

Halibut Management Framework – September 30, 2015 DRAFT

Introduction

In conjunction with its June 2015 action to reduce halibut PSC limits in the BSAI groundfish fisheries, the Council discussed several aspects of halibut management, and committed to developing a more explicit ‘framework’ for consideration of halibut management overall, including enhanced coordination with the IPHC process. Citing from the Council’s June 2015 newsletter:

“The Chair and the Executive Director will evaluate ways to integrate the variety of halibut management and research activities currently underway, and develop a framework for improving coordination between the Council and IPHC. Council and agency staff, including the IPHC, and State representatives on the Council, will be consulted. Both Council members and the public highlighted a need for better alignment of the two management bodies when dealing with halibut needs among the various directed fishery and bycatch user groups. The intention is to outline a process to ensure progress continues on issues both that were raised at this meeting, and were outcomes of the joint Council-IPHC meeting in February. These include, among others, a discussion of the Council’s management objectives with respect to the tension between the needs of the directed halibut fishery and halibut bycatch needs in the groundfish fishery; the role of stakeholder working groups to develop a more surgical resolution to halibut use conflicts; and a common understanding of available data and the science of various halibut stock and life history issues, such as growth and migration. The Chair and Executive Director will bring back recommendations for the Council in October, which may be followed by a public scoping session, and the consideration of specific actions by the Council in December.”

Halibut management, whether bycatch in the groundfish fisheries, or harvest in the directed longline, recreational, charter and subsistence fisheries, is one of the most significant issues of interest among stakeholders, and the Council continues to recognize its responsibility to balance the objectives of all resource users. The Council also acknowledges that while the MSA, National Standard Guidelines, the Halibut Convention between the U.S. and Canada, and the Halibut Act, outline those responsibilities, they may not clearly or thoroughly articulate how best to balance these competing uses of halibut.

The overall goal of this Framework is to identify and define the most important issues/topics/questions necessary to guide the Council’s decisions about halibut management, and to inform Council interactions with the IPHC. It also serves as a record or catalog of ongoing Council activities and stakeholder involvement, research and management projects, and the interaction among Council, NFMS management and AFSC, Plan teams, the IPHC and stakeholders. It would describe what we are doing collectively and how these efforts interact; it would identify areas of uncertainty, misunderstanding and disagreement; it would identify areas where further analysis and research may be warranted; and it would suggest actions and timelines for addressing various aspects of halibut management. With this framework, the Council would become more proactive and directly engaged in its management authority and responsibility for halibut for the benefit of all users. A key aspect of this Framework is to articulate how a particular issue/topic/question relates to decision-making (process-wise and time-wise) by either the Council or the IPHC.

Key assumptions for this Framework include:

- The Council and the IPHC will continue to operate under their respective authorities. There is no intent to create a joint decision making process with the IPHC. However, the Framework process may inform development of recommendations from one body to the other.

- The IPHC is in the process of developing new understanding and capabilities (stock assessment, SPR, total mortality accounting, MSE process, etc) which will affect how both the Council and the IPHC understand and develop halibut management.
- The Framework is intended to be comprehensive, include consideration of all user groups, and be applicable to the BSAI and the GOA.

The main purpose of this Framework is:

- To catalog current work/research/activities that are underway, or that have been identified but not started, so that priorities and timelines can be set (or recommended, for activities under the purview of the IPHC) for the Council and NMFS.
- To identify gaps in our understanding of halibut, and deficiencies/shortcomings in the way halibut research and management has been addressed. These are potentially new areas of work for the Council to pursue, possibly in coordination with the IPHC and NMFS.
- To identify ways to improve research and management coordination and communication between the Council, NMFS, and the IPHC, and stakeholders.

Public Review of Halibut Management Framework

There are two potential ways to further develop this draft Framework. As initially suggested in June, the Council could hold a public scoping session (in November 2015) to receive public comment on these issues, their relative priorities, and whether there are other issues to consider. In December 2015, the Council could again take public comment and modify the Framework to define the priorities, and task/request work on them as necessary and appropriate, in order to advance their progress or resolution.

