North Pacific Fishery Management Council

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SCIENTIFIC AND STATISTICAL COMMITTEE
to the
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
March 30-April 1, 2009

The SSC met during March 30-April 1, 2009 at the Hilton Hotel, Anchorage, Alaska. Members present were:

Pat Livingston, Chair
NOAA Fisheries—AFSC
Keith Criddle, Vice Chair
University of Alaska Fairbanks
Troy Buell
Oregon Department of Fish and Wildlife
Robert Clark
Alaska Department of Fish and Game
Anne Hollowed
NOAA Fisheries—AFSC
George Hunt
University of Washington
Gordon Kruse
University of Alaska Fairbanks
Franz Mueter
University of Alaska Fairbanks
Lew Queirolo*
NMFS—Alaska Region
Terry Quinn II
University of Alaska Fairbanks
Farron Wallace
Washington Dept of Fish and Wildlife
Ray Webster
International Pacific Halibut Commission
Doug Woodby
Alaska Department of Fish and Game

* attended via teleconference

Members absent were:

Sue Hills
University of Alaska Fairbanks
Kathy Kuletz
US Fish and Wildlife Service
Seth Macinko
University of Rhode Island

C-2 Salmon Bycatch

Diana Stram (NPFMC) provided a brief introduction of this agenda item. Public comment on the Draft EIS has been received, a response to those comments has been released, and the Draft EIS has been revised in response to some of the public comments. The Council is scheduled to select a preferred alternative and take final action at this meeting. In February 2009, the Council requested SSC assistance in evaluating aspects of its Preliminary Preferred Alternative (PPA) for the April meeting. Specifically, they requested SSC advice on:

1. Whether the elements of each incentive plan adequately address the Council's objectives in the PPA of:
   - Providing incentive(s) for each vessel to avoid salmon bycatch under any condition of pollock and salmon abundance in all years;
   - Including rewards for salmon bycatch avoidance and/or penalties for failure to avoid salmon bycatch at the vessel level.

2. Whether the programs can be expected to promote reductions in actual individual vessel bycatch rates, relative to what would have occurred in absence of the incentive program. Incentive measures must promote salmon savings in any condition of pollock and salmon abundance, such that they are expected to influence operational decisions at bycatch levels below the hard cap.

John Gruver (UCB) and Karl Haflinger (Sea State Inc.) provided an overview and responded to questions about the Salmon Savings Incentive Plan (SSIP). Stephanie Madsen (PCC) and Joe Plesha (Trident Seafoods) provided an overview and responded to questions about the Financial Incentive Plan (FIP). Alan Haynie (AFSC) provided a review of key features of the SSIP and FIP in the general context of policy responses to externalities. Diana Stram (NPFMC) and Sally Bibb (NMFS-AKR) provided clarification regarding alternatives for structuring a backstop cap for vessels that opt-out of the ICA. **The SSC appreciates the quality of these analyses and the effort that has gone into their preparation and presentation.**

Public testimony was provided by William Beans (Mountain Village), Joe Plesha (Trident Seafoods), Brent Paine (United Catcher Boats), Bob Dooley (United Catcher Boats), Glenn Reed (Pacific Seafood Processors Association), Paul Peyton (Bristol Bay Economic Development Corporation), Erik Weingarth (Yukon River Panel), Jon Warrenchuk (Oceana), and Sky Starkey (Association of Village Council Presidents).

The SSC reviewed the Draft EIS in June, 2008, and commented on early conceptualizations of the elements of a Chinook salmon prohibited species bycatch inter-cooperative agreement (ICA), in February 2009. In preparation for this meeting, the SSC has benefited from the opportunity to review a formal description of the draft ICA, a paper (Kochin, Riley, Kujundzic, & Plesha[1]) on theoretical underpinnings of the FIP, a paper (Barzel and Kochin[2]) on possibilities of gaming and exercise of market power under the FIP and suggestions for eliminating those undesirable features, a paper (Wilen[3]) that considered both the SSIP and the FIP, a letter (Murphy[4]) on the likelihood that the SSIP will exceed the performance standard, a letter (Kochin and Riley[5]) that explores the controllability of bycatch rates under the FIP, and papers (Sugihara & Ye[6][7]) describing an alternative approach to incentivizing bycatch avoidance. The ICA description and the contributed papers have been very helpful. These highly regarded specialists and their critical perspectives have helped shape the SSIP and FIP. Haynie's review of the draft ICA was also influential in shaping the SSIP and FIP, and helped the SSC fully understand the efficacy of these plans. **The draft ICA, itself, has evolved and improved rapidly, a testament to the goodwill and hard work of many stakeholders.**

Below, we address the questions that the Council posed and provide additional observations for the Council's consideration.

