in original analysis, in fact CVOA could serve to preclude potential additional effort (from offshore sector) in this area.

If delay only applied to offshore sector, then inshore sector fishery would finish season earlier and allow offshore vessels into the CVOA. Maximum projected additional pollock which might be taken from CVOA is 106,000 mt, if all offshore vessels moved into CVOA. On the other hand, some vessels moving into CVOA would reduce concentrations of effort occurring just to the north of the CVOA boundary.

Interaction with yellowfin sole fishery

In 1995 yellowfin sole fisheries halibut bycatch was very high, and production of yellowfin sole per mt of halibut very low, during first two weeks of August. 'Pollock' vessels fishing in yellowfin fishery during that time may have contributed to these high bycatch rates, resulting in early closure of yellowfin fishery.

During spec setting process last December, Council set last PSC release for yellowfin at August 15, same as pollock opening, to alleviate this situation. If season delayed to September 1, same situation could occur.

Could remedy by also changing PSC release date to September 1, but that may be onerous solution for yellowfin fishery. Other option is to implement 'stand down' as done for pollock A season. Could be 7-day stand-down from pollock fishing for any vessel which fishes yellowfin in 7 days previous to September 1. Alternative approach would be to stand down a "day for a day" - If fishing 2 days prior to pollock opening, would have to sit out first two days of pollock season.

http://www.fakr.noaa.gov/1996/bysalb.txt

1996

AGENDA D-4(f)(2)
DECEMBER 1997

	groundfish	Chinook		Chum	
P 08/24/96	6,243.62	4.90	0.00	31.02	0.00
P 08/31/96	7,305.85	14.83	0.00	518.23	0.10
P 09/07/96	71,370.39	529.59	0.01	10,403.11	0.10
P 09/14/96	81,361.92	505.02	0.01	17,582.85	0.20
P 09/21/96	88,490.28	1,286.40	0.01	9,335.09	0.10
P 09/28/96	77,374.80	2,454.57	0.03	11,957.86	0.20
P 10/05/96	74,308.79	2,915.42	0.04	6,675.87	0.10
P 10/12/96	76,593.93	4,254.66	0.06	7,102.28	0.10
P 10/19/96	69,435.53	5,074.34	0.07	9,513.93	0.10
P 10/26/96	3,944.04	304.60	0.08	133.88	0.00
P 11/02/96	5,589.30	291.56	0.05	96.05	0.00
P 11/09/96	4,282.24	271.49	0.06	14.06	0.00
P 11/16/96	1,350.53	84.94	0.06	12.13	0.00
R 01/20/96	152.42	0.00	0.00	0.00	0.00
R 01/27/96	3,509.24	176.44	0.05	0.00	0.00
R 02/03/96	6,122.86	67.46	0.01	0.00	0.00
R 02/10/96	1,865.20	69.96	0.04	0.00	0.00
R 02/17/96	8,243.24	182.30	0.02	0.23	0.00
R 02/24/96	8,130.27	4.53	0.00	0.00	0.00
R 03/02/96	3,704.20	0.00	0.00	0.00	0.00
R 03/09/96	1,860.94	0.00	0.00	0.00	0.00
R 03/16/96	1,232.37	0.00	0.00	0.00	0.00
R 03/23/96	224.21	0.00	0.00	0.00	0.00
R 04/20/96	601.93	0.00	0.00	0.00	0.00
R 05/04/96	83.69	0.00	0.00	0.00	0.00
R 05/11/96	813.78	0.00	0.00	0.00	0.00
R 05/18/96	672.64	0.00	0.00	0.00	0.00
R 05/25/96	934.80	0.00	0.00	0.00	0.00
R 06/01/96	930.06	0.00	0.00	0.00	0.00
R 06/15/96	56.43	0.00	0.00	0.00	0.00
R 07/20/96	489.16	0.00	0.00	0.00	0.00
R 07/27/96	687.45	0.00	0.00	0.00	0.00
R 08/17/96	660.03	0.00	0.00	1.82	0.00
R 08/24/96	1,769.25	0.00	0.00	1.34	0.00
R 08/31/96	924.33	0.00	0.00	0.00	0.00
R 09/14/96	12.93	0.00	0.00	0.00	0.00
R 09/21/96	415.67	0.00	0.00	0.00	0.00
R 09/28/96	574.08	0.00	0.00	0.00	0.00
R 10/19/96	353.59	0.00	0.00	0.00	0.00
S 06/01/96	5.65	0.00	0.00	0.00	0.00
S 07/06/96	99.12	0.00	0.00	0.00	0.00
T 05/04/96	1.70	0.00	0.00	0.00	0.00
T 05/11/96	27.01	0.00	0.00	0.00	0.00
T 06/08/96	4.88	0.00	0.00	0.00	0.00
T 07/06/96	173.60	0.00	0.00	0.00	0.00
T 07/13/96	14.66	0.00	0.00	0.00	0.00
T 07/20/96	427.63	0.00	0.00	0.00	0.00
T 07/27/96	106.93	0.00	0.00	0.00	0.00
T 08/03/96	15.17	0.00	0.00	0.00	0.00
W 06/22/96	45.73	0.00	0.00	64.94	1.40
W 08/31/96	0.12	0.00	0.00	0.00	0.00
W 11/02/96	12.74	0.00	0.00	0.00	0.00
Y 03/02/96	15.67	0.00	0.00	0.00	0.00
Y 03/09/96	1,875.39	0.00	0.00	0.00	0.00
Y 03/16/96	9,990.44	0.00	0.00	0.00	0.00
Y 03/23/96	8,228.90	8.94	0.00	0.00	0.00
Y 03/30/96	11,269.16	0.00	0.00	0.00	0.00
Y 04/06/96	12,417.06	0.00	0.00	0.00	0.00

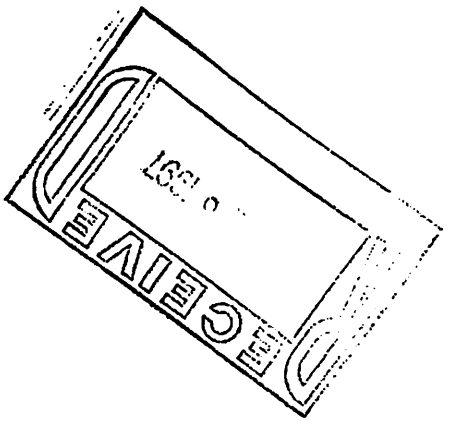
1997

		groundfish	Chinook		chum	
P	03/22/97	1,089.31	6.99	0.01	5.48	0.00
P	03/29/97	1.00	0.03	0.03	0.16	0.20
P	05/31/97	76.85	2.31	0.03	12.29	0.20
P	08/02/97	1,685.55	0.00	0.00	0.00	0.00
P	08/09/97	6,008.55	0.00	0.00	139.07	0.00
P	08/16/97	5,825.53	18.04	0.00	501.19	0.10
P	08/23/97	10,370.64	110.88	0.01	1,588.88	0.20
P	08/30/97	11,806.21	164.27	0.01	877.97	0.10
P	09/06/97	62,999.17	2,988.53	0.05	12,180.94	0.20
P	09/13/97	111,073.14	4,372.73	0.04	14,434.82	0.10
P	09/20/97	70,870.88	3,864.70	0.05	6,963.43	0.10
P	09/27/97	94,895.63	3,667.98	0.04	7,937.84	0.10
P	10/04/97	91,809.07	7,153.23	0.08	9,406.58	0.10
P	10/11/97	37,217.68	7,023.85	0.19	4,331.84	0.10
P	10/18/97	26,640.53	4,434.13	0.17	2,433.66	0.10
R	01/25/97	7,337.77	0.00	0.00	0.00	0.00
R	02/01/97	4,841.11	0.00	0.00	0.00	0.00
R	02/08/97	7,638.91	0.00	0.00	0.00	0.00
R	02/15/97	12,505.77	0.00	0.00	0.00	0.00
R	02/22/97	9,412.75	0.00	0.00	0.00	0.00
R	03/01/97	1,304.14	0.00	0.00	0.00	0.00
R	03/08/97	1,278.66	0.00	0.00	0.00	0.00
R	03/15/97	1,136.87	0.00	0.00	0.00	0.00
R	03/22/97	779.46	0.00	0.00	0.00	0.00
R	03/29/97	116.77	0.00	0.00	0.00	0.00
R	04/26/97	89.36	0.00	0.00	0.00	0.00
R	05/03/97	30.51	0.00	0.00	0.00	0.00
R	05/10/97	670.53	0.00	0.00	0.00	0.00
R	05/17/97	276.95	0.00	0.00	0.00	0.00
R	05/24/97	156.47	0.00	0.00	0.00	0.00
R	05/31/97	593.37	0.00	0.00	0.00	0.00
R	06/07/97	308.68	0.00	0.00	0.00	0.00
R	06/14/97	1,612.35	84.02	0.05	0.00	0.00
R	06/21/97	994.42	0.00	0.00	0.00	0.00
R	07/05/97	620.24	0.00	0.00	0.00	0.00
R	07/12/97	1,095.17	0.00	0.00	0.00	0.00
R	07/19/97	3,170.18	0.00	0.00	0.00	0.00
R	07/26/97	3,577.68	0.00	0.00	145.96	0.00
R	08/16/97	131.73	0.00	0.00	0.00	0.00
R	08/23/97	1,025.42	0.00	0.00	0.00	0.00
R	08/30/97	1,282.81	0.00	0.00	0.00	0.00
R	09/06/97	30.90	0.00	0.00	0.00	0.00
R	09/13/97	147.14	0.00	0.00	0.00	0.00
R	11/15/97	274.24	0.00	0.00	0.00	0.00
T	07/05/97	268.07	0.00	0.00	0.00	0.00
T	07/12/97	254.82	0.00	0.00	0.00	0.00
T	07/19/97	348.01	0.00	0.00	0.00	0.00
T	07/26/97	255.65	0.00	0.00	0.00	0.00
W	05/10/97	101.54	0.00	0.00	0.00	0.00
W	06/21/97	4.00	0.00	0.00	0.00	0.00
W	07/26/97	29.84	0.00	0.00	0.00	0.00
Y	02/22/97	483.77	0.00	0.00	0.00	0.00
Y	03/01/97	3,756.59	0.00	0.00	0.00	0.00
Y	03/08/97	5,345.85	0.00	0.00	0.00	0.00
Y	03/15/97	14,927.07	0.00	0.00	0.00	0.00
Y	03/22/97	11,747.76	0.00	0.00	0.00	0.00
Y	03/29/97	449.90	0.00	0.00	0.00	0.00
Y	04/05/97	6,105.39	0.00	0.00	0.00	0.00
Y	04/12/97	8,126.06	0.00	0.00	0.00	0.00

