MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: April 12, 1999

ESTIMATED TIME
8 HOURS
(for all D-1 items)

SUBJECT: Experimental Fishing Permit application to test species composition testing methods

ACTION REQUIRED

Provide recommendation on EFP application.

BACKGROUND

Groundfish Forum has submitted an application to NMFS for an experimental fishing permit to test species composition sampling methods (Item D-1(h)). The Bering Sea Flathead sole fishery in August/September 1999 is the subject of the experiment. The goal of the test is to: (1) evaluate the accuracy of basket sampling; (2) develop an automated random sampling method to select fish from the haul; and (3) provide preliminary information on the effects of stratification of catch on current size composition methods. John Gauvin, Groundfish Forum, will present the industry application and answer questions.

Mr. Steve Pennoyer
Regional Director
NMFS- F/AKR
P.O. Box 21668
Juneau, AK 99802

March 23, 1999

RE: EFP application to test species composition sampling methods

Dear Steve:

Groundfish Forum hereby submits for your consideration an application for an experimental fishing permit (EFP) to test and improve species composition sampling methods during August or September of 1999. Through a "request for proposals" process, Groundfish Forum will invite interested industry parties to submit applications to participate in the EFP. The EFP needs to be conducted under conditions that, as closely as possible, resemble actual open access fishing in order to learn as much as possible about species and size composition sampling. Participant responsibilities include providing a description of how the sorting and accounting tasks critical to the success of the EFP will conducted and a demonstration of willingness and ability to accomplish the difficult and demanding tasks associate with this project.

Our EFP application stipulates that a NMFS review panel will review applications and select a participant based on the ability of the vessel and crew to undertake the work of the experiment and other criteria set out in our application. The EFP test described in the attached document employs an experimental design which has a high probability of measuring the accuracy of current species composition sampling techniques as well as the accuracy and feasibility of a new sampling technique proposed by Groundfish Forum for the second part of the test. The new sampling technique involves automated random sampling of different portions of the fish associated with a given haul.

Through this EFP project, management and industry are expected to gain a great deal of knowledge to improve conservation and management of multi-species fisheries, reduce potential for sampling bias and conflict, and allow successful implementation of management programs where haul by haul estimation of catch is needed, such as CDQs and VBAs.

Thanks in advance for considering our application. We look forward to working closely with the NMFS personnel involved with the EFP and, of course, to accomplishing the important objectives of this study. Please do not hesitate to call me if you have questions or need more information.

Sincerely,

John R. Gauvin

Groundfish Forum 1999 EFP Summary

Date of Application: April 9, 1999

Name mailing address, and phone number of applicant:
Groundfish Forum
4215 21st Avenue West , Suite 201
Seattle, WA 98199
Phone: (206) 301-9504 Fax: (206) 301-9508

Purpose and Goals of the EFP: The experimental fishing permit has two specific goals: First, to evaluate the accuracy of basket sampling and how sampling at different intervals in the flow of fish into the processing area affects estimates of species composition. And second, to develop an automated random sampling method that will randomly and mechanically select samples from different portions of the fish from a haul, thus reducing potential for human error or bias. Finally, through some pilot work on a small number of tows, the EFP will also provide some preliminary information on the effects of potential stratification of catch on current size composition sampling methods.

Justification for the EFP: Fishery management is quickly moving towards a multi-species approach and this will require species composition sampling that accurately reflects the major components of catch per tow so that estimates of removals of all major species are accurate. In addition, fishery management currently includes Community Development Quotas in multi-species fisheries and will likely also include Vessel Bycatch Accounts in the future. Both of these programs depend heavily on accurate catch composition estimates on a tow by tow basis. Current species composition sampling techniques may not accurately reflect catch composition of an individual haul. This experiment will not only measure the accuracy or potential bias of current sampling techniques but will also provide data for improvements in sampling. In addition, the proposed automated random sampling technique to be tested in this EFP holds promise for reducing potential for bias and conflict associated with sampling.

Names of participating vessels, copies of vessel Coast Guard documents, names of vessels masters: A vessel will be selected from applications solicited through an RFP process involving NMFS review of applications. For this reason, the participating vessel cannot be determined at this time. This information will be supplied as soon as the RFP process is complete, and prior to any field work.

Target and incidental species harvested: The field test will take place in the Bering Sea flathead sole fishery. Using the observer data supplied by Sea State for the 1998 July/August flathead sole fishery, it is estimated that the portion of the EFP fishery that tests sampling methods will require 925 MT of groundfish catch. This catch is expected to be comprised of the following species: 194.25 MT flathead sole, 166.5 MT arrowtooth flounder, 92.5 MT yellowfin sole, 92.5 MT Pacific cod, 74 MT pollock, 64.75MT other flatfish, 46.25 MT rocksole and 194.25 MT of other (including unallocated) species. In addition, it is predicted that the following amount of PSC Species will be needed: 18.5 MT halibut , 130 red king crabs, 46 other king crabs, 4,005 bairdi crabs, and 15,586 other tanner crabs.

In addition, a preliminary assessment of size stratification of fish in trawls will also be conducted in a brief fishery targeting Greenland turbot. That portion of the research is expected to result in a total of 342 MT of groundfish catch, of which 140 MT is Greenland turbot, not to exceed 175 MT of Greenland turbot, as outlined in our application. The halibut catch associated with this

portion of the EFP is expected to range from 3.4 to 10.2 MT of catch. Decksorting will be used to reduce the expected mortality on the quantity of halibut taken in this portion of the EFP.

Disposition of allocated groundfish species caught in the EFP: The participant will be allowed to retain all groundfish catches in accordance with the directed fishing standards for the third quarter flathead sole fishery except in the portion of the EFP that tests size composition of catch where the maximum retainable bycatch limits have been expressly modified to allow a limited target for Greenland turbot (see application).

Expected impacts on marine mammals and endangered species: None

Type and size of vessels and gear: The vessel will be a "head and gut" vessel that normally participates in flatfish fisheries. The vessel will fish with gear that is normally used for fishing flathead in the normal fishing area of Zone 2.

Approximate time and place for exempted fishing under EFP: Fishing will take place in the Zone 2 statistical area of the Bering Sea in either August or September of 1999. Field work is expected to take 13-15 days, including the size composition sampling evaluation. The exact locations will be in areas normally fished for flathead sole and turbot and fishing location will be left to the discretion of the vessel captain.
Signature of Applicant:

Groundfish Forum 1999 Experimental Fishing Permit

Introduction: The objectives of this proposed EFP are:

1: Improvements in species composition sampling through identification and quantification of potential inaccuracies of basket sampling practices.

2: Industry/NMFS collaboration on development of automated random sampling methods for species composition sampling

3: Exploration of the degree of stratification of fish by size in trawls and evaluation of potential effects of current size composition sampling practices on size composition estimates

Groundfish Forum believes a collaborative field research project between NMFS and industry to achieve these objectives is important for a number of reasons, including the following five.