In response to the Council's questions to the SSC:

1. **Do the SSIP and FIP provide incentives (rewards or penalties) for each vessel to avoid salmon bycatch under any condition of pollock and salmon abundance in all years?**

[1] Kochin LA, CC Riley, A Kujundzic, and JT Plesha. Analysis of an incentive-based Chinook salmon bycatch avoidance proposal for the Bering Sea pollock fishery. November 2008.
[2] Barzel Y and LA Kochin. Letter to JT Plesha regarding the Market Share problem. January 2009.
[3] Wilen JE. Analysis of alternative incentive plans for reducing salmon bycatch in the pollock fishery. March 2009.
[4] Murphy J. Letter to G Reed regarding expected bycatch under the Salmon Savings Incentive Plan. March 26, 2009.
[5] Kochin LA and CC Riley. Comments on the efficacy of incentives. March 2009.
[6] Sugihara G and H Ye. Reducing Chinook salmon bycatch with market-based incentives: individual tradable encounter credits. March 13, 2009.
[7] Sugihara G and H Ye. Why hard caps and fixed targets for managing bycatch of Alaskan Chinook and the Alaskan economy. March 2009.

Our response to this question is unambiguously affirmative for the SSIP and a qualified affirmative for the FIP. The qualification to our finding on the FIP is that the FIP generates financial incentives that, though calculated at the vessel level, would be paid at the level of fishing companies. Although it is likely that companies will create additional internal incentives that apply to the operators of individual vessels, such incentives are not explicitly specified or required in the FIP. Furthermore, the FIP derives its incentive structure from a highly competitive performance hierarchy that impedes collaboration, information sharing, and cooperative bycatch avoidance behaviors. The FIP may also advantage companies with multiple vessels and greater levels of operational integration, relative to single vessel operations.

The mechanisms used to create incentives to avoid bycatch under the FIP and SSIP differ. Under the FIP, the incentive is a combination of financial awards and penalties that redistribute a pool of funds, based on **"relative"** bycatch rates. Consequently, the incentives under the FIP are active at all combinations of pollock and salmon abundance. Indeed, incentives under the FIP remain active even at Chinook prohibited species bycatch rates that may be technologically unavoidable. The SSIP rewards prohibited species bycatch avoidance through the accrual of salmon prohibited species catch (PSC) credits. It establishes individual vessel Chinook bycatch allowances and, thus, by definition, provides incentives that apply at the individual vessel level. Individual Chinook PSC allowance amounts are designed to be binding at bycatch levels that approach the Council's established performance standard (i.e., proportionate share of 47,591). At low salmon abundance levels, the individual Chinook prohibited species bycatch caps are less binding, but incentives remain intact. The SSIP provides a financial opportunity for one vessel to sell unused Chinook bycatch allowances to another vessel(s) that has exhausted its individual bycatch allowance or, alternatively, to bank unused Chinook salmon bycatch allowances, providing an insurance benefit. The insurance and sales incentives apply at all levels of biomass, but decline at low levels of Chinook abundance, where the rolling hot spot system of the SSIP provides additional incentive to avoid Chinook PSC. The SSIP moderates potential cumulative impacts on Chinook PSC removal totals, by incorporating a "discount rate" on transferred Chinook bycatch allowances, and an "expiration date" on banked bycatch allowances. Both serve to enhance the inter-annual stability of aggregate Chinook PSC removals, but the expiration date reduces the value of banked PSC salmon as the expiration date approaches.

2. **Can the FIP and SSIP be expected to reduce individual vessel bycatch rates relative to what would occur in absence of an incentive program?**

   There is evidence of consistent heterogeneity in bycatch rates across vessels, and serial correlation of bycatch rates through time at the scale of haul, trip, and year. Non-randomness is a precondition for the successful application of an incentive program leading to reductions in "individual vessel bycatch rates, relative to what would occur in (the) absence of an incentive program". As noted above, both the FIP and SSIP have incentive structures that operate at all levels of pollock and salmon abundance. **Therefore, the FIP and SSIP can be expected to lead to reductions in Chinook salmon prohibited species bycatch rates, relative to what would be achieved in the absence of an incentive program.**

Decisions regarding the magnitude of the backstop cap for the opt-out pool and its relationship to the 68,392 hard cap could affect Chinook bycatch totals and the effectiveness of the incentive programs. For example, treating the backstop cap as an open access pool, could result in Chinook bycatch overages in the backstop and possibly in the overall cap. If those PSC overages are deducted from bycatch allowances issued under the FIP or SSIP, this could lead to ICA season compression, disruption of transfer prices, and reduction of the incentive to avoid Chinook bycatch.