UNITED FISHERMEN OF ALASKA

211 Fourth Street, Suite 112
Juneau, Alaska 99801
907/586-2820
Fax: 907/463-2545

November 28, 1997



FAX: (907) 271-2817

Mr. Rick Lauber, Chairman
and Council Members
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

RE: Pollock B Season

Dear Chairman Lauber and Council Members:

It has come to our attention that the September 1 date for the Pollock B season is coming up for renewal at the December meeting. As you may know, United Fishermen of Alaska (UFA) supported the September 1 date in 1996, in hopes of diversifying salmon products and markets via processing by factor trawlers. In some regions of the state, notably Prince William Sound and Southeast, this diversification has indeed occurred as a result of alternative processing. In regards to salmon bycatch rates, UFA still remains concerned. However, the two years of additional data on salmon bycatch does not yet bring clarity as to which date, August 15 or September 1, best minimizes salmon bycatch overall.

Pending no new significant information on salmon bycatch and given the gain in product diversification, UFA would like to go on record reaffirming our previous position of supporting a September 1 date for the Pollock B season.

Thank you for the opportunity to comment.

Sincerely,

Kate Troll
Executive Director

MEMBER ORGANIZATIONS

Alaska Crab Coalition • Alaska Longline Fishermen's Association • Alaska Trollers Association • Area K Seiners Association
Bering Sea Fishermen's Association • Bristol Bay Drifinetters Association • Concerned Area "M" Fishermen
Cook Inlet Aquaculture Association • Cordova District Fishermen United • Kenai Peninsula Fishermen's Association
North Pacific Fisheries Association • Northern Southeast Regional Aquaculture Association • Peninsula Marketing Association
Petersburg Vessel Owners Association • Prince William Sound Aquaculture Corporation • Purse Seine Vessel Owners Association
Seafood Producers Cooperative • Southeast Alaska Seiners Association • Southern Southeast Regional Aquaculture Association

Alaska Groundfish Data Bank — P.O. Box 2298 • Kodiak, Alaska 99615

TO: RICK LAUBER
CHAIRMAN, NPFMC

DATE: DECEMBER 3, 1997

SENT BY FAX: 1 PP

RE: CHANGE IN BERING SEA B SEASON OPENING DATE (Agenda Item d-4(f))

The Bering Sea and Gulf of Alaska pollock seasons are now as synchronized as much as possible. AGDB requests that, should the North Pacific Fishery Management Council decide to change the opening date of the Bering Sea B Season pollock fishery, that the opening date of the Gulf of Alaska third trimester pollock fishery also be changed to be concurrent with the Bering Sea B season opening.

Thank you for considering our request.

Chris Blackburn, Director
Alaska Groundfish Data Bank

Chris Blackburn • Director • (907) 486-3033 • FAX (907) 486-3461 • e-mail 7353974@mcimail.com

UNITED STATES DEPARTMENT
National Oceanic and Atmospher
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

AGENDA D-4
DECEMBER 1997
SUPPLEMENTAL

November 20, 1997

Richard B. Lauber, Chairman
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

Dear Rick:

I am writing in regard to two items on the December, 1997, Council agenda: item D-4(c), Catch reporting accuracy/precision, and item D-4(e), Salmon retention revisions. These issues are related and complex, and I believe that additional staff work is needed before the Council considers them.

The groundfish catch accounting system uses a variety of methods, depending on the type and size of vessel or processing plant, and on the presence of groundfish observers. These methods include product weights converted to round weight using standard product recovery rates, volumetric measurements of total weight apportioned to individual species using species composition sampling, and scale weights of landed catch. None of these methods provide statistically-based estimates; therefore, determination of variance or confidence intervals for these estimates is not possible.

Consultants from Versar, Inc., under contract to the National Marine Fisheries Service (NMFS), investigated use of a statistical estimate of catch for observed processor vessels. This technique, based on observer estimates of haul weight and observer species composition sampling, allows confidence intervals to be calculated, though all sources of variance cannot be accounted for at this time.

In addition to the Versar study, the NMFS has conducted research into the statistical properties of sampling for species such as salmon, and has conducted an experiment on a trawl catcher-processor vessel which compares methods for estimating total catch weight. The methods examined include cod-end and bin volumetrics, and a flow scale. A report of this experiment is being reviewed for publication, and is expected to be available early in 1998.

The Council's Scientific and Statistical Committee (SSC) has proposed a workshop during early 1998 to discuss data collection and catch estimation. I believe that discussion of catch accounting in this forum should occur prior to Council consideration of the issue. The estimation of prohibited species catch, including catch of salmon, is closely related to accounting for groundfish catch, and I believe the issues should be considered together.

For these reasons, I suggest that the agenda items D-4(c) and D-4(e) be removed from the December agenda and that these topics be rescheduled based on the results of the SSC workshop.

Sincerely,

Steve

Steven Pennoyer
Administrator,
Alaska Region

cc: Dr. Clarence Pautzke

GROUNDFISH FORUM, INC.

4215 21st Avenue W. Suite #201
Seattle, WA 98199
(206) 301-9504 FAX (206) 301-9508

Mr. Rick Lauber
Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK 99510

December 2, 1997

Dear Rick:

Enclosed is a draft report of Groundfish Forum's EFP test of the "open top intermediate" (OTI) to reduce pollock bycatch in flatfish trawls. The report details the findings from our August 2-12 field test on six H&G vessels. As you will recall, the Council unanimously approved our EFP experiment because of its promising potential for reducing pollock discards in preparation for IR/IU full retention standards for pollock and cod beginning in 1998. The results reported here suggest that, on most of the vessels, the device greatly reduced pollock catches but at a large cost in terms of forfeited target catches of flatfish species.

As outlined in the EFP application, Groundfish Forum is responsible for making public the results to the Council and public through a presentation to the Council and this report. Thank you for including our report in the materials distributed to Council members and the Council's advisors. Although the results were somewhat disappointing, we feel the test increased our knowledge of how to reduce bycatch. In addition, it is possible that with some modifications, the problems encountered with the use of the OTI in Bering Sea flatfish trawls may be overcome.

Sincerely,

John R. Gauvin

Groundfish Forum's Exempted Fishery Permit (EFP) tests of a trawl modification for reducing roundfish bycatch in Bering Sea sole fisheries

by John Gauvin [1] and Craig S. Rose [2]

DRAFT 12/2/97

[1] Groundfish Forum
[2] RACE Division, AFSC, NMFS
(assisted on Methods and Results)

I. Introduction

In April of 1997, the North Pacific Fishery Management Council recommended approval of Groundfish Forum's request to receive an exempted fishing permit (EFP). Groundfish Forum's EFP application requested the Council and NMFS agree to set aside approximately 4,500 MT of yellowfin sole and associated bycatch species to be harvested in a test of the effectiveness of a trawl net innovation to reduce the capture of pollock and other round fish in flatfish trawls. The experiment was designed to deliver a statistically reliable assessment of the effectiveness of a pollock exclusion device under a number of relevant types of fishing conditions and strategies employed by vessels of different sizes targeting flatfish in the Bering Sea.