The North Pacific Council and NMFS have developed regulations and are in the process of considering additional regulatory initiatives to improve catch weight estimation in fisheries involving at-sea processing. These include requirements for motion-compensated flow scales in combination with platform scales for weighing total catch in pollock fisheries, as well as in the multi-species CDQ program for trawl vessels. During the development of the scale requirements for the multi-species CDQ program, Groundfish Forum repeatedly requested the Council and NMFS consider measures to deal with inaccuracies of species composition sampling, instead of focussing solely on a requirement for scales. Recognizing that there is likely to be some gain in accuracy for estimation of total catch from the use of motion-compensated flow scales compared to volumetric methods in the multi-species fisheries, association members nevertheless feel the largest improvement in data accuracy lies with the species composition sampling, not total weight measurement.

From the members' perspective, knowing that a haul caught 10.03 MT rather than somewhere between 8 and 12 MT has a certain value, but if there is a plus or minus 40% error (hypothetically) surrounding the estimation of what species comprise the 10.03 MT haul, then the gain in accuracy in total catch estimation is overshadowed. Given that a relatively small percentage of the TACs is harvested in most of the flatfish fisheries, our interest is devoted to what we feel is the greatest shortcoming in the fishery data collection system.

Another impetus for addressing the inaccuracies of species composition sampling stems from the implementation of a full retention regime for pollock and cod last year. Many member companies have long been aware of the difference in their product case counts and extrapolated catch data based on species composition samples. This issue became more prevalent in 1998, the first year of the full retention regime for pollock and cod

because despite the fact that they are retaining all cod and pollock, there often remains an inability to reconcile product case weight counts converted to round weight equivalents with estimates of catch of these species from observer data. This has occurred even when they are putting up cod and pollock in round product form where product recovery rates are not an explanation for the difference.

Groundfish Forum is also aware that the environmental community is focusing on multi-species management regimes. This will put considerable focus on the management of species complexes and fishing effects on non-target species. In addition to our own incentives for sustainable management of fisheries, the likely downside for industry of scrutiny from environmental advocates motivates us to seek accuracy in estimates of removals by species and estimates of age composition of catch.

Another important motivation is that as management turns to individual vessel incentive programs such as vessel bycatch accounts (VBA) and community development quotas (CDQs), accuracy at the level of the individual haul will become more of an issue than it has been in the past.

Lastly, we are aware that a common source of conflict on fishing vessels (right or wrong, legitimate or not) is the accuracy and potential bias of observer sampling methods for prohibited species. We see benefit in working to reduce potential for bias in the data collection system and the ensuing conflict that can occur between industry, the Observer Program, and observers. We believe the development of an automated sampling technique, such as the one slated for testing in this EFP, will help to accomplish this objective.

Purpose of this EFP:
The first objective of this EFP is to evaluate "basket sampling" techniques currently employed for species composition sampling on trawl vessels in mixed species fisheries. The goal here is to attempt to provide data to estimate the variability and any biases resulting from standard methods of species composition sampling. This project seeks to evaluate the accuracy of basket sampling for estimation of haul by haul catch of species commonly occurring in multi-species trawl fisheries such as flatfish and Pacific cod. The question of estimation techniques for rarely encountered species in mixed species trawl fisheries is important and challenging, but involves a different set of analytical and statistical methods and thus is not the focus of this project.

In multi-species trawl fisheries, the method NMFS currently recommends to observers on catcher processor vessels for determination of species composition of a sampled tow is by systematic sampling at intervals as fish pass from live tanks into the processing line. Observers, however, are given some latitude in the selection of methods. The industry has repeatedly raised concerns regarding the ability of current methods, particularly the way such methods are applied in the field, to achieve an accurate estimation of haul-specific catch composition. The objective of the EFP is to improve NMFS' and the industry's understanding of potential biases and accuracy factors associated with current

methods, as well as development of improvements in current methods and alternative methods for species composition sampling.

These objectives will be accomplished by employing current and alternative basket sampling methodologies to develop a comparison of estimated species composition per haul compared to a retention-based species composition "census" of catch per haul. To achieve this "census" of catch of major species per haul, during the field test portion of the EFP, the selected participant will fish under a regime which is specifically designed to closely simulate normal commercial fishing conditions. At the same time, this regime is also designed to accurately catalogue quantities of major species in retained and discarded catch. Assessment of the portion of catch that is discarded involves accounting of species composition of major species prior to discarding.

The second objective is to foster development of alternative methods of sampling by an automated random sampling method. More correctly, the automated sampling technique involves random sampling within designated intervals, as will be explained below. The assumption here is that even under the best of conditions, the current sampling methods may suffer, to some degree, from the effects of human judgement, reflex, and potential for bias by deliberate and non-deliberate actions by observers and crew members. These potential deficiencies can result from the observer being unable to ignore visual keys when they can view the catch before sampling. Even under the best of circumstances where crew do not interfere and the observer makes a concerted effort to implement systematic sampling in an unbiased manner, the ability to see fish before electing when to sample is likely to be inherently problematic.

The development and field test of automated random sampling methods objective of the EFP will be accomplished by comparing random sampling methods (as explained below) to data on the real composition of catch per haul obtained from the same "census" of major species as in the first objective.

Lastly, the EFP will develop a preliminary assessment of the degree of stratification by size in the fish comprising a haul and the effects of current observer size composition sampling on estimates of fish lengths (if size stratification occurs to a significant degree). In addition to species composition, observers also take samples to determine the size composition of the catch of each species. This information is used in estimating the age composition of the catch, which is an important input to the models used to determine the condition of the fish stocks. Recently, the Observer Program has decided to reduce sample sizes for size composition sampling to 20 fish per tow. Therefore, in addition to the tows used to test the accuracy of species composition, a series of tows will be dedicated to a preliminary test of the accuracy of size composition sampling.

Methods:

Choice of a fishery to conduct the evaluation of species composition methods EFP
The principle fishery proposed for this experiment is the flathead sole fishery. This is thought to be a good target fishery for the experiment because it is a mixed fishery where

flatfish and roundfish are commonly caught together on tows, tows are typically fairly long (2-3 hours), and haul size is fairly large (around 15 MT on average), but not so large to necessarily overwhelm the accounting necessary for the experiment. Mixed catches, tow duration, and size of hauls are important factors determining potential for catch to be stratified when sampled.

An additional reason for selecting the flathead sole fishery is that it is currently the most economically viable flatfish fishery for the average size H&G vessel and it occurs during the summer months when weather and conditions are better for the experiment. The yellowfin sole fishery can have mixed catches, but depending of the fishing strategy of the participant, it also can have rather homogeneous catches. It is probable that only a very limited number of companies would be willing to do all the extra work associated with this project for a fishery that would likely be open for open access fishing in August or September when the field portion of the EFP will be conducted.