Given the limited time available for refining this draft framework and planning for a November scoping session, and potentially revising it again for review in December, we suggest instead that the Council request staff to refine this white paper based on Council and preliminary public input at this October meeting (as practicable), and bring it back to the December Council meeting as a separate agenda item for public review. In essence, rather than a separate scoping session in November, we would schedule this as a regular agenda item for December, for public input and Council discussion. The Council may then decide whether and how to use this halibut management Framework and any other actions to take related to it. This alternative provides the public with a more fully developed Framework for review and the same opportunity for comment that a public scoping session would provide, prior to the Council adopting the Framework.

Regardless of whether the Council holds a November public scoping session or a review at the December Council meeting, the intent and expectations for stakeholder review and input should be clearly articulated and understood in advance. For example, the following tenets should guide public review in December:

- Public review provides an opportunity for stakeholders to ask questions and request clarifications, recommend other issues for consideration, and suggest priorities for issues and elements described in the halibut management framework.
- Recognizing that the Council has a responsibility to manage halibut for all users, public review of the halibut management framework is not intended to focus only on bycatch, or to recommend initiation of specific management actions to allocate halibut among user groups.
- Public review is intended to get input on how to better coordinate information and decision-making processes, rather than to suggest specific outcomes of the decision-making processes.

Additionally, in preparation for public review the Council should determine whether there are specific background materials to provide at the December meeting that would be informative to the public, in addition to a revised halibut management Framework.

Cataloging current work: NPFMC/NMFS/IPHC research and management issues

The Council and the IPHC identified a variety of research, management and data collection issues of interest at the joint meeting held in February of this year. Attachment 1 provides a summary of these issues and their current status. The Council may wish to organize them in the Framework as management, research, catch accounting, etc.; several of them, however, may no longer apply. To further coordinate and collaborate halibut research and management with the IPHC, the Council could take the next step of reviewing and refining these issues as needed to determine prioritization of specific staff tasking or requesting analysis from other bodies such as the NMFS, AFSC and IPHC as necessary, and drafting a projected timeline for their completion or resolution. In essence the Council would develop a more explicit workplan in collaboration with NMFS and the IPHC for various halibut research and management issues that would inform the public and guide Council actions or recommendations (recognizing that many of these issues are directly, or indirectly, within the purview of the IPHC).

It's important to note that the Council may have close agreement with the IPHC on the pursuit and prioritization of some, but not all of the issues in Attachment 1, given the differences in overarching management objectives and responsibilities of the two bodies. For example, there may be close agreement on the need for developing an abundance based approach to halibut management (item #3), and perhaps how best to achieve it. On the other hand, the Council may choose to retain authority and responsibility for monitoring standards and programs for its fisheries, and determine how best to meet the IPHC's data needs within those programs through discussion, rather than jointly agreeing to all fisheries monitoring standards with the IPHC (item #15).

Gap analysis for Council decision-making: Research and Assessment Priorities

As part of this Framework, it may be useful to explicitly separate the biological/scientific issues from those related more to management and policy, and identify those most important for the Council (and IPHC) decision-making process. Although there are many interesting scientific questions to ask about the life history and biology of halibut and how these features might respond to environmental change, as stated earlier a key element of this Framework is to identify those activities which are most critical for management decisions by the Council. A preliminary list of candidate issues would likely include the following, for which there appear to be varying degrees of uncertainty, disagreement and/or misunderstanding:

- Migration of halibut between areas, and associated implications.
- Discard mortality rates in all fisheries, as well as overall bycatch estimation in all fisheries (and associated observer sampling validity).
- Reconciliation of NMFS trawl survey abundance estimates with IPHC survey estimates.
- Effect of BSAI bycatch on downstream direct harvests, in light of uncertainty about abundance and movement and treatment of different sized halibut.
- Impacts of short term, medium term, and long term changes in the environment relative to key aspects of halibut life history.

This list of issues is based on the views expressed by many stakeholders, managers, Council members and others during numerous Council meetings, as well as the February 2015 Joint meeting with the IPHC. The intent is to highlight areas of scientific uncertainty and disagreement that affect Council decision making.

Public review of these issues may inform the Council about relative priorities, plans for further work by NMFS, ADF&G, and the IPHC, and whether there are other issues to add. For those issues over which there is extensive disagreement or uncertainty, but which have significant implications for halibut management by the Council, the peer review process may at some point in time provide an avenue for resolution.