The "open top intermediate" (OTI) trawl innovation tested in the EFP was designed by Dr. Craig Rose of the Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center, National Marine Fisheries Service (Seattle). Dr. Rose's presentation at a bycatch reduction workshop describing his early tests of the device indicated significant potential to reduce pollock bycatch in flatfish trawls. Rose had tested the OTI during a research fishing cruise in the Gulf of Alaska and another in the Bering Sea. The scale and other characteristics of the research tows were somewhat different from flatfish fishing by "head and gut" (H&G) vessels in the Bering Sea. After reviewing the paper, the relevant question for Groundfish Forum members was whether the gear would work when applied to their flatfish trawls.

Groundfish Forum's interest in developing methods of avoiding pollock catches is fueled by the economics of flatfish vessels. H&G boats generally cannot produce a head and gut product from pollock that sells for more than the costs of production. The problem is the low relative value of pollock which is compounded by limited freezer hold space on for H&G boats. To be profitable, hold space must be used for higher-valued flatfish products. This explains why a significant portion of the pollock caught by H&G vessels has been discarded in the past. According to a NMFS report on utilization in groundfish fisheries, discards of pollock in the flatfish fisheries were approximately 29,000 MT in 1995. Although H&G vessels are not the only vessels fishing flatfish that discard pollock in flatfish fisheries, more than half of these discards are probably attributable to H&G vessels.

The impetus to avoid catching pollock has lead to considerable individual company efforts to fashion pollock exclusion devices and other net modifications. Although individual efforts to develop solutions are valuable, the ability to thoroughly and reliably test the actual effectiveness of such devices is limited during competitive fisheries. The H&G sector's experience has been that *ad hoc* tests are commonly abandoned when initial results fail to meet expectations. In competitive fisheries, to continue to refine a device might jeopardize the economic position of the company. Furthermore, lacking an adequate experimental design, results can be less than reliable. At times, substantial gear modification investments have been made when more testing under an adequate experimental design would have demonstrated beforehand the limitations of a device.

There have always been incentives to avoid catching pollock rather than discarding them. This is because discarding pollock involves sorting and handling costs to the vessel as well as the fishing

costs associated with a portion of the net filled with species other than the flatfish target. The problem has been that the techniques and fishing strategies available for avoiding pollock have been less feasible than the cost of discarding unwanted pollock. Pollock discards are counted against the pollock quota, but until recently, the only individual cost associated with unwanted pollock catches was the handling costs and the fishing effort squandered on non-target catch.

The need for better methods to avoid pollock bycatch became acute recently with the approval and impending implementation of Amendment 49. Starting in 1998, every groundfish vessel will have to retain all pollock catches regardless of target fishery. These new regulations pose a great deal of potential economic impact on the H&G fleet because freezer hold space is very limited and H&G vessels cannot make fishmeal out of unwanted pollock catches. While many trawl pollock vessels can turn pollock into fishmeal or lower recovery products such as fillets, H&G vessels cannot practically install fishmeal plants or are not designed or permitted for filleting machines. The only options for H&G boats is to avoid catching the pollock or make products with relatively high recovery rates, thus constraining product hold capacity and hence economic returns.

Because they generally agree with the goal of reducing discards, Groundfish Forum members did not oppose the requirement to retain all pollock and cod starting in 1998. Instead of trying to modify the objective of the plan, members have endeavored to develop excluder devices and lower profile net designs as well as increased product and market development for the pollock catches that cannot be avoided. Groundfish Forum's EFP was one part of its memberships' efforts to improve fishing techniques and reduce unwanted catches. As can be seen from the report that follows, the OTI as currently conceived will probably not be the salvation of the H&G fleet. Modifications to the basic approach, however, have already been spawned. Furthermore, the fleet has seen first hand the need for a well-designed test to demonstrate the effectiveness of potential innovations. Perhaps most important result is that the H&G fleet has seen the value of working together to improve fishing methods.

The preliminary report below details the manner in which the experiment was conducted and the most general statistical results of the field test. This report is intended to convey the principle results of the gear test to the industry and interested public in a timely manner. More detailed analysis of the data generated from the study will be performed by NMFS scientists and other researchers.

II. Acknowledgments

Dr. John Skalski provided the statistical design for this project under a consulting contract with Groundfish Forum. The Groundfish Forum would like to thank Dr. Craig Rose for helping to design our study, providing underwater camera coverage during the experiment, and for assisting us with the statistical analysis. Without Craig, we would not have been able to accomplish our objective. We would also like to thank Dr. Gary Stauffer for making some of Craig's time available for this work and for providing guidance throughout every step of the EFP. Dr. William Karp, NMFS Observer Program, also helped us determine the best way to collect our species composition samples for the experiment. We would also like to thank the North Pacific

Council and the Alaska Region of NMFS, (Steve Pennoyer and Ron Berg in particular), for making sure the application received timely review and for trusting us with conducting the experiment and staying within the limits for catch and bycatch. Andy Smoker and Kent Lind deserve our thanks as well for serving on the application oversight committee and writing up the Environmental Assessment and other paperwork tasks critical to the experiment.

We also want to thank the 12 NMFS-trained observers who dutifully followed an expanded sampling regime during the experiment to ensure our data were of sufficient quality for the experiment. Alaskan Observers and Northwest Observers also deserve our gratitude for providing us with 12 experienced observers willing to conduct the expanded sampling and for accommodating our timing for the experiment.

Dr. Jack Tagart, Washingon Department of Fisheries, and Dr. Keith Criddle, University of Alaska, provided direction for the statistical analysis. The more in-depth analysis that will be performed later by Dr. Rose and others will likely be able to take full advantage of some of the more refined analytical techniques outlined by Drs. Tagart and Criddle.

Lastly, the companies that participated in the experiment deserve our thanks. Five of the six vessels that participated in the experiment were Groundfish Forum member vessels. All participants incurred the expense of the gear purchases and fishing time, as well as the extra expense of having two observers and other non-employee persons aboard during the experiment. As compensation, participants were allowed to retain their catches for sale provided they stayed within the directed fishing standards for the yellowfin sole fishery. Our feeling however, given the results of the experiment, was that the participation was a break-even scenario at best for all participants. Groundfish Forum appreciated the willingness of all participant companies to commit up front to the completion of the experiment regardless of sub-optimal economic returns.

III. Methods

To test the ability of the OTI to exclude pollock while retaining sole species under commercial conditions, a permit was obtained for an exempted fishery in the early August 1997. This fishery included five head and gut factory trawlers and one vessel that has primarily targeted pollock for fillets. Vessels participating in this fishery were selected based on the following information:

1. Diagrams of the vessels fishing gear, including both experimental and control nets, if two trawls were to be used.

2. Description of an implementation of the OTI concept that would be installed in the vessel's trawl,

3. A description of the vessel itself, with emphasis on facilities and configuration to allow extended observer sampling of the catch, and

4. Written and signed agreement to abide by experimental protocols and other permit requirements.

Preliminary examination of observer data from the yellowfin sole fishery indicated a somewhat different species composition of catches by smaller flatfish vessels, with the most rapid shift in the range of 165 feet. To assure representation of the range of vessel types and fishing strategies occurring in the fishery, three vessels greater than 165 feet in length and three less than 165 feet were selected for the exempted fishery. Applicants were provided information on previous configurations of the OTI and developed their own designs, under the constraints that the openings in the trawl intermediate should be at least 16 feet in length and occupy at least 40 % of the circumference of that length of the intermediate section.

The six vessels selected are described in Table 1. They ranged from 133 feet in length to 215 feet. The smaller three vessels all used two panel trawls, which had lower vertical openings than the four panel trawls used by the longer vessels. The OTI designs for five of the vessels were quite similar, installed in an untapered section of the intermediate with openings approximating the length and circumference criteria. The Cape Horn chose to install their OTI in a tapered section farther forward in their intermediate. Because the tapered section has a larger diameter than the untapered section, this resulted in a larger opening, installed in a section that got smaller from front to back.

Table 1. Characteristics of vessels and gear used in the 1997 exempted fishery to test the Open Top Intermediate.

Vessel	Length	Trawl (HR/FR)[1]	Alternation Method
Arica	182'	163/203 4 panel	Switched matched nets
Brown's Point	200'	120/153 4 panel	Switched codend/int
Cape Horn	146'	202/208 2 panel	Cover
Legacy	133'	137/153 2 panel	Cover
Ocean Peace	215'	164/201 4 panel	Cover
Rebecca Irene	140'	114/155 2 panel	Switched codend/int

[1] - headrope length (ft)/ Footrope length (ft)

Three methods were used to alternate between control and experimental configurations. The Arica used two matched trawls, one with the OTI installed and one in a unmodified configuration (control). The Brown's Point and the Rebecca Irene each used the forward sections of one trawl throughout the experiment, installing either intermediate and codend sections with an OTI or a matched intermediate and codend set without the OTI. The Cape Horn, Legacy and Ocean Peace each used one full trawl with an OTI installed throughout the experiment and installed a mesh cover over the OTI opening during the control tows. All of these methods achieved the goal of

experimental and control tows only differing by the availability of the escape opening in the intermediate.