The open access fishery for flathead sole reopens on July 4th this year with the third quarter release of halibut PSC is expected to remain open until late July or early August, depending on PSC bycatch rates in the fishery and the number of participants. The field work for this EFP is slated to be conducted after the regular flathead sole fishery and this probably means late August or September. The precise start date is intentionally left open to accommodate the scheduling needs of NMFS personnel that will participate in the field work, as well as the scheduling needs of the selected participant and the Groundfish Forum personnel involved in the field work.

The small number of tows (probably ten) used for the preliminary test of size stratification will be tows targeting Greenland turbot that are a normal component of flathead sole fishing. Directed fishing standards governing the flathead sole fishery allow retention of up to 35% of Greenland turbot, round weight equivalent against the round weight equivalent of retained flathead sole. This is to accommodate the bycatch of Greenland turbot in the fishery as well as to provide an opportunity for a controlled and limited target fishing opportunity trawling for Greenland turbot.

The directed fishing standard adjustments that led to this turbot fishing allowance in the flathead fishery have, in fact, resulted in a limited and manageable trawl fishery for turbot with low bycatch rates. Prior to this, a wider target fishery was conducted in April and this attracted many more vessels and resulted in what was generally recognized as a high-bycatch, unmanageable fishing target. One reason for the improvement was that targeting turbot during the summer and fall months involves lower halibut rates because in those months, turbot can be found in areas where halibut are less prevalent than at other times of the year. The limited turbot fishing opportunity attached to the flathead sole fishery has become an important component of the flathead sole fishery. This EFP modifies the turbot allowance that is normally available in the flathead target to explore the potential for size stratification in the catch.

Catch Composition Sampling

The first step in determination of the accuracy of current species composition sampling methodologies and automated systematic/random sampling techniques is development of a reasonable methodology for determining actual catch composition on a haul by haul basis. In multi-species fisheries, the prospect of sorting and counting and weighing catch by principle species and species groups is daunting, particularly at the actual scale of the open access fishing where haul quantities are sometimes large. In common flatfish targets such as rocksole and flathead sole, groundfish catch per haul typically ranges from 8 to 20 MT on head and gut vessels of 125 to 160 feet in length. Yet it is at this scale of fishing that the problems of stratification of catch by species in the trawl codend (and other areas such as in the tanks and factory) is thought to occur, hence creating the potential obstacles to sampling that are of interest for this project.

The methodology to census catch by major species and species groups has to be adequately designed to work at the catch level of the open access fishery. It must be recognized that achievement of such a census of catch is not trivial and has plagued even research cruises. Research projects in the past have involved many field personnel and considerable resources and despite this, limitations had to be placed on catch per tow to keep from overwhelming the accounting system used for the research.

Groundfish Forum has evaluated the issue of creating a census of major species catches. At our annual skippers' meeting last January, trawl skippers were asked to help devise a methodology that would work under conditions closely simulating normal catch levels in open access fishing. As discussed at the meeting, the proposed methodology should not only lead to an accurate census of catch of major species but do this without hamstringing fishermen and vessels operations even at the normal scale of operation. The consensus was that such a census was probably achievable, but involved a great degree of additional effort and cost, and is likely only practical on the medium to large H&G vessels.

Total weight will be determined for each haul in the experiment via an approved flow scale. Based on our information, more than half of at-sea processing vessels that participate in flatfish fisheries now have NMFS-approved flow scales on board. From this estimate of total weight, the total weight of discards can be determined by subtracting weight of retained catch from total catch.

Census of retained catch:

The basic approach to a haul by haul estimate of weight of retained catch by species starts with determination of vessel-specific product recovery rates from which to calculate round weight equivalents. On H&G vessels, fish are packed in cases (bags) to product specifications based on size of headed and gutted fish. These cases can easily be marked for all the fish retained from an individual tow, so accounting of retained catch by species is a straight forward calculation once accurate product recovery rates (PRRs) for each species are determined through a calculation exercise that is the first task in the experiment.

The use of recovery rates to "back calculate" round weight equivalent of retained catch has been somewhat problematic for fishery management in general and thus managers generally have a dim view of the use of PRR calculations to estimate round weight equivalents of catch. The use of average product recovery rates across different vessels to track total catch in a regular fishery introduces error into calculations because PRR estimates are known to vary between vessels attempting to serve different markets and using different cutting machines, crew, etc.. This limitation for the use of product recovery rates is not problematic for this project because the project will first calculate a set of vessel-specific PRRs.

In the first phase of the experiment, the participating vessel will make a tow in an area where a mixed catch of the species of interest for the target fishery can be expected. Some of the fish from that tow will be used to calculate recovery rates for each species and product form that will be produced during the experiment.

The methodology to calculate these vessel/ and product form-specific recovery rates for each species of interest is as follows. A quantity of fish (probably 100-200 KG) of a species will be set aside for each product form that will be produced during the experiment. The mixture of sizes of fish comprising the 100-200 KG quantity should approximate the range of fish sizes targeted for the catch. Fish set aside in the 100-200 KG batch will be run through cutting machines and total remaining weight of fish will be determined to obtain a species and product-form specific estimate of recovery rate. This process will be repeated for each species and product form to see how much variability there is in the estimated recovery rate, and to develop an average with an associated variance that will be used for the statistical analysis. Several tests of the recovery rates established at the outset of the experiment will be done during the experiment to ensure that recoveries are consistent during the experiment.

Calculation of weight of discards and species-specific weight of major species in discards

To achieve a catch census to test the sampling against, the weight of the discards of selected species will also have to be determined. This will include the discarded fraction of processed species, selected discard species and all prohibited species. The total weight of discards will be determined by subtraction of total retained weight per tow (as calculated above) from total catch per tow from the flow scale weight estimate. During the experiment, all fish will be passed over the flow scale so that the weight of total catch per tow is an accurate basis for further calculation. The only exception will be fish in the catch that are too large to be placed in the live tanks. It sometimes occurs that large halibut or other species are sorted on deck because they will not pass through the gate from the live tanks to the conveyor belts or would not be transportable by conveyor belts. These large fish will be held on deck for observers and observers will make an estimate of weight of those fish will be taken on deck.

Discard sampling is expected to be the process which most limits how many species (retained, discard and prohibited) can be analyzed for sampling accuracy. The participating vessel will be responsible for separating out major discard species and

weighing them by species prior to discarding. This likely will be the most difficult task associated with participation in this EFP and smaller vessels may not be able to participate because of this requirement. Several modifications to the way fishing and processing normally occurs will be necessary and EFP applicants will be responsible for explaining how this task will be accomplished on the applicant vessel and providing an estimate of the number of discard species that they anticipate being able to weigh.