The Council may also wish to assess these issues in the context of fisheries management objectives and annual research priorities for the groundfish and halibut fisheries, in consultation with NMFS/AFSC, ADF&G and the IPHC.

Other Research Projects

In addition to identifying the key scientific questions that affect Council and IPHC decision making, currently there are ongoing halibut related research projects conducted by the AFSC, some of them in conjunction with the IPHC, described in Attachment 2. These should be included or cataloged with other research/science issues within the Framework to inform stakeholders of the extent of halibut related research, even if they are not addressing the most immediately critical management or science questions.

The Groundfish Plan Teams provide another forum for assessment of halibut science and management issues, and the annual SAFE report, including the economic and ecosystem chapters, provide another source for reporting on halibut related information of interest to stakeholders. As reflected in Attachment 1, the Plan Teams are expected to review initial discard mortality rate (DMR) information at the Plan Team meetings in mid-September.

SSC Recommendations and Comments

Based on their review of the BSAI halibut PSC reduction analysis in 2015, the Council's SSC also had numerous recommendations and comments, including some related to longer-term aspects of halibut management. These comments are within Attachment 3. To some extent, the SSC's comments represent potential areas of new research and analysis for the Council to undertake when considering changes in PSC limits, as well as monitoring or reviewing the outcomes of those changes. In particular, the SSC recommended the Council initiate a program review to evaluate the performance or outcomes of the Council's BSAI halibut PSC reduction. The Council may wish to explore some of these recommendations as specific actions within the halibut management framework, however further explanation and assessment of what they actually entail would be appropriate.

Coordination and Communication with the IPHC

The Council could also review the manner and the schedule by which it currently communicates with the IPHC, to determine if there is additional information or times during the year or types of communications that would foster improved coordination and collaboration. This relates to the question of whether a more formal and regular joint meeting process or protocol with the IPHC should be considered. Currently, the main instrument for communicating to the IPHC is through a management report that includes recommendations for charter halibut management measures, prior to the IPHC's annual meeting. It should be noted that documents for the annual IPHC meeting that occurs in January are typically not

available for review and comment by the Council in December. However, the Council could still consider providing additional information about halibut management activities, make recommendations to the IPHC regarding management proposals or other aspects of the IPHC's stock assessment review and catch limit setting process when appropriate. For example, the Council could provide comments on such issues as improving abundance estimates of halibut in the BSAI, or the effect of lowering the 32" size limit on stock biomass. The extent to which the Council provides additional information and comment to the IPHC should be governed by the goal of improving coordination and collaboration for the purpose of achieving management objectives of the respective bodies.

The Council could also consider providing recommendations and comments directly to the US Commissioners to the IPHC, which focus more specifically on issues that are relevant to broader US domestic fishery management objectives.

Ongoing Activities by the Council, Committees, Stakeholder Groups

There are a number of other ongoing activities and initiatives in the Council (and the IPHC) process that are related to halibut management. Most of them will likely be informed by the critical scientific and management questions in the framework. For example, the Council depends on stakeholder committees for detailed review and recommendation regarding management programs and activities as well as research priorities related to the management of groundfish and shellfish.

Committees and Stakeholder Groups

The Council has a number of halibut related stakeholder committees and initiatives, organized to provide recommendations or reports to the Council on management programs and issues, that are likely to be informed by the work described in this outline of the Framework. The Council depends on these stakeholder groups for detailed review and recommendation on regulatory and FMP amendments, as well as problem solving. In some cases, the Council's approach has been to delegate some responsibility for achieving management objectives to sectors, particularly those operating within cooperatives, with specific guidance and direction. The halibut management Framework intends to describe or identify these groups and their roles, and the Council may consider how best to task them in addressing various halibut management issues as they arise. They include:

- The BSAI AM80 Cooperatives. As part of its June action, the Council requested AM80 cooperatives to provide halibut bycatch management plans to Council for 2016 (these will be reviewed in December 2015, and include specific requests for cooperatives to include various measures to minimize bycatch).
- IFQ Committee. The committee would be informed by, and could comment and review, or develop IFQ program changes generated by other actions within the halibut management framework. (For example, DMRs, 32" size limits)The committee could also have a role in the upcoming IFQ Programmatic Review and any possible IFQ program changes that may develop from that review.
- Charter Halibut Management Committee. While the task of this group is to recommend annual management measures for the charter sector, they would also be informed by other actions within the halibut management framework
- CATCH Committee. As it reviews and comments on the proposed CATCH program, this Committee will also be informed by actions in the framework.
- Council's Rural Outreach Committee. This committee could have relevance in context of community and subsistence related concerns.