To increase the likelihood of optimum OTI configuration, NMFS scientists used underwater video systems to observe two of the OTI sections during an unrelated bycatch research charter immediately prior to the OTI experiment. Underwater video cameras were used to assess the fishing configuration and the reactions of pollock and sole. In addition, a NMFS scientist with an underwater video system moved between the vessels during the experiment, documenting OTI function on all vessels except for the Cape Horn.

So that the experiment would be representative of commercial fishing efforts, vessels were allowed to fish at any location that would be open for the August 1997 yellowfin sole season, which was to open after the experiment, and were required to follow the directed fishing standards and all other rules that pertain to that fishery. Each vessel was allocated a portion of the fisheries quotas of target species and of important bycatch species, particularly halibut, tanner crab and snow crab. These limits were monitored throughout the fishery to assure that the vessel captains could adjust their tactics in such a way that their parts of the experiment would be completed without exceeding the catch and bycatch limits set by the exempted fishing permit.

To improve statistical measurements of the OTI's effects on target and bycatch catch rates, vessels alternated experimental and control gears to create pairs of tows (blocks) conducted under similar conditions. Blocking of the data helped to eliminate variations in catch between areas, days, times of day, and between vessels from the analysis. The gear used for the first tow of each block was randomly determined and the vessel captain was not informed of the selection until after the decision of where and when to tow had been made. The second tow of each block was made as close in time and space as practical to the first, matching speed and other towing parameters. Tow duration was allowed to vary within blocks with the goal that similar catch sizes were obtained from experimental and control tows.

A preliminary analysis (reported in Groundfish Forum's EFP application's technical appendix by Skalski Statistical Services), using observer data from yellowfin sole fisheries, indicated that a sample size of 150 pairs would be sufficient to have an 60 % chance of detecting catch differences of 10 %. To accomplish this, each vessel was assigned a goal of 25 complete blocks (pairs of one control and one experimental tow) to achieve during the experiment. A small number of short test tows were used to allow a vessel moving into a new area to determine if the catch composition warranted a pair of full tows. If the initial tow of a pair was unsuccessful (i.e. gear damage or crab pot in the net) or the catch composition made further towing at that site inadvisable (excessive crab or halibut bycatch) vessels were allowed to abandon an incomplete block in a limited number of cases. These test tows and incomplete blocks were not included in the experimental analysis, though they were accounted for in tracking the target and bycatch limits for each vessel and for the experiment as a whole.

Catch sampling followed NMFS fisheries observer protocols for North Pacific H&G trawlers with a few modifications. Each vessel contracted two NMFS certified observers who alternated 12 hour shifts to assure that all catches were sampled. Catch volumes were estimated by

determining the shape of the filled codends and taking necessary codend measurements or by taking measurements from tanks into which the catch was placed.

To assure a reliable tracking of each vessel's use of their halibut bycatch cap and to improve survival of discarded halibut, as many halibut as possible were sorted out of the catch on deck as the catch was dumped into the live tank. The observer worked with the deck crew to achieve a census of these halibut and to measure them before they were returned to the sea. To assure that the rest of the catch was available for sampling, no fish were moved out of the tanks into the factory until the deck sampling was completed and the observer went down to the factory. While this procedure cannot currently be used in commercial fisheries, due to the constraints of sampling for the vessel incentive program (VIP), a specific exemption from these requirements was made for this project

Samples of the catch, to determine density and species composition, were taken by filling baskets from conveyor belts as the catch passed from the holding tank to the factory. Basket samples were taken at several points throughout the emptying of the tank. The procedures of the NMFS observer manual were followed, except that larger sample sizes were encouraged to improve catch estimates, with a goal of at least 300 kg from each catch. Any remaining halibut coming out of the live tanks were taken from the conveyor and measured.

Subsamples of some species were selected to determine their size composition. First priority for these length samples was the principal target species, yellowfin sole. Sample of other species were measured as time allowed.

The position and time of the start and end of each tow were recorded by bridge personnel. They also recorded the depth, towing speed, their own estimate of catch weight and whether the experimental or control net was used. An underwater datalogger was attached to each net to record depth, light level and temperature every 10 seconds while the trawl was fished. Because these sensors measured ambient conditions at the trawl throughout each tow, their data were used to measure towing durations and to categorize the trawl tows into day or night conditions.

The goal of this experiment was to measure the proportion by which the OTI changed the catch rates of target and bycatch species, particularly yellowfin sole and pollock. To adjust for varying tow durations, all analyses were done on catch per unit of time rates, not raw catches. Tow duration was the length of time between when the trawl depth, as indicated by the datalogger, stabilized at the beginning of the tow until the depth began to decrease during retrieval. Where datalogger information was not available, due to sensor failure or other problems, the difference between the bridge recordings of start and end times were used. This was adjusted by the average difference between bridge and datalogger durations from tows when both were available.

To allow tests for proportional differences with additive models, a (natural) logarithmic transformation was applied to all catch rates. This also improved the normality of the catch rate distributions. The parameter which was used as a measure of the effect of the OTI was the difference between the transformed catch rate from each tow with the OTI and the comparable rate from the control tow in the same block (pair).

$$\text{Ln OTI} = L_n\left(\frac{\text{Catch}_e}{\text{Duration}_e}\right) - L_n\left(\frac{\text{Catch}_c}{\text{Duration}_c}\right)$$

This parameter was calculated for each block for each major species in the catch. Means and confidence intervals of LnOTI's were untransformed, using the exponential function, and decreased by 1 to provide estimates of the proportional change in catch rates due to the OTI. To test whether there was a significant difference between the effects of the OTI on catch rates of two species (or size groups), the difference between their LnOTI parameters was used as the test parameter.

One concern in designing and analyzing this experiment was that light levels and diurnal behavior patterns could change the availability of some species to the trawl or the effectiveness of the OTI. Mean light level during the tow, as measured by the underwater dataloggers were used to partition tows into day or night categories. For tows where light data were not available, time cutoffs were used to make this classification, based on the light observations were compared to the mean time of day for the tow. Comparisons between transformed catch rates for control tows between day and night were used to test whether availability of each species varied diurnally. Where this was the case, all mixed blocks, those where a daytime control tow was paired with a night experimental tow, or visa versa, were excluded from the analysis, because the effect of the OTI could have been confounded with the diurnal difference in availability.

The LnOTI values for each species and for the combined flatfish catches were analyzed with t-tests and analysis of variance (ANOVA) to test the following questions:

1. Does the OTI have a significant effect on the catch rates of pollock, flatfish and cod?
2. Are the effects on flatfish and pollock significantly different?
3. Do these effects vary between vessels?

In addition to the significance tests, estimates and confidence intervals for each significant effect were generated. The data were also examined along with information on the vessels, their operations and video observations of the gear and the fish to try to identify the reasons for any differences.

Any effect of the OTI on the size selectivity was of interest because of significant price differentials between large and small flatfish. To test whether the effect of the OTI varied for different sizes of the same species, catch rates by size class were generated and analyzed in the same manner as the species catch rates. Yellowfin sole were partitioned into four size classes, less than 25 cm, 25 to 29 cm, 30 to 34 cm and greater than 35 cm. Length-weight relationships from the NMFS Bering Sea groundfish survey indicate that these length classes correspond to weight classes of: less than 160 g, 160 to 300 g, 300 to 500 g, and more than 500 g. For each block where yellowfin sole were measured from both tows, the number of sole in the length subsample from each of these classes was expanded by both the length subsample fraction and the basket sampling fraction to provide estimates of the number of sole in each size class in the entire catch. LnOTI values were calculated with these catch numbers for each size group. Paired

t tests between the LnOTI's for adjacent size groups were then performed to test for selectivity differences.

IV. Results

The exempted fishery experiment to test the OTI was conducted from August 1 to 12, 1997.

Six vessels completed 138 blocks of paired tows in the eastern Bering Sea. A total of 4,371 metric tons of groundfish were taken of the 4,500 set aside for the experiment. Monitored bycatch species catches compared to the PSC limits allocated for the experiment are reported in Table 2. In all prohibited species categories, catches were less than 50% of the upper limit quantity set by the Council and NMFS for the fishery. Bycatch limits designated for the experiment were based on performance guidelines in the regular fishery for yellowfin sole.