A sketch of how this task might be accomplished on H&G vessels is provided here to illustrate the issues and show that species-specific weights of major discard species are obtainable.

A modification to the normal use of the discard conveyor belt line would likely be a necessary first step. Under normal conditions, discards would flow to a grinder and then directly to a discard chute (possibly multiple chutes). The discard line would have to be routed such that crew members responsible for sorting discards would have sufficient space to remove the discard species of interest. Those species would be placed in totes or other holding bins and an approved platform or flow scale would be used to record weights by species.

All prohibited species catches would also be routed to totes for weighing on a platform scale. An alternative to a platform scale for weighing the discard species of interest would be to hold fish from the discard line in totes or bins and then route them back to the flow scale once all fish from the haul had passed over the flow scale.

The size of the applicant vessel, available space in the factory for storing and weighing discards, and the quantity of fish per tow would be factors important to the success of the experiment. To help ensure the success of the project, the experiment should focus on just a few discard species (in addition to any discard of fish that are the principle components of retained catch) for this experiment to be successful. For example, if the main species comprising retained catch is flathead sole, rocksole, and Pacific cod, and pollock, then quantification of discards by species would include any flathead sole, rocksole, (all Pacific cod and pollock will be retained) and one or possibly two other discard species such as skates and arrowtooth flounder. This would allow the experiment to measure the accuracy of species composition sampling of retained and a few discarded species, but not create an impossible task for the participating vessel.

According to fishery data obtained from Sea State for the flathead sole target fishery in July and August of 1998, arrowtooth flounder can be a major component of discard and can exceed the volume of target species in some tows. This could pose problems of available space to temporarily hold arrowtooth before weighing. An alternative methodology if arrowtooth is a major component of catch is to set up the discard line such that only arrowtooth is sorted and discarded immediately (without being weighed) and all other species are held before discarding. The remaining fish routed to the discard line but held (everything but arrowtooth flounder) would then be weighed via a platform scale or routed back over the flow scale to obtain a total weight of discard. Next, the species where weight per species is needed would be sorted out and weighed.

Alternatively, all species other than arrowtooth could be removing from the discard conveyor in the first pass, including a tote for miscellaneous fish and invertebrates. The non -arrowtooth weight would then be the sum of all of these weights.

In either case, the weight of arrowtooth discard could be obtained by subtraction because the following components of catch are known: total weight of the haul; weight of retained catch; weight of discard minus arrowtooth. Methods to obtain discard weights by species will likely require the most work in the preparation of applications and will also likely require a great deal of attention by reviewers of applications.

Methodology for measuring the accuracy of current species composition sampling techniques and automated sampling techniques

Measuring the potential effects of fish stratification within the net and in live tanks on systematic species composition sampling methods

Although little has been written about the way catch in mixed trawl fisheries tends to stratify in different parts of the trawl codend, this phenomenon is strikingly obvious to those who have witnessed the dumping of flatfish codends into live tanks. From Groundfish Forum's experience on H&G vessels, it is clear that roundfish taken in flatfish trawls (such as pollock and cod) tend to end up in the top portion of the codend such that when the codend is opened, these fish tend to spill out first and in greater concentration than occurs later. The fish that were dumped out of the codend first may stay at the bottom of the tank and tend to come out of the tank first.

Another source of stratification results from the shape and "slime" differences between some round and flatfish species that can cause stratification of fish in a live tank itself. This is especially true if fish are left in the tank for more that a few minutes and when vessel motion is great due to rough sea conditions. To the degree that these types of stratification can occur, the accuracy of species composition sampling would be reduced if sampling was conducted such that it focused on one portion of the fish in the codend or tank. This portion of the EFP will evaluate the effects of stratification on sampling designs in current use and the potential improvements in species composition sampling from adjustments to sampling designs.

Measuring the accuracy of current basket sampling procedures

To measure the accuracy of existing species composition sampling and to evaluate the potential effects of "oversampling" a portion of the fish from a specific part of the codend or live tank, the following methods will be used. Six 100 KG samples will be taken from each haul using a systematic design that observers must attempt to apply consistently and without the aid of the flow scale to gauge how much of the fish in the haul has passed from the live tank into the processing area. The decision of when to sample will be made by the observer assigned to this task, based on the time the observer estimates is needed to process the fish in the haul and other subjective measures. The direction provided to the observer will be to sample systematically throughout the fish comprising the haul.

By taking the six samples at systematic intervals in the flow of fish from the live tank to the processing line, data will be obtained that allows evaluation of systematic sampling techniques. Observers, with the assistance of crew members (see responsibilities section below), will perform species composition analysis of each of the six samples and record data separately. Size composition and other observer tasks will not be performed for this EFP in order to provide the additional time needed for the extensive species composition sampling in the EFP. Observer and crew tasks are outlined in the "Responsibilities" section below and will be explained in detail at a briefing meeting for observers and crew prior to the EFP field test.

The time and flow scale readings will be recorded when each of the six samples are taken (the decision to sample must be made without reference to flow scale readings) and when the first and last fish cross the flow scale. Interval data and associated species composition samples (when compared to the actual composition of major species in the haul) will be used to provide an assessment of the accuracy of sampling and the consistency of systematic sampling techniques. Through a post-stratification analysis of data derived from this portion of the project, upper and lower bounds can be estimated for the potential inaccuracies from systematically sampling and sampling that, in effect, is not systematic. Given the industry's expectation that stratification of fish does occur to a large degree in many fisheries with mixed catches, it is hoped that in information obtained in the EFP will help improve sampling for multi-species fisheries.

Test of an automated random sampling methodology

The following describes the automated random sampling methodology to be tested, subject to modification as logistics and technical constraints are explored in preparation for the field experiment. Groundfish Forum will provide a random number generator program to obtain random sampling numbers within intervals, in the following manner. First the random number generator program will be fed an estimate of weight of total catch per haul. This total weight estimate will be derived through standard observer volume to weight conversion methods based on tape measurements of the codend on deck (or bin volume, where available). The random number generator will randomly generate two "sampling trigger weights" or "sampling points" that fall within each of the three intervals comprising the first one-third, second one-third and final one-third of the estimated weight of fish in the haul. These intervals will be fed into the flow scale and the flow scale software will "trip" a mechanical "diverter" mechanism which diverts the specified quantity of fish into a tote placed to catch the diverted fish at the prescribed randomly-generated weight intervals.