While the 80% inter-seasonal rollover provision was envisioned as a mechanism for reducing Chinook bycatch, it may reduce the incentive to avoid bycatch as A-season target catch limits are approached.

Higher prices paid for pollock roe, compared to other product forms in the A season, have the potential to reinforce this tendency.

Because the PPA limits Chinook salmon bycatch amounts, but does not create simultaneous limits on chum salmon PSC amounts, actions taken to reduce Chinook bycatches or bycatch rates could increase chum bycatch and bycatch rates. This will need to be analyzed when chum salmon bycatch measures are developed.

The ICA does not address details of compensation mechanisms for third parties, used to oversee bycatch rates, transfers, and salmon savings. Nor does it address the possibility that a CDQ could opt-out of the ICA (and the implications for Chinook bycatch management, should that occur).

The ICA and specific details of the FIP and SSIP were developed in the context of a PSC hard cap of 68,392 Chinook and a PSC performance standard of 47,591 Chinook. Changes in the cap, changes in the performance standard, or other substantive changes in PPA performance criteria could prompt renegotiation of the ICA and reconsideration of design features of the FIP and SSIP, with unknown consequences for Chinook bycatch. However, the economic incentives provided by a FIP or SSIP can be expected to operate effectively over a wide range of hard caps and performance measures.

While retrospective analyses, featured in some of the papers provided for Council review, provide useful examples of the types of effects that could result from adoption of the SSIP and FIP, the examples should not be mistaken as predictions of the actual outcomes. By definition, the SSIP and FIP change incentives, and fishing companies and fishing vessel operators will respond to those new incentives. Vessels that have a history of high bycatch rates did so under conditions that, for the most part, rewarded operators who maximized the value of their target catches, and not those that minimized Chinook salmon bycatch rates. Under the SSIP and FIP, high prohibited species bycatch rates engender high opportunity costs. Successful fishing companies will balance the value of target catches and the opportunity cost of Chinook PSCs. Under the new incentives, erstwhile black sheep could reinvent themselves as spotless lambs.

Over the past three decades, the Council has tried a variety of strategies to reduce Chinook bycatch. Past strategies have not prevented unusually high levels of bycatch. Amendment 91 represents yet another attempt to rein-in Chinook salmon bycatch. Some features of Amendment 91 have well understood consequences. For example, the introduction of a hard cap will prevent the reoccurrence of unusually high annual bycatch totals, but on its own could lead to a race for bycatch. Other features of Amendment 91 are novel, such as the reliance on stakeholder-designed bycatch avoidance incentives, and may have unexpected consequences. In light of these novel features, **implementation of Amendment 91 should mandate preparation of annual reports that document PSC bycatch rates, Chinook bycatch transfer prices, quantities, dates, and parties of transfers, payments made in the FIP, and banked salmon PSC amounts in the SSIP. The annual reports should provide enough information to allow NMFS, the Council, and the SSC to judge performance, with respect to the ICA requirements specified in the PPA. In addition, the efficacy and consequences (e.g., inadequate performance of the ICA would trigger a consequence) of Amendment 91 should be subject to a thorough program review three to five years after implementation.**

The SSC has noted in its previous evaluation of the EIS and the alternatives that there are two fundamental purposes implicit in the proposed action: first, compliance with National Standard 9[8],and second, reduction in the extent to which Chinook bycatch in the BSAI pollock fishery adversely affects the return of Chinook salmon to rivers of origin, especially in western Alaska. While it is clear that the PPA will contribute to both of these objectives relative to the status quo, the practicable extent to which Chinook bycatch can be reduced will only be seen upon implementation, and the extent to which

[8] Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

reductions in Chinook bycatch in the BSAI pollock fisheries will contribute to increased returns of Chinook to their rivers of origin is unknown. As we previously noted, the EIS analyses and bycatch impact model, by region and stream of origin, show what the effects of the alternatives would potentially have been in the years 2003 through 2007, but there is uncertainty about what the impact of these measures might be in future years.