Table 2

Vessel	Groundfish (MT)	Halibut Mortality (MT)*	Bairdi (#)	Opilio (#)
1	754.49	3.31	732.03	2,522.37
2	643.12	0.95	1,421.68	14,574.23
3	479.80	0.92	1,406.77	20,857.90
4	965.77	4.17	1,925.23	11,747.19
5	493.8	1.84	307.71	14,606.95
6	1,034.96	5.11	51.87	314.85
Total	4,371.94	16.30	5,845.29	64,623.49
Limits	4,500.00	43.00	27,750.00	140,000.00
unused catch	*128.06*	*26.70*	*21,904.71*	*75,376.51*

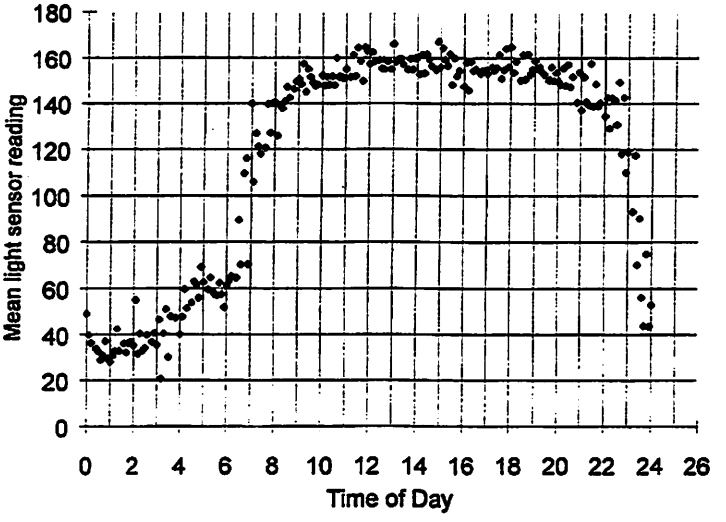
*Halibut mortality is reported using the 1997 IPHC mortality rate for the yellowfin sole fishery = 0.79

Groundfish Forum administered the PSC limits in the experiment by dividing the available PSC quantities into individual allocations among vessels based on the tonnage of groundfish made available to each participating vessel. This was done because prohibited species bycatch quantities for the experiment were binding constraints creating the possibility that the catches of one or a few vessels (or even a few careless tows) could have ended the experiment. This would have been costly for participants who had incurred the gear expenses for the experiment. Groundfish Forum believes that the inherent accountability created from individual allocations of PSCs contributed greatly to our ability to conduct the experiment under a small PSC allocation and an even smaller usage of PSC.

The goal of including a range of towing methods and strategies was clearly achieved (Table 3). Towing speeds, tow durations, proportions of day and night tows, average depth all varied between vessels, even though they were operating in the same general area most of the time. All but 18 of the pairs were made within a 60 NM by 120 NM box on the central Bering Sea shelf,

where depths ranged from 50 to 80 m and bottom temperatures from 1.3 to 3.8 degrees Celsius. Outside of this box, seven pairs were carried out in 42 to 44 m depth by a vessel that moved northeast and 11 pairs were made by two vessels that moved south into depths between 75 and 105 m. Bottom temperatures for the southern tows were in the same range as for the main area, while the northeastern area had temperatures between 6.3 and 6.6 degrees.

Figure 1



Examination of the light readings from the underwater dataloggers indicated that tows could be categorized into night and day by the average light level during the tow (Figure 1). While not explaining all of the light variability, day/night differences were clearly the most important factor. For those tows where light data was not available, comparison of the mean time of day during the tow to cut off times of 0700 and 2315 was used for day/night determination.

Table 3 - Operational parameters for vessels participating in tests of an open top intermediate.

Vessel	Mean Tow Duration (min)	Mean Speed (knots)	Mean Depth (m)	Percent of Tows during day (%)
Rebecca Irene	103	2.8	34	67
Browns Point	164	3.8	37	66
Cape Horn	92	3.2	38	88
Legacy	95	3.5	33	84
Arica	171	3.3	37	69
Ocean Peace	149	4.0	29	77

The distribution of experimental tows by vessel and day/night is presented in Table 4. The blocks where both tows were during daylight were the most abundant with 81 pairs and at least 10 blocks for each vessel. There were also a large number of mixed blocks and relatively few night blocks.

Table 4. Distribution of tows and pairs by vessel and time of day.

Vessel	Day tows	Night tows	Day/Day Pairs	Night/Night Pairs	Day/Night Pairs [1]	Night/Day Pairs [2]
Rebecca Irene	32	16	13	5	3	3
Browns Point	33	17	11	3	8	3
Cape Horn	42	6	19	1	3	1
Legacy	37	7	16	1	5	0
Arica	29	13	10	0	4	5
Ocean Peace	34	10	12	0	3	7
Total	207	69	81	12	26	19

1 - Experimental tow during the day, control tow at night
2 - Control tow during the day, experimental tow at night

A set of t-tests comparing the catch rates of control tows between night and day indicated that pollock and cod were clearly more available to the trawls during the daytime, while there was a marginal indication of such a difference for flatfish (Table 5). Therefore, the mixed blocks, the pairs that included both day and night tows, were not used in the catch rate analyses due to the potential for confounding of availability differences with the effects of the OTI. Because so few night blocks were completed, it was decided to also exclude those from this initial analysis. Day / night differences will be more thoroughly examined in later analyses.

Table 5 - Comparison of day and night catch rates with unmodified trawls by species.

Species	Prob. ($p <$)	Day Mean (ln transf.)	Night Mean (ln tranf.)	Difference	Untransformed Diff. (Ratio)
Walleye Pollock	.001	3.09	2.28	0.81	2.25
Flatfish	.067	4.47	4.22	0.25	1.28
Cod	.005	2.31	1.93	0.38	1.46

The OTI significantly ($p<.001$)lowered catch rates of pollock by 58 % and cod by 46 %. Unfortunately, the reduction in the flatfish catch rates was also relatively large (44 %). The decrease in pollock catch was significantly greater than that for the flatfish catch at the $p < 0.01$ level. However, these rates do not allow separation as well as those indicated in previous studies with smaller scale trawls used in the Gulf of Alaska and with open codends and smaller scale trawls in the Bering Sea (Rose, 1995).

Analysis with a general linear model detected differences between vessels in the effects of the OTI on species catch rates. These differences were significant at levels from 3.9 % (flatfish) to 6.7 % (pollock) (Table 6). While these differences will be more rigorously examined in later analyses, the mean OTI effects presented here provide an indication of the variability between vessels. The effects on pollock and flatfish catches were notably consistent (pollock -58 to -59 %, flatfish -33% to -41%) between the large vessels (Browns Point, Arica and Ocean Peace), while they were highly variable between the smaller vessels (Rebecca Irene, Cape Horn and Legacy). The OTI did not seem to work at all on the Rebecca Irene, where the flatfish loss was

greater than that for pollock, with both loss rates relatively low, or the Cape Horn, where the loss rates for pollock and flatfish were high and equal. The Legacy followed a similar pattern to the large vessels except that its catch rates of both pollock and flatfish were decreased by approximately an additional 10%. Some factors that could be associated with this increased variability for the smaller vessels include the different OTI design used by the Cape Horn, the less constrained side panels of the Legacy's OTI and low visibility in the intermediate sections associated with the low opening trawls used by these small vessels. This last phenomenon is described below, in the section on video observations.

Table 6. Effects of OTI on species catch rates by vessel.

Vessel	Change in pollock catch rate $p<0.067$	Change in flatfish catch rate $p<0.039$	Change in cod catch rate $p<0.065$
Rebecca Irene	-6 %	-22 %	plus 37%
Browns Point	-59 %	-38 %	-17 %
Cape Horn	-60 %	-60 %	-58 %
Legacy	-70 %	-47 %	-47 %
Arica	-58 %	-33 %	-62 %
Ocean Peace	-58 %	-41 %	-73 %

Paired t tests were used to test whether the effect of the OTI varied between size classes of yellowfin sole (Table 7). These comparisons were based on only those daytime blocks where yellowfin sole size samples were taken for both tows. Tows from the two vessels where the OTI did not separate pollock from flatfish (the Rebecca Irene and the Cape Horn) were also excluded. No significant differences were detected.

Table 7. Comparison of OTI effects on catch rates of different size groups of yellowfin sole.

Size range	less than 25 cm (less than 60 g)	25 - 29 cm (60 - 150 g)	30 - 34 cm (150 - 500 g)	more than 34 cm (more than 500 g)
Effect of OTI on catch rate	-67%	-44%	-44%	-48%
significance of difference		$p<0.14$ (n.s.)	$p<0.95$ (n.s.)	$p<0.87$ (n.s.)

Video observations were made on the OTI's of all of the vessels participating in the experiment, except for the Cape Horn. Time and weather conditions precluded getting the video system and operator to that final vessel. Those videos have not been fully analyzed and the following observations are based on only preliminary examinations. All of the OTI's observed operated in the intended shape, forming a U-shaped trough for the length of their openings. The rigidity of this shape varied, from the Ocean Peace, where all support lines were extremely tight, to the Legacy, where the side panels of the trough were relatively free to move in the water currents.