Diverted fish will be channeled into a tote or holding bin instead of proceeding on the normal conveyor belt pathway into the processing line. In this way, the automated random sampling design will take samples of a desired quantity randomly and independently of most foreseeable subjective factors. The test of automated random sampling will also take six 100 KG samples according to the sampling design above. As with the test of the observer systematic sampling method above, species composition sampling will be performed on each of the 100 KG samples and data on the weight and time intervals of the samples will be recorded for each sample. As with the test of the

observer systematic sampling methodology, the true species composition of the hauls where automated random sampling is used will be evaluate the relative accuracy of the sampling methodology. Data generated in the experiment will also be used to evaluate potential for improvements or simplification of the methodology through adjustments in sample size and intervals.

It is anticipated that the two separate tests of sampling methodologies will be performed on a haul rotation basis. This means that sampling of one haul may involve systematic sampling and the next may be by automated random sampling. It is also possible that instead of rotating methods by haul, some number of consecutive hauls may employ one method and then methods are rotated for an equal number of hauls, possibly including rotation of sampling methods on a daily basis as well. The final decision on rotation of methods will depend on final adjustment to the sampling methodologies to be tested as well as practical information from the EFP as the study progresses.

Experimental Design

The number of hauls n required to detect a difference in the proportion of a given species between sub-samples from different sections of the haul was estimated using the formula given in Sokal and Rohlf (1995), box 9.14:

$$n \geq 2\left(\frac{cv}{\delta}\right)^2 \left[t_{\alpha[\upsilon]} + t_{2(1-P)[\upsilon]}\right]^2$$

where n = the estimated minimum number of hauls
cv = the within haul variability of the proportion of a given species
δ = the minimum detectable difference in species proportion between sub-samples
t = value from the t distribution with the given probability and degrees of freedom
α = the significance level of the test
P = the power of the test
ν = the degrees of freedom of the test

The error degrees of freedom, ν, are determined by the number of sub-samples and the number of hauls. For this analysis, it was assumed that 6 sub-samples of 100 kg each would be taken from every haul using a systematic design. (However, according to this analysis the sub-samples could be aggregated into a minimum of three 200 kg sub-samples for analytical purposes without greatly altering the power of the test.) The error degrees of freedom are calculated as

$$\upsilon = s(n-1)$$

where s is the number of sub-samples. The desired power of the test was set at 0.6, so that there is a 60% chance of finding a true difference of δ between sub-samples. The significance level α was set at 0.10 (a 10% probability that the difference between sub-samples would happen by chance).

The ratio of cv to δ, (estimated within haul variance of a given species to the minimum detectable difference between sub-samples) was fixed at 2. Therefore, it would be possible to detect a minimum of a 25% difference in proportions between sub-samples for a species with a cv of 50% (common bycatch species), while a difference of as little as 3% between sub-samples could be detected for a species with a low within haul variability of 6% (target species).

The equation is used iteratively, "guessing" at an initial value of n to determine the appropriate degrees of freedom, ν, which in turn determine the values of t at the given power and significance levels. The calculated n is then used to determine a new ν, etc., until the input n is the same as the calculated n.

In this analysis, assuming 6 sub-samples, given a within haul with 50% variance we can find a 25% difference, species with 80% variance we can find a 40% difference (ratio of variance to detectable difference of 2). That way relatively subtle differences can be detected like 10% for species with "only" 20% variance.

This ratio of variance to detectable difference necessitates 30 hauls for observer systematic sampling portion of the study and 30 hauls for automated random sampling. Assuming that 5 hauls per day can be processed, this gives a total cruise length of 12-13 days of fishing. Also assuming that 5 hauls can be processed per day and the hauls average 15 tons, this means observers and crew assistants will have to collect, identify, sort, and weigh 100 kg of catch approximately every 40 to 50 minutes throughout each 24 hour period. If only 4 hauls per day can be processed this would extend the length of the cruise to 15-16 days of fishing.

Methods of analysis for data obtained in the EFP

The data collected from this project will consist of total catch weights for several selected species (retained, discard and prohibited) for each tow and weights of these species in each of the 100 kg samples taken by the observers. With the overall catch and sample weights, these can be converted into estimates of the proportion of each species in the catch. In a similar manner, any combination of samples from a tow can be used to generate estimates of catch proportions. The differences between the estimates based on each sample or combination of samples and the census-based proportions for each tow will represent the sampling error.

Different combinations of the samples will be used to address three issues in catch sampling: catch stratification, sample size and sample selection. Stratification will be analyzed by relating the sampling errors to the position of each sample in the flow of the catch by the observer's station. Sample size analyses will relate these errors to the number of samples (1-6) which are combined to generate an estimate. Finally, the method used to select the samples (systematic by the observer or stratified-random with automation) will be related to the errors to test if one method is significantly superior. In each of these comparisons bias will be examined by testing the hypotheses that the mean error are significantly different from zero and precision will be evaluated by using the

resulting variances to show how many tows would need to be sampled to bring uncertainties down to acceptable levels.

Incidental to the main focus of this research will be an extensive set of volumetric estimates of total catch and flow scale measurements of the corresponding weights. These will be compared to evaluate accuracy and precision of codend estimates.

Preliminary evaluation of potential effects of size stratification of catch in trawls

Recently, the Observer Program has decided to reduce sample sizes to 20 fish per tow and because size composition of catch is an important variable for conservative management, it is worthwhile to evaluate the degree that fish stratify by size in trawls and the potential effects of current sampling methods on the accuracy of size composition data. Therefore, in addition to the tows used to test the accuracy of species composition, a series of tows will be dedicated to a pilot test of the accuracy of size composition sampling. These cannot be done in the same tows as for the species composition sampling because the work necessary for testing species composition will require all of the available sampling resources.

The size composition sampling evaluation is referred to as a pilot test because it is not considered possible to achieve a definitive test in the context of this EFP. However, a pilot test of approximately 10 tows can provide enough information to assess the likelihood of a serious problem and to determine what sample sizes would be necessary for a full test.

During the experimental tows for size composition testing, at least six samples of twenty fish each will be drawn systematically for each of at least two target species. These samples will be measured and recorded separately. As with the species composition test, the separate sub-samples will be compared and recombined to test for the relation between errors and sample size or sequence in the catch. Reduced species composition sampling will be carried out during these tows to track the total catch.

Because the size composition sampling experiment is not focussed on halibut, it will be possible to sort and measure halibut before they are dumped into the live tanks. This opportunity for deck sampling will follow the procedures from the 1998 Groundfish Forum EFP. In that study, estimated halibut mortalities were reduced significantly through deck sorting. Being able to deck sort on the current EFP will allow further refinement of sorting and measuring methods and test deck sorting in a fishery where the target catch closely resembles halibut in appearance and size.