Thus, the recommended program review should consider the results of ongoing genetic and ecological studies that could contribute to improved understanding of the significance of linkages between bycatch mortality and Chinook salmon returns to rivers of origin. In addition, the review should address structural changes in the organization and ownership of pollock fishing companies, changes in the timing and location of fishing activities, changes in the number of active fishing vessels and the magnitude of catch shares fished by each vessel, and changes in the mix of products, where such changes may be attributable to Amendment 91. Additional information that would be useful for assessing the impacts of Amendment 91 would include logbook reports that document hauls with and without excluders and information about how decisions to change fishing location, depth, and haul duration may have been based on concern about Chinook salmon PSC rates.

While not part of the PPA, collection of additional data from bycaught Chinook PSC could be invaluable. For example, tissue samples could be used to determine stock of origin. Size, sex, and age data could contribute to improved modeling of the impact of Chinook prohibited species bycatches, by region of origin. Information on condition and stomach contents of Chinook PSC could contribute to an improved understanding of ecological linkages that lead to the co-occurrence of pollock and Chinook. Improved understanding of the ecological mechanisms that bring pollock and salmon together at some times and places and not others, could ultimately facilitate bycatch avoidance.

D-1 (a) Halibut sorting EFP

John Gauvin (Best Use Cooperative) described an EFP application submitted by BUC to conduct a pilot study that will examine the efficacy of approaches to reducing mortality of halibut prohibited species bycatch on Amendment 80 vessels. Catches in the non-pelagic trawl fishery are increasingly constrained by halibut bycatch, even though Amendment 80 vessels use hotspot avoidance and halibut excluders in an effort to reduce bycatch. The objective of this EFP is to explore whether mortality for halibut bycatch can be reduced by minimizing time on deck. The ultimate goal of this work is to increase usage of TAC for flatfish, including arrowtooth flounder, while reducing halibut PSC mortality.

As noted by Mr. Gauvin, the proposed work under this EFP is a feasibility study, and not a designed experiment for evaluating effectiveness of a new method, or comparing different methods. The study will try to minimize halibut bycatch mortality during regular fishing operations through immediate on-deck sorting of catches, as well as testing electronic monitoring equipment to monitor deck sorting.

The SSC appreciates receiving a well laid-out and detailed EFP application and we recommend that the Council approve the EFP. The proposed work has the potential to result in real benefits for the industry and provide conservation benefits in the form of reduced halibut PSC mortality.

While we realize that the focus of this study is to iteratively develop a practical approach to quickly sort halibut on deck under different conditions to minimize mortality, we encourage the authors to collect as much usable information as practicable to evaluate factors affecting viability of halibut. To that end, in addition to length and viability measurements, we suggest tracking time on deck for each individual fish and recording potentially influential covariates, such as tow length, depth of water, target species, total weight of haul, air and water temperature, and major changes in operation. This would provide valuable preliminary data for designing potential follow-up studies, and for developing testable hypotheses. We also note that the cost associated with increased monitoring, required to accurately account for halibut

sorted on deck, will affect the practicability of adopting these measures in the fishery, and we recommend that data associated with these costs be collected and reported. Finally, we point out that this and similar studies provide an opportunity for tagging halibut, if such efforts fit into the overall IPHC research plan.

D-1 (b) HAPC evaluation criteria and EFH 5-yr review methodology

The SSC received reports by Diana Evans (NPFMC) and Matt Eagleton (NMFS) regarding evaluation criteria for Habitat Areas of Particular Concern (HAPCs), and the process now underway for a review of Essential Fish Habitat, 5 years after the initial EFH EIS was completed for the North Pacific. Public testimony was provided by Jon Warrenchuk (Oceana).

The SSC considered the proposed review process and suggests scheduling reviews of HAPC and EFH on the same timelines (i.e., the process can be paired with the 5 year EFH review process). With regard to the four HAPC "considerations" (identified on page 5 of the Council materials under D-1(b)(1); hereafter referred to as criteria), the SSC recommends forming a workgroup to improve definitions of the criteria for use in the HAPC proposal review process. The workgroup should include some Council staff, NMFS Habitat Conservation Division representatives, Plan Team members (possibly chairpersons), and SSC members. SSC members available for this workgroup are Anne Hollowed, Doug Woodby, and Farron Wallace. This group will work by corresponding between now and the June, 2009 NPFMC meeting to produce a revised draft.