The most obvious difference between the observations during this experiment and those collected during previous tests of the OTI was visibility. The intermediate sections seemed to be closer to the seafloor during these tests, putting them into a layer of particles suspended by the passage of the forward parts of the trawl. This greatly reduced visibility in the intermediate, likely affecting the ability of fish to orient themselves in the net. One potential cause of this lower position is the greater water resistance caused by the nets used for the EFP which were larger than those used in earlier research cruises. Another contributing factor was the low openings of the two panel trawls used by the smaller vessels. The intermediates of these trawls could only be observed up until the trawl was just coming into contact with the seafloor and as it was retrieved. During the tow itself, only objects passing very close to the camera could be detected. Observations of OTIs on the higher opening, four panel trawls used by the larger vessels, were not as fully obscured. After these trawls had settled into towing configuration, only the bottom half of the intermediate was obscured. This allowed observations of the escaping individuals, but not those fish which remained near the floor of the net. As the catch accumulated and increased the pull of the codend, the intermediate lowered, allowing less and less visibility. The entire OTI was usually obscured within the first 30 minutes of the tow.

T-Test - Catch rates by species between day and night
All vessels - Control tows only

Group Statistics

	D/N(C)	N	Mean	Std. Deviation	Std. Error Mean
LFLATCRC	d	100	4.4728	.7543	7.543E-02
	n	38	4.2238	.6827	.1108
LPOLCRC	d	100	3.0867	1.0940	.1094
	n	38	2.2847	1.0344	.1678
LCODCRC	d	100	2.3102	.6795	6.795E-02
	n	38	1.9285	.7503	.1217

Independent Samples Test

		Levene's Test for Equality of Variances	
		F	Sig.
LFLATCRC	Equal variances assumed	.000	.997
	Equal variances not assumed		
LPOLCRC	Equal variances assumed	.003	.954
	Equal variances not assumed		
LCODCRC	Equal variances assumed	.160	.690
	Equal variances not assumed		

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Mean	
							Lower	Upper
LFLATCRC	Equal variances assumed	1.777	136	.078	.2491	.1402	-2.81E-02	.5262
	Equal variances not assumed	1.859	73.383	.067	.2491	.1340	-1.80E-02	.5161
LPOLCRC	Equal variances assumed	3.904	136	.000	.8020	.2055	.3957	1.2083
	Equal variances not assumed	4.004	70.391	.000	.8020	.2003	.4025	1.2015
LCODCRC	Equal variances assumed	2.863	136	.005	.3817	.1333	.1181	.6453
	Equal variances not assumed	2.738	61.426	.008	.3817	.1394	.1030	.6604

T-Test - Effect of OTI on catch rates by species
All vessels - Daytime blocks only

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DLOGPOLC	81	-.8688	1.0724	.1192
dlogflatc	81	-.5721	.6031	6.701E-02
diflogcodc	81	-.6133	1.4408	.1601

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
DLOGPOLC	-7.291	80	.000	-.8688	-1.1059	-.6317
dlogflatc	-8.538	80	.000	-.5721	-.7054	-.4387
diflogcodc	-3.831	80	.000	-.6133	-.9319	-.2947

T-Test - Pollock Flatfish Difference in Effect
All Vessels - Days blocks Only

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
POLFLTCM	81	.2967	.9859	.1095

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
POLFLTCM	2.709	80	.008	.2967	7.872E-02	.5147

General Linear Model - Differing Effects between Vessels?
All Vessels - Days Blocks Only
Pollock

Between-Subjects Factors

		Value Label	N
VES	1		13
	2		11
	3		19
	4		16
	5		10
	6		12

Descriptive Statistics

	VES	Mean	Std. Deviation	N
DLOGPOLC	1	-6.34E-02	.8876	13
	2	-.9000	.7736	11
	3	-.9101	.9199	19
	4	-1.1957	.7238	16
	5	-.8667	1.0118	10
	6	-1.2134	1.7228	12
	Total	-.8688	1.0724	81

Levene's Test of Equality of Error Variances [a]

	F	df1	df2	Sig.
DLOGPOLC	.584	5	75	.712

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+VES

Tests of Between-Subjects Effects

Dependent Variable: DLOGPOLC

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Intercept	Hypothesis	56.861	1	56.861	24.979	.004	.828
	Error	11.786	5.177	2.276[b]			
VES	Hypothesis	11.611	5	2.322	2.167	.067	.126
	Error	80.391	75	1.072[c]			

Tests of Between-Subjects Effects

Dependent Variable: DLOGPOLC

Source		Noncent. Parameter	Observed Power[a]
Intercept	Hypothesis	24.979	.977
	Error		
VES	Hypothesis	10.833	.681
	Error		

a. Computed using alpha = .05

b. .963 MS(VES) + 3.673E-02 MS(Error)

c. MS(Error)

Expected Mean Squares [a,b]

Source	Variance Component		
	Var(VES)	Var(Error)	Quadratic Term
Intercept	12.867	1.000	Intercept
VES	13.358	1.000	
Error	.000	1.000	

a. For each source, the expected mean square equals the sum of the coefficients in the cells times the variance components, plus a quadratic term involving effects in the Quadratic Term cell.

b. Expected Mean Squares are based on the Type III Sums of Squares.

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Eta Squared
						Lower Bound	Upper Bound	
DLOGPOLC	Intercept	-1.213	.299	-4.060	.000	-1.809	-.618	.180
	[VES=1]	1.150	.414	2.775	.007	.324	1.976	.093
	[VES=2]	.313	.432	.725	.471	-.548	1.174	.007
	[VES=3]	.303	.382	.794	.429	-.457	1.064	.008
	[VES=4]	1.766E-02	.395	.045	.964	-.770	.805	.000
	[VES=5]	.347	.443	.782	.437	-.536	1.230	.008
	[VES=6]	0[b]	.	.	.	.	.	.

Parameter Estimates

Dependent Variable	Parameter	Noncent. Parameter	Observed Power[a]
DLOGPOLC	Intercept	4.060	.980
	[VES=1]	2.775	.782
	[VES=2]	.725	.110
	[VES=3]	.794	.123
	[VES=4]	.045	.050
	[VES=5]	.782	.121
	[VES=6]	.	.

a. Computed using alpha = .05

b. This parameter is set to zero because it is redundant.

General Linear Model - Differing Effects between Vessels?
All Vessels - Days Blocks Only
Flatfish

Between-Subjects Factors

		Value Label	N
VES	1		13
	2		11
	3		19
	4		16
	5		10
	6		12

Descriptive Statistics

	VES	Mean	Std. Deviation	N
dlogflatc	1	-.2429	.5242	13
	2	-.4859	.6779	11
	3	-.9137	.4436	19
	4	-.6396	.5270	16
	5	-.3943	.5102	10
	6	-.5249	.7993	12
	Total	-.5721	.6031	81

Tests of Between-Subjects Effects

Dependent Variable: dlogflatc

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Intercept	Hypothesis	21.979	1	21.979	27.245	.003	.841
	Error	4.159	5.155	.807[b]			
VES	Hypothesis	4.124	5	.825	2.477	.039	.142
	Error	24.971	75	.333[c]			

Tests of Between-Subjects Effects

Dependent Variable: dlogflatc

Source		Noncent. Parameter	Observed Power [a]
Intercept	Hypothesis	27.245	.985
	Error		
VES	Hypothesis	12.386	.748
	Error		

a. Computed using alpha = .05

b. .963 MS(VES) + 3.673E-02 MS(Error)

c. MS(Error)

Expected Mean Squares [a,b]

Source	Variance Component		
	Var(VES)	Var(Error)	Quadratic Term
Intercept	12.867	1.000	Intercept
VES	13.358	1.000	
Error	.000	1.000	

a. For each source, the expected mean square equals the sum of the coefficients in the cells times the variance components, plus a quadratic term involving effects in the Quadratic Term cell.

b. Expected Mean Squares are based on the Type III Sums of Squares.

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Eta Squared
						Lower Bound	Upper Bound	
dlogflatc	Intercept	-.525	.167	-3.151	.002	-.857	-.193	.117
	[VES=1]	.282	.231	1.221	.226	-.178	.742	.019
	[VES=2]	3.908E-02	.241	.162	.872	-.441	.519	.000
	[VES=3]	-.389	.213	-1.827	.072	-.813	3.506E-02	.043
	[VES=4]	-.115	.220	-.520	.604	-.554	.324	.004
	[VES=5]	.131	.247	.529	.599	-.362	.623	.004
	[VES=6]	0[b]	.	.	.	.	.	.

Parameter Estimates

Dependent Variable	Parameter	Noncent. Parameter	Observed Power[a]
dlogtlatc	Intercept	3.151	.875
	[VES=1]	1.221	.226
	[VES=2]	.162	.053
	[VES=3]	1.827	.438
	[VES=4]	.520	.081
	[VES=5]	.529	.082
	[VES=6]	.	.

a. Computed using alpha = .05

b. This parameter is set to zero because it is redundant.