RFP process and timing of tasks for the EFP

Selection of a participant for the EFP will be done through a "request for proposals" (RFP) application process and NMFS-directed review of applications. Groundfish Forum and NMFS have jointly used this approach in the past with considerable success. NMFS will be responsible for selecting independent reviewers for consideration of applications. Groundfish Forum, in conjunction with NMFS scientist (title) Sarah Gaichas and Dr. Craig Rose of the RACE Division, has prepared this EFP application. Groundfish Forum

will develop informational materials for interested industry applicants to follow for the RFP process. Groundfish Forum will schedule a review meeting and make all arrangements necessary to conduct the review process. In addition, Groundfish Forum will do all work necessary to coordinate the field experiment between industry participants, NMFS personnel associated with the experiment, Observer Contractors, and Groundfish Forum personnel.

Anticipated timing for tasks is as follows.

1. EFP application prepared in February and March
2. NMFS review of EFP application early April
3. Council review of EFP at April NPFMC meeting
4. Groundfish Forum dissemination of review materials (proper caveats incorporated because final approval is pending) in May
5. Applications due in June
6. Review process for applications by NMFS selected panel in late June or early July
7. Field work in Late August or September
8. Date analysis and writing of first draft of report (October and November)
9. Finalization of report, SSC review, Council presentation of EFP results at December (SSC) and February (AP and NPFMC) meetings

Responsibilities of principle parties in the EFP

NMFS

In addition to its role as EFP reviewer, NMFS personnel involved with the technical guidance and oversight of the EFP will:

1. Assist Groundfish Forum in technical design elements and logistics of EFP
2. Provide technical assistance for analysis of EFP data and preparation of a report of EFP findings
3. Select NMFS and other qualified reviewers for the review of applications
4. Provide in field technical support during EFP field test (Sarah Gaichas and/or Craig Rose)

Groundfish Forum

Because of the value of the EFP study to industry and resource managers, Groundfish Forum proposes to be joint investigator on this EFP. Groundfish Forum will:

1. Prepare written materials describing the purpose of the EFP project and the elements needed for incorporation into applications
2. Set deadlines for and collect all application materials, including informing applicants of the completeness of their application (provided materials are received in a timely manner).
3. Provide NMFS reviewer's with copies of completed applications
4. Provide informational assistance before and during review of applications
5. Provide at least one Groundfish Forum representative on participant vessel during the EFP field work
6. Provide paper and electronic forms as necessary for collection of data during field work.

7. Transcribe EFP data to electronic format, create working data set for the analysis, perform spot checks and statistical "outlier" analysis of data.
8. Assist in technical analysis, where possible and prepare draft EFP report
9. Revise report after initial SSC and any other technical review and present findings to NPFMC

Requirements of applicants and participants in EFP:
In the context of achieving the catching, scientific processing, and fish processing of five tows per 24 hour period for the duration of the field portion of the EFP, applicants must:

1. Prepare an application that detail vessel facilities and crewing available for EFP field study
2. If selected for the EFP, agree to follow all procedures and requirements of the field experiment including necessary adjustments to these procedures due to unanticipated factors, unless released from these responsibilities by Groundfish Forum and NMFS
3. Provide a detailed description of the manner in which the proposed crew and vessel facilities can achieve the "census" of catch of major species including the weighing by species of some or all of the major component species that are discarded. Applicant must specify which discard species (major component) it anticipates can be weighed by species for all hauls and which it feels cannot be weighed.
4. Provide a detailed description of crew assistance made available (upon request of the observer) to assist in performing species composition sampling on six 100 kg samples drawn during the unloading of fish from a haul.
5. Provide up to three NMFS-certified observers for the duration of the EFP (final decision on number of observers is to be made by NMFS review panel
6. Agree to provide all catch data needed for the analysis including case counts and other information on retained and discarded catch that are collected in fulfillment of the EFP objectives. Participant must also agree to make all EFP data from the EFP available to Groundfish Forum and NMFS personnel associated with this project.
7. Stay within the catch and bycatch limitations of the EFP as closely as possible and agree to keep catches as close as possible to the target quantity of catch per tow so that the limits on catch and bycatch are not met or exceeded prior to accomplishing the numbers of tows required for the experimental design.
8. Applications will describe the configuration and composition of the net they will use for the EFP, including the size and shape of net meshes and the expected effects on the composition of catch of net meshes and any escape panels that are to be used.
9. Perform deck sorting of halibut to reduce mortality during the size composition sampling portion of the EFP.

Responsibilities of NMFS-trained observers participating in EFP
1. NMFS observers hired for the EFP must agree to sample according to the direction of the EFP design.
2. Observers must agree to conduct species composition sampling and other assigned duties in an accurate and expeditious manner, record data, and agree to request assistance from, provide basic training to (if necessary), and work in conjunction with whatever crew resources are necessary to accomplish the sampling, species and size

composition analysis, sorting and weighing of discard, and paperwork duties associated with this EFP.

3. Observers will be expected to adhere as closely as possible to the anticipated workload per tow or per day for the EFP field work. Should this prove impossible, observers must inform Groundfish Forum and NMFS personnel on the vessel during the EFP of obstacles to accomplishing sampling and other tasks within the allotted (or anticipated) time, including suggesting alternative procedures and modifications to procedures as necessary.
4. Observers will be expected to work on a rotation that makes best use of the observer resources on the vessel during the EFP. If three observers are used for the EFP, observers may have to follow "swing" rotations that alternate their sampling and accounting of discards duties depending on the progress of the experiment and the relative amount of work needed during the experiment.

How applications will be reviewed and how a successful applicant will be selected
The tasks associated with this EFP are demanding and it is possible that an applicant may not be selected because, in the opinion of the reviewers, the proposed vessel lacks space and crewing necessary for accomplishing the objectives of the study. Interested applicants should consider the duties and objectives of the EFP, the fishing opportunities available from the EFP, and decide whether to apply based on having a reasonable plan and facilities for accomplishing the objectives of the EFP including but not limited to: sampling, species composition analysis, retained catch accounting, and sorting and weighing of major components of discard. Reviewers will base their selection on the vessel facilities, amount and expected experience of crew made available for assisting the observer and other tasks of the EFP, experience level of the skipper and crew in the flathead sole fishery, and probably most importantly, the soundness and thoroughness of the plan made in the application to accomplish the stated tasks of the EFP.

Applicants should propose exactly which species they feel will be the major species in the catch during the species composition methods test, the species it will retain (and at what anticipated percentage), the species it will discard (at what expected percentage), how the sorting and weighing of discard of major species will be carried out (for whatever species the applicant feels are the major ones in their expected catch), and how and why it feels it can accomplish the stated EFP at the rate of four to five tows per day (not fewer than four tows per day). Reviewers will give most consideration to the merits of the applicant's proposed plan and the level of recognition of what is, in fact, possible or impossible.

One final consideration will be the expected amount of variation in the catch of the applicant vessel and the possibility that the mixture of round and flatfishes will present stratification in the net and live tanks. In general, this should not be problematic given the nature of the fishery for the EFP. In the case where an applicant intends to use excluder panels or extremely large mesh panels in the body, intermediate, or codend portion of the net in order to reduce pollock bycatch, this may reduce the acceptability of their application. Applications will describe the configuration and composition of the net they will use for the EFP and its expected effects on the composition of catch.