At this point, the SSC recommends the following changes to the HAPC proposal review criteria:

1. The definition of "Rarity" should be accounted for in two categories, global and local. Global rarity (as in Table 1 at the bottom of page 13 of Council materials for item D-1(b)(1)) should be formally defined. The definition for local rarity should be retained (as in the table at the top of page 13).
2. Split the "Ecological Importance" criterion into "habitat complexity" (features, structure, etc.) and "habitat associations" between the habitat and the production of managed species.
3. "Sensitivity" should be redefined as resilience, and the metric should be the "expected recovery rate". A rank of low (=1) would be for fast recovery, whereas a rank of high (=3) would be for slow recovery.
4. For each criterion, there should be an additional column in the review matrix for "Data Certainty", pertaining to that criterion, instead of a single stand-alone column with the heading (as in the table at the bottom of page 7 of Council materials for item D1b1).

The SSC requests further definition of item iii on page 5. Specifically, the SSC requests information be provided from the EFH rule and guidelines on the definition of "development" and whether fishing or non-fishing impacts or both were intended to be the focus. Also, it was noted that the previous call for proposals was limited to sites that are "largely undisturbed and occur outside core fishing areas." The SSC requests clarification as to whether this would continue to be a requirement for the next call for proposals. This will assist the workgroup in devising the appropriate ranking definitions for each criterion.

In regard to the EFH review process, the SSC requests that the AFSC and the Alaska Regional office of NMFS provide the EFH analytical team with a summary that describes how EFH related research has advanced our understanding of habitat associations, recovery rates, and impacts analyses. In regard to the fishing effects model, the CIE review highlighted that EFH impacts should be considered as an independent variable influencing growth, reproductive success, and distribution. The long-term effects index (LEI) approach undertaken in the EFH EIS analysis prevented this consideration, because it did not provide a temporal view of shifts in habitat impacts. The SSC requests that the analysts attempt to describe the temporal pattern of habitat impact.

D-2 Scallop SAFE review

Gregg Rosenkranz (ADF&G) presented preliminary results from scallop research activities, and summarized the 2009 February Scallop Plan Team (SPT) minutes. Public testimony was presented by Jim Stone (Alaska Scallop Association).

The SPT minutes reflect many of the same issues the SSC discussed in previous SAFE reviews. The SSC notes that the Scallop FMP will need to be amended to comply with ACL requirements. Given that the ACLs need to be set by 2011, the SSC recommends that the SPT initiate the process to develop ACLs, providing justification and incorporating uncertainty into the estimates. The SSC recommends the development of an FMP amendment to comply with new ACL rules. SAFE authors should consider developing a set of tier levels that address differing information levels to establish these specifications.

The SAFE document, itself, is not well organized and includes a set of documents prepared for other purposes. This was formerly also the case for the Crab SAFE. Separate annual documents should be integrated into one comprehensive document, in which Appendices include only occasional special additions. The report should contain necessary information to evaluate reference points (OFLs, GHLs, etc.). In restructuring the SAFE, the SSC recommends that the authors use the guidelines for the Crab and Groundfish SAFE documents as a template.

In the March/April 2008 SSC minutes, the SSC recommended that "next year's SAFE include an explanation in the management chapter describing the process by which changes to GHLs are determined each year", by registration area. This has not yet been accomplished. This topic is of particular interest with respect to potential biological conservation issues. The SSC further notes that, without prior documentation of the process (and undocumented scallop research conducted on local scales), there is concern of loss of institutional knowledge as managers and biologists retire. Mr. Rosenkranz reported that the current procedures used to set GHLs are more qualitative, and vary among regions based on levels of information and historical practice. The SSC requests that the authors articulate the process by which fishery information (e.g., fishery CPUE, age/size composition, apparent recruitment levels) is used by managers to adjust GHLs. The SSC requests the SPT to work with ADF&G fishery managers to move toward more formalized and consistent control rules that are biologically based to aid in a transparent process for setting guideline harvest levels (GHLs) within registration areas each year.

The SSC makes the following additional requests:

1) The SSC encourages the development of a statewide ageing protocol and development of an age-structured model for scallop stocks in the Central Region.
2) The SSC would like to see the investigation of scallop movement within beds as a research priority, with the purpose of determining whether scallops can fill areas previously harvested.
3) SAFE authors should consider modeling the ecosystem section of the scallop SAFE after the groundfish SAFE and remove the last sentence in section 4.1.
4) The SAFE should include a more thorough description of predator-prey relationships, including effects of fishing on scallop predators, as well as considerations of habitat effects and bycatch.
5) An implementation plan should be developed for a potential statewide scallop survey, so that its efficacy can be evaluated. This should consider cost and efficiency of video review, transcription and the potential for sub-sampling.
6) The SSC encourages an evaluation of differences in dredge selectivity between fishing regions.