General Linear Model - Differing Effects between Vessels?
All Vessels - Days Blocks Only
Cod

Between-Subjects Factors

		Value Label	N
VES	1		13
	2		11
	3		19
	4		16
	5		10
	6		12

Descriptive Statistics

	VES	Mean	Std. Deviation	N
diflogcodc	1	.3150	.8661	13
	2	-.1920	.5806	11
	3	-.8608	1.5005	19
	4	-.6368	.9857	16
	5	-.9579	2.2732	10
	6	-1.2945	1.6791	12
	Total	-.6133	1.4408	81

Tests of Between-Subjects Effects

Dependent Variable: diflogcodc

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Intercept	Hypothesis	28.213	1	28.213	6.826	.046	.569
	Error	21.394	5.176	4.133[b]			
VES	Hypothesis	21.085	5	4.217	2.181	.065	.127
	Error	144.991	75	1.933[c]			

Tests of Between-Subjects Effects

Dependent Variable: diflogcodc

Source		Noncent. Parameter	Observed Power [a]
Intercept	Hypothesis	6.826	.564
	Error		
VES	Hypothesis	10.907	.684
	Error		

a. Computed using alpha = .05

b. .963 MS(VES) + 3.673E-02 MS(Error)

c. MS(Error)

Expected Mean Squares [a,b]

Source	Variance Component		
	Var(VES)	Var(Error)	Quadratic Term
Intercept	12.867	1.000	Intercept
VES	13.358	1.000	
Error	.000	1.000	

a. For each source, the expected mean square equals the sum of the coefficients in the cells times the variance components, plus a quadratic term involving effects in the Quadratic Term cell.

b. Expected Mean Squares are based on the Type III Sums of Squares.

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Eta Squared
						Lower Bound	Upper Bound	
diflogcodc	Intercept	-1.295	.401	-3.225	.002	-2.094	-.495	.122
	[VES=1]	1.610	.557	2.892	.005	.501	2.718	.100
	[VES=2]	1.103	.580	1.900	.061	-5.36E-02	2.259	.046
	[VES=3]	.434	.513	.846	.400	-.588	1.455	.009
	[VES=4]	.658	.531	1.239	.219	-.400	1.715	.020
	[VES=5]	.337	.595	.565	.573	-.849	1.523	.004
	[VES=6]	0[b]	.	.	.	.	.	.

Parameter Estimates

Dependent Variable	Parameter	Noncent. Parameter	Observed Power[a]
diflogcodc	Intercept	3.225	.889
	[VES=1]	2.892	.814
	[VES=2]	1.900	.466
	[VES=3]	.846	.133
	[VES=4]	1.239	.231
	[VES=5]	.565	.086
	[VES=6]	.	.

a. Computed using alpha = .05

b. This parameter is set to zero because it is redundant.

General Linear Model - Differing Effects between Vessels?
All Vessels - Days Blocks Only
Difference in effect between pollock and flatfish

Between-Subjects Factors

		Value Label	N
VES	1		13
	2		11
	3		19
	4		16
	5		10
	6		12

Descriptive Statistics

	VES	Mean	Std. Deviation	N
POLFLTCM	1	-.1795	1.0340	13
	2	.4141	.5739	11
	3	-3.67E-03	.9720	19
	4	.5561	.6581	16
	5	.4724	.8392	10
	6	.6884	1.4695	12
	Total	.2967	.9859	81

Tests of Between-Subjects Effects

Dependent Variable: POLFLTCM

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Intercept	Hypothesis	8.137	1	8.137	5.139	.070	.496
	Error	8.269	5.223	1.583[b]			
VES	Hypothesis	8.041	5	1.608	1.730	.138	.103
	Error	69.723	75	.930[c]			

Tests of Between-Subjects Effects

Dependent Variable: POLFLTCM

Source		Noncent. Parameter	Observed Power[a]
Intercept	Hypothesis	5.139	.457
	Error		
VES	Hypothesis	8.650	.567
	Error		

a. Computed using alpha = .05

b. .963 MS(VES) + 3.673E-02 MS(Error)

c. MS(Error)

Expected Mean Squares [a,b]

Source	Variance Component		
	Var(VES)	Var(Error)	Quadratic Term
Intercept	12.867	1.000	Intercept
VES	13.358	1.000	
Error	.000	1.000	

a. For each source, the expected mean square equals the sum of the coefficients in the cells times the variance components, plus a quadratic term involving effects in the Quadratic Term cell.

b. Expected Mean Squares are based on the Type III Sums of Squares.

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Eta Squared
						Lower Bound	Upper Bound	
POLFLTCM	Intercept	.688	.278	2.473	.016	.134	1.243	.075
	[VES=1]	-.868	.386	-2.249	.027	-1.637	-9.91E-02	.063
	[VES=2]	-.274	.402	-.682	.498	-1.076	.527	.006
	[VES=3]	-.692	.356	-1.947	.055	-1.400	1.615E-02	.048
	[VES=4]	-.132	.368	-.359	.720	-.866	.601	.002
	[VES=5]	-.216	.413	-.523	.602	-1.038	.606	.004
	[VES=6]	0[b]	.	.	.	.	.	.

Parameter Estimates

Dependent Variable	Parameter	Noncent. Parameter	Observed Power [a]
POLFLTCM	Intercept	2.473	.685
	[VES=1]	2.249	.603
	[VES=2]	.682	.103
	[VES=3]	1.947	.485
	[VES=4]	.359	.065
	[VES=5]	.523	.081
	[VES=6]	.	.

a. Computed using alpha = .05

b. This parameter is set to zero because it is redundant.

T-Test - Species effects and difference between pollock and fatfish effects Day blocks only - Vessels 1 and 3 suspended

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DLOGPOLC	49	-1.0665	1.0891	.1556
dlogflatc	49	-.5269	.6213	8.876E-02
diflogcodc	49	-.7636	1.4654	.2093
POLFLTCM	49	.5396	.9171	.1310

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
DLOGPOLC	-6.855	48	.000	-1.0665	-1.3793	-.7537
dlogflatc	-5.937	48	.000	-.5269	-.7054	-.3485
diflogcodc	-3.647	48	.001	-.7636	-1.1845	-.3427
POLFLTCM	4.118	48	.000	.5396	.2761	.8030

T-Test - Differences in Effects by Size Groups of Yellowfin Sole All vessels

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	LDIF25	-.7179	74	2.2330	.2596
	LDIF2529	-.8178	74	1.3624	.1584
Pair 2	LDIF2529	-.8178	74	1.3624	.1584
	LDIF3034	-.6558	74	.8508	9.890E-02
Pair 3	LDIF3034	-.6558	74	.8508	9.890E-02
	LDIF34	-.6668	74	2.5588	.2975

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	LDIF25 & LDIF2529	74	.265	.023
Pair 2	LDIF2529 & LDIF3034	74	.593	.000
Pair 3	LDIF3034 & LDIF34	74	.093	.429

Paired Samples Test

		Paired Differences					t
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	
Pair 1	LDIF25 - LDIF2529	9.984E-02	2.2872	.2659	-.4301	.6297	.375
Pair 2	LDIF2529 - LDIF3034	-.1620	1.0975	.1276	-.4163	9.228E-02	-1.270
Pair 3	LDIF3034 - LDIF34	1.101E-02	2.6202	.3046	-.5960	.6181	.036

Paired Samples Test

		df	Sig. (2-tailed)
Pair 1	LDIF25 - LDIF2529	73	.708
Pair 2	LDIF2529 - LDIF3034	73	.208
Pair 3	LDIF3034 - LDIF34	73	.971

D-4(b)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Alaska Fisheries Science Center
Resource Ecology and Fisheries Manage. Div.
7600 Sand Point Way NE.
Seattle, WA 98115-0070

December 5, 1997

David Witherell
North Pacific Fishery Management Council
605 West 4th Ave., Suite 306
Anchorage, AK 99501

Dear Dave,

Below are my answers to your questions regarding the anticipated "overfishing" amendments.

When will the final rule on national standards be published? I do not know. Proposed revisions and additions to the national standard guidelines were published as a proposed rule in August of this year. The new guidelines were scheduled to have been published in October as an "interim" final rule, which has the same effect as a final rule. However, publication has been delayed.

How long afterwards do we have to prepare an analysis and implement the new overfishing definitions? Regardless of when the guidelines are published, the Council has until October 11, 1998 to submit any amendments necessary to bring all FMPs into compliance with the provisions of the Magnuson-Stevens Act. If the national standard guidelines are published in a form close to that which appeared in the proposed rule, NMFS' interpretation will probably be that compliance involves replacing existing "overfishing definitions" with two new "status determination criteria," one of which specifies a "maximum fishing mortality threshold" (something like F_{OFL} in our overfishing definition), the other of which specifies a "minimum stock size threshold" (something which does not exist in our overfishing definition).

Will NMFS make a determination of which stocks are overfished, then inform the Council as to which stocks need rebuilding? The Council was informed of which stocks are overfished or approaching an overfished condition on September 30, 1997 in the *Report to Congress - Status of Fisheries of the United States*.