Data used for design of the EFP

The power equations developed for the experimental design are based on species composition data from the NMFS' 1998 rockfish adaptive sampling charter on the Unimak Enterprise for rockfish in the Gulf of Alaska. Data used to estimate catch and bycatch needed to support the amount of fishing called for in the experimental design was from Sea State, Inc., a fishery monitoring service used by the trawl industry. Sea State was asked to provide vessel-specific catch data (observed tows only and without vessel identifiers) for vessels that participated in the 1998 July/August flathead sole fishery. Sea State used catch composition and trawl depth information to select which data to provide. Data on the species composition of tows targeting turbot was obtained from the NMFS Alaska Regional Office.

Groundfish and PSC mortality needed to support the EFP

The experimental design for the evaluation species composition objectives of the EFP calls for a total of 60 tows to test the two sampling methods (30 tows each) and approximately three to five short tows will be needed to determine product recovery rates as well as for use as test tows when a new fishing area is needed for the participating vessel.

Based on available data, Groundfish Forum estimates that tows on average will catch approximately 15 MT of groundfish. The species composition percentages listed below are the average for all vessels in the flathead target calculated from the observer data obtained from Sea State.

Flathead sole = 21%
Arrowtooth flounder = 18%
Yellowfin sole =10%
Pacific cod =10%
Pollock =8%
Other flatfish =7%
Rocksole =5%
Other species (includes unallocated species) =21%

Using these species percentages from the 1998 flathead sole July/August fishery, we estimate the groundfish catch needed to support this EFP, based on 60 tows at 15 MT per tow and 5 test tows at 5 MT per tow, to be as follows:

Total groundfish catch = 925 MT;

Totals per principle species:
Flathead sole = 194.25 MT
Arrowtooth flounder = 166.5 MT
Yellowfin sole = 92.5 MT
Pacific cod = 92.5 MT
Pollock = 74 MT

Other flatfish = 64.75MT
Rocksole = 46.25 MT
Other species (includes unallocated species) = 194.25 MT

Expected catch of prohibited species during the EFP
Using the observer data supplied by Sea State for the 1998 July/August flathead sole fishery, the following PSC bycatch rates are expected for the EFP fishery:
Halibut = 0.02 MT per ton of groundfish
Red king crab = 0.14 animals per ton of groundfish
Other king crab = 0.05 animals per ton of groundfish
Bairdi = 4.33 animals per ton of groundfish
Other tanner = 16.85 animals per ton of groundfish

Multiplying these rates by the 925 MT of groundfish for the EFP results in the following estimates of PSC catches (catch not mortality) for the EFP:

Halibut = 18.5 MT
Red king crab = 130 animals
Other king crab = 46 animals
Bairdi = 4,005 animals (Zone 2)
Other tanner = 15,586 animals

Note: In contrast to past Groundfish Forum EFPs, deck sorting procedures for halibut will not be employed for the field test of species cmposition methods. It is important that halibut not be sorted on deck so that the accuracy of methods to estimate halibut catch can be tested. Due to the excessive sampling and accounting for the test of species composition sampling methods, it is expected that the pace at which fish flow from the live tank to the processing lines will be very slow and therefore we expect that the halibut mortality during the EFP will be higher than in normal fishing conditions.

Deck sorting of halibut will be conducted during the brief evaluation of size stratification effects on sampling portion of the EFP. Deck sorting is allowable for that portion of the EFP that portion halibut is not the focus of the size stratification evaluation although the deck sorting procedures do result in a reliable estimates of the size composition of halibut in the catch because, under past EFPs where deck sorting has been done, nearly all halibut in the catch have been measured before being released.

Expected groundfish and PSC catch for the preliminary evaluation of size stratification

The evaluation of size stratification will be carried out in turbot target fishing. The selection of the turbot fishery for this portion of the EFP is for the following reasons. The tasks associated with the evaluation of species composition sampling methods are large and the additional cost to the EFP participant company is expected to be significant. The selected participant must dedicate crew members to assist observers during the project , task crew members to the sorting and weighing of discard species, and fish at a pace of four to five tows per day. This virtually guarantees that the vessel will be

operating below its break-even margin. There is also the additional burden of paying for up to three observers (one is normally required for vessels >125 feet), the costs of feeding five to six extra people associated with the project. For this reason, it is important that the normal revenue from flathead sole fishing not be further reduced by excluding turbot target fishing from the EFP. As may be obvious, however, turbot is not an appropriate target for the species composition sampling portion of the test because it typically does not involve much catch of roundfish and therefore low potential for species stratification. Turbot tows, however, are a reasonable venue for the size composition sampling work of the EFP because a mixture fish of different sizes is expected for the principle species in the catch.

Given the tasks of the first part of the EFP and the number of tows needed for at least a preliminary assessment of size composition sampling in the second part of the EFP, Groundfish Forum proposes a modification to the normal maximum retainable bycatch (MRB) regulations pertaining to turbot retention for the flathead sole target. The modification is to allow the normal MRB allowance percentage for Greenland turbot against flathead sole (35%) to apply to the round weight equivalent of all retained catch from the 60 tows comprising the species composition sampling experiment portion of the EFP for the following species: Pacific cod, pollock, yellowfin sole, rock sole, and flathead sole.

With this modification, we feel the likely amount of allowed turbot retention will be 140 MT for the EFP (including turbot from the species composition test portion of the EFP). Groundfish Forum has no objection to the establishment of an upper limit for the total turbot (round weight equivalent) of 175 MT. This upper limit is based on the data used above to predict the catch composition for the species composition test in the flathead fishery. To attain that upper limit, all expected catch of the species listed above would have to be retained in order to achieve an allowance to take 175 MT (round weight equivalent) of Greenland turbot. The allowance for turbot retention against retained catch is a helpful incentive for the species composition sampling tests because with greater retention, the task of weighing discards of major species during the species composition test portion of the EFP is reduced somewhat.

The size composition sampling evaluation will take place immediately following the successful completion of the test of sampling methods. Based on data obtained from NMFS on the species composition of tows where Greenland turbot was the principle component, we estimate the following catches to occur during the size composition evaluation portion of the EFP. These estimates are based on having sufficient retained catch of the species listed above to retain a total of 140 MT of Greenland turbot.

Total groundfish catch of 342 MT
comprised of:
41% Greenland turbot = 140 MT
33% Arrowtooth flounder = 113 MT
5% flathead sole = 17 MT
5% pollock = 17 MT

5% other flatfish = 17 MT
4% pollock = 14 MT
3% sablefish = 10 MT
4% other (rockfish, yellowfin sole, rocksole, etc.) = 14 MT

Expected PSC quantities:
Given that Greenland turbot fishing occurs in deep water, the only PSC likely to be a significant portion of the catch is halibut. Based on the same NMFS data used for the above estimates of groundfish catch, we estimate that halibut will be between 1% to 3% of catch, therefore 3.4 to 10.2 MT of catch.