When would this occur? The initial determination was made in the abovementioned report. This determination was based solely on existing overfishing definitions, as required by the Magnuson-Stevens Act, not on the status determination criteria that were described in the national standard guidelines as they appeared in the proposed rule. Subsequent determinations will be reported either in the Annual Report to Congress submitted in October of each year, or directly to the Council at any other time during the year that a stock is found to be overfished.

What schedule for Council review do we need to follow to get a plan amendment on overfishing

approved: the April-June meeting, or later? When the existing overfishing definition was adopted in 1996 (Amendment 44/44), initial review took place at the April Council meeting, with final action taken at the June meeting. The amendments were in place for the 1997 fishing season, but just barely. A similar schedule might be appropriate for the next set of amendments on overfishing, given that considerable preliminary work remains to be done (please see below).

What are the alternatives being considered for overfishing biomass thresholds? If the national standard guidelines are published in a form close to that which appeared in the proposed rule, the minimum stock size threshold will probably be defined as follows: one-half the MSY stock size, or the minimum stock size at which rebuilding to the MSY level would be expected to occur within 10 years if the stock or stock complex were exploited at the maximum fishing mortality threshold, whichever is greater. In my opinion, the Magnuson-Stevens Act is clear in its expectation that we will typically be able to estimate MSY stock sizes, and I feel that we should try our best to fulfill this expectation. However, in the event that we cannot estimate MSY stock size for some species, I expect that we would be allowed to substitute a reasonable proxy, perhaps something like the $B_{40\%}$ reference point which is used in the current overfishing definition. Other possibilities or recommendations might emerge from NMFS' stock assessment workshop, scheduled to take place in February of next year. The workshop is intended to fulfill the proposed rule's promise to supplement the national standard guidelines with further "technical guidance" for use in implementing a precautionary approach to fishery management.

What species in our FMPs (groundfish, scallops, crab, salmon) could fall into the "overfished" category? I am not very familiar with the stocks covered by the scallop, crab, and salmon FMPs. In terms of stocks covered by the groundfish FMPs, my guess is that very few would fall into the "overfished" category anytime soon. I suspect that Bogoslof pollock might be the most likely candidate, since its projected 1998 biomass is only about 14% of the accepted estimate of $B_{40\%}$.

Will rebuilding plans be a simple reduction relative to current and target biomass applicable to all species, or do we actually need to spell out and analyze each stock rebuilding plan separately? We actually need to spell out and analyze each rebuilding plan separately. Once spelled out and analyzed, however, it is possible that a given rebuilding plan might consist simply of a proportional reduction in the maximum allowable fishing mortality rate.

Is the amendment you are preparing for groundfish only? I have been tasked by the Regional Administrator with preparing FMP amendments for the Alaska groundfish fisheries.

How will we deal with salmon, crab, and scallops? I would be happy to share the results of my analysis with whoever is preparing the amendments for the salmon, crab, and scallop FMPs.

Sincerely,

Grant Thompson

Testimony to North Pacific Fisheries Management Council

My name is Kenneth Adams, I'm here to represent Prince William Sound Aquaculture Corporation (PWSAC) and Cordova District United (CDFU) in seeking your retention of the September 1 start up date for the Bering Sea Pollack B season. I'd like to call your attention to the accompanying letter dated February 13, 1997 sent by PWSAC to Mr. Pautzke. I bring this letter up now with the concern that it may have been forgotten over the past ten months. Basically that letter conveys our appreciation to the Council for their action taken in the spring of 1996 that allowed two additional weeks to process pink salmon before vessels had to be on the Bering Sea pollack grounds.

For us in Prince William Sound this meant participation from both a factory trawler and a mother ship processor. The latter vessel became our biggest customer in 1996, taking approximately 10 million pounds of pink salmon and did a similar amount in 1997. The same company would like to return in 1998 and take an even larger amount of pinks.

What we see, clearly, is the definite benefit resulting from the Council's action in changing the B season starting date. You've created an environment for opportunity: one that addresses the ongoing need for pink salmon product diversity as well as processing opportunities for pollack vessels during their off season.

I'd like to mention that although we in Prince William Sound directly benefitted by the additional processing capabilities that pollack vessels afforded us, we feel, statewide, there has also been a gain. In recent years the canned salmon market has been in depressed condition due to bounteous state-wide pink harvests and resulting huge canned salmon inventories. Removing a portion of that harvest and placing in forms other than the can benefits all pink salmon harvesters.

To allow for more pink processing opportunities, a climate of stability needs to be created. What pollack company would realistically consider diversifying into summer salmon processing if the B season starting date remained threateningly changeable? We therefore ask you to retain the September 1 date and help provide a stable climate for more needed processing opportunities.

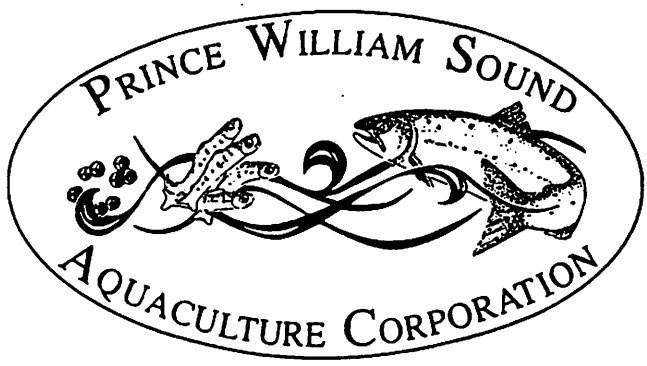
In the spring of 1996, when the Council implemented the September 1 start up date, you said you wanted to revisit this issue to see if any particular problems had arisen in 1996 and 1997. I'd like to offer the following comments regarding by-catch for that period.

Regarding Stellar Sea Lions and herring, there doesn't appear to be a problem. For both years the B season concluded by mid-October, approximately two weeks before the "drop dead" date of November 1 that NNFS considers crucial for the foraging of juvenile sea lions. As for herring, the incidental take was below the caps in both years.

With salmon by-catch, we have to distinguish between chums and chinooks. B season chum interception in 1996 was approximately 79 K and in 1997 approximately 62 K. These values are comparable to what was taken in 1994 (79 K) when the B season opened August 15 and well below the 242 K taken in 1993. So there doesn't appear to be anything too unusual with chum by-catch in 1996 and 1997.

Chinook interception was different however. In general, chinook interception was slightly higher in both 1996 and 1997 than in preceding years. In 1996 twice as many chinooks were taken in the A season (37 K) than the B season (18.8 K). This appears to be in keeping with the normal pattern where the majority of chinooks are taken in the A season. However, in 1997, we find more than 3 times the amount of chinooks taken in the B season (34 K) than in the A season (10 K). This anomalous result is probably in keeping with the anomalous marine environmental conditions observed in the Bering Sea in general this year. Does this constitute a basis for reverting the B season opening date back to August 15? I doubt it. We all recognize the presence of an extremely large El Nino event this year and therefore we shouldn't be surprised at unusual accompanying oceanic events.

We believe the B season start date should be left as is and be allowed more time for a truer, more representational picture of events to develop. There seems to be little biological basis for making any changes now. We therefore urge your retention of September 1 as the B season opening date . . . or revisit the issue again, perhaps in three years. Thank you. (DEC. '97)



February 13, 1997

Mr. Clarence Pautzke, Executive Director
North Pacific Fisheries Management Council
605 W. 4th Ave., Suite 306
Anchorage, AK 99501

Mr. Pautzke,

I'd like to express our thanks to you and the Council for delaying the pollock B season to September 1st in 1996. This delay has allowed floating processors access to the late part of our salmon run contributing to both increased demand for our resource, and processing and marketing options not locally available. As CEO of the state's largest salmon ocean ranching program with a large component of our hatchery and wild stock production arriving late in PWS, I underline the importance of the pollock B season delay decision, the contribution it made to the 1996 season in PWS, and the desire we have to see a continuation of the pollock B season delay.

To give you an example of the value the delayed pollock B season is to us, we entered the 1996 season with an outlook that as many as 15 million pounds of pink salmon might not be purchased and processed by the local industry. Loss of this valuable product would have been financially and politically damaging. I know that Glacier Fish participated in PWS. Also, our company contracted with Northern Victor Partnership to have the *Northern Victor* joint venture process pink salmon from Wally Noerenberg and Cannery Creek hatcheries. We moved nearly 10 million round pounds of product through the *Northern Victor.* We have you and the Council to thank for this opportunity. I do not want the fact lost to our fishermen and the Council that we in PWS are very appreciative of your efforts and continued support for a delayed pollock B season in 1997.

We will keep informed of issues that may impact future decisions regarding the pollock B season and in every way possible support you and the Council to continue this very important management program.

May you have a Great New Year.

Sincerely,

Bob Roys
CEO

(hf)

Corporate Office • Post Office Box 1110 • Cordova, Alaska 99574-1110
phone: 907/424-7511 * fax: 907/424-7514