The decksorting protocol used during this portion of the EFP is expected to reduce the mortality of this halibut significantly from the current IPHC rate of 73% used for the open access fishery where decksorting is not employed.

Nature of the PSC limitations for the EFP
For past experimental fisheries, Groundfish Forum has sought to test the effectiveness of a fishing gear or modification of a fishing gear. The purpose of those experiments has been to test the potential for bycatch reduction, which has general benefits as well as benefits for industry though avoidance of premature closures of groundfish fisheries. The value of this EFP is wider, we believe, because the experiment is geared more to resource conservation and management objectives than past projects.

We also feel the EFP offers potential benefit to the industry in terms of improvements in the accuracy of species composition sampling at the haul by haul level which should help to ameliorate potential estimation problems with the IR/IU and multi-species CDQ programs. Lastly, to the degree that the automated sampling techniques serve to resolve a perennial source of tension and conflict on fishing vessels with observer coverage, then industry and observers will be better off from having worked on this project.

The above prologue is intended to point out that this EFP is of wider interest than previous ones and PSC limits for the EFP should reflect the nature of the EFP and the intent of the experiment itself. Because the EFP limits are essentially a set of individual vessel quotas, there is a strong incentive to change fishing methods or locations as one of the limits is approached. With earlier EFPs, the devices tested were intended to reduce bycatch and there was no potential down side to incorporating PSC bycatch avoidance during the EFP fishery because use of the device in open access would also involve other bycatch avoidance measures. For the species composition sampling portion of this EFP, bycatch avoidance could lower the degree of potential stratification of prohibited species in the catch.

For this reason, we do not favor a set of "drop dead" limits on the PSC available for that portion of the experiment because this could create negative consequences for the value of the research. Consider the case where the participating vessel, through an unfortunate occurrence, catches most of the "allotted" PSC in the first half of the experiment. The participant would be forced to fish under a strict avoidance regime, which could affect

the actual species composition of tows and defeat the experimental design to detect a given amount of variability. For this reason, we feel the limits for the test of sampling methods portion of the EFP should be treated as "guideline harvest limits". Furthermore, we recommend that Groundfish Forum and NMFS personnel associated with the EFP should be required to remain in consultation with the Regional Director if PSC catches are trending higher than anticipated. We do not feel it would be prudent to subject the field test to "knife edge" criteria and the possibility that the test will be necessarily curtailed if PSC catches are greater than expected.

We feel that during the field work for the experiment, the NMFS Regional Director is in the best position to consider the tradeoffs between opting to terminate the field test or finishing it and perhaps exceeding the projected guidelines. Participants will be informed that they must take all reasonable steps to stay within the limits, but should the natural species composition of fish species prove different from the projection, this will not necessarily be fatal to finishing the project.

This request does not apply to the size composition portion of the EFP. We feel it is fair to subject the participant to a concrete limit on PSC for that portion of the EFP, as long as that those limits provide a reasonable potential to catch the allowed quantity of fish for that portion of the research. Adherence to an upper limit is not likely to affect the validity of this portion of the experiment because avoidance of areas with high halibut rates will not impact the evaluation of size composition sampling.

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

AGENDA D-1(h)
APRIL 1999
Supplemental

April 15, 1999

RECEIVED
APR 15 1999
N.P.F.M.C

Clarence G. Pautzke
Executive Director
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501

Dear Clarence,

We have received an application for an experimental fishing permit (EFP) from Mr. John Gauvin of Groundfish Forum to test and improve species composition sampling methods. The application proposes to evaluate the accuracy of basket sampling and how sampling at different intervals during the flow of fish into the processing area affects estimates of species composition. Mr. Gauvin also proposes to develop an automated sampling method that will randomly and mechanically select samples from different portions of the catch from a haul with the intent of reducing the potential for human error or bias.

Under regulations at 50 CFR part 679.6, we have consulted with the Alaska Fisheries Science Center (AFSC) and have determined that the application contains all the information necessary to judge whether the proposal constitutes a valid fishing experiment appropriate for further consideration. The AFSC has provided several comments on the proposal that are listed in the attached memo. We are initiating consultation with the North Pacific Fishery Management Council by notifying you of the AFSC's support of the subject EFP application. We understand that Mr. Gauvin already has forwarded you a copy of the application and that its review by the Council has been scheduled for the April 1999 meeting in anticipation of our review and determination that the application warrants further consideration.

Sincerely,

Steven Pennoyer
For Administrator, Alaska Region

Attachments (2)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Alaska Fisheries Science Center
BIN C15700; Building 4
7600 Sand Point Way NE
Seattle, Washington 98115-0070

APR 12 1999

MEMORANDUM FOR: Steven Pennoyer
Regional Administrator, Alaska Region

FROM: James W. Balsiger
Science and Research Director, Alaska Region

SUBJECT: Groundfish Forum 1999 Experimental Fishing Permit

The Center reviewed this permit request and supports its granting. The proposed study should provide important insights into the species composition and length sampling methods used in groundfish fisheries off Alaska. We are unaware of any previous studies which evaluate the accuracy of species composition estimates made from basket samples of commercial catches, because the census of catch necessary to provide a standard for comparison is extremely difficult to achieve. There have been only limited data collected to date on the "stratification" (species-specific layering in nets or bins) of catch in commercial fisheries and its effect on sample-based species composition estimates. In addition, we are unaware of any studies on the effects of size-specific stratification in commercial catches on sample-based length composition estimates for commercially important species. Fishery length data collected to date for Greenland turbot have been sparse and rather noisy, so a study of length composition sampling for this species in particular is encouraged. If this research proceeds as outlined, it should provide useful data addressing all of these issues.

We have the following specific comments on the proposal:

1. Product recovery rates, size grading systems, and case packing may vary considerably over the course of time. Since each retained species PRRs and size-graded case counts are functioning as a weighing system in this project, they should be subject to the same type of daily calibration/testing requirements that are applied to other weighing systems used in research fisheries (flow scales). The applicant should fully

describe techniques for verifying species specific PRRs, case counts, and weights daily throughout the research. Some description of flow scale testing protocols should also be included.

2. The automated system should be set up with the same sampling design that the observers are using, so that any differences are attributable to human versus machine sample selection, and not sampling design.

3. It is important that the applicant be careful and realistic in evaluating the number of additional crew required to provide both the census and observer sampling assistance. In addition, a minimum of three NMFS-certified observers should be provided by the vessel given the workload expected for this study, not "up to three" as stated in the EFP.