- Voluntary reporting of halibut bycatch avoidance by different groundfish sectors, as requested by the Council. Future requests for reporting are likely to depend on progress or outcomes of different parts of the framework.

Other issues and activities within the Council process

- Council initiation of discussion paper to allow CDQ entities to lease halibut IFQ in Areas 4B and 4CDE in years with low directed harvest quotas.
- Halibut/sablefish IFQ program review (as mandated by the MSA) – Council is scheduled to review the outline/workplan for this review at its December 2015 meeting.
- Halibut deck sorting EFPs intended to facilitate timely release and reduce bycatch mortality – could result in regulatory action to allow deck sorting.
- Development and implementation of EM for the small boat longline fleet to meet fishery monitoring objectives.
- Review of pending information on 2015 groundfish fisheries halibut bycatch performance.

Summary

In summary, this draft Framework attempts to identify the major research activities underway relative to halibut science and management, highlight the most critical information gaps, outline the primary management (or related) activities affecting halibut decision-making, and identify the need to improve coordination and communication with the IPHC. One benefit of this Framework process may be to more explicitly, and proactively, guide the various research elements underway, and thereby promote more timely resolution for management consideration. The Framework process may also be an integral part of funding requests through NMFS or ADF&G for priority research that might otherwise never be undertaken. Finally, a more explicit Framework process would serve as a general catalyst for improved coordination among the various management bodies, as well as the various user groups dependent upon the halibut resource.

This Framework is not intended as a ‘final product’, but is expected to be refined by further Council discussion, and informed by stakeholder input. One result could be to incorporate a ‘Framework Update’ at specific times during the year (for example, every April and December Council meeting), where the various aspects can be discussed as they relate to ongoing research and management, or even as they may relate to specific management actions being considered by the Council or IPHC. For example, in addition to the Council’s annual management letter that is transmitted to the IPHC each year prior to their January annual meeting (which traditionally summarizes relevant Council actions which have occurred, or which are pending), a December ‘Framework discussion’ could likely raise additional issues for which the Council might develop specific recommendations to the IPHC for their consideration.

In summary, because the Framework in essence forces our process to more explicitly (and proactively) address the various science and management issues surrounding the halibut resource, it will likely provide the Council and the IPHC, as well as other management agencies, a more informed platform for improved coordination in general, and help both bodies identify the timing and nature for more direct interactions (such as our Joint meeting, or other vehicles for coordination). This version of the Framework should be considered as a starting point for further development, based on public input in December and further Council direction.

ATTACHMENT 1

Status report on 2/5/15 NPFMC/IPHC meeting issues for further consideration: Updated August 2015

Issue for further consideration	Action/Timelines	Primary Responsibility	Relative Priority
<p>1. The need to review and update DMRs for all fisheries, including development of a table which summarizes current DMRs, how the rates were derived for each fishery, and the level of 'certainty' (if possible) associated with each DMR.</p>	<p>Underway - IPHC staff/Gregg Williams under contract currently developing table per request. Will need to coordinate with Observer Program to promulgate potential changes.</p>	<p>IPHC (Council and NMFS follow up) – Plan Teams to review in Fall 2015</p>	
<p>2. Recognizing that the Commission has its own scientific review process, the Council expressed a desire for the Council's SSC to review ongoing research by the IPHC under an NPRB grant, and for the SSC to review (when appropriate) the ongoing development of the Commission's total mortality accounting approach (including the application of Spawning Potential Ratio (SPR) and associated management implications).</p>	<p>Ongoing – SSC (and Council) will have opportunity for review as updated documents become available.</p>	<p>IPHC – timelines are uncertain depending upon progress on specific aspects</p>	
<p>3. Both bodies recognize that there are potential benefits to abundance-based management of all removals from the halibut stock and supported continued investigation of this approach.</p>	<p>Council requested discussion paper on abundance-based limits – IPHC already working on updating their February 2015 paper, which is now scheduled for review at Council's December 2015 meeting. This will serve as discussion paper and Council can provide direction and next steps in December.</p>	<p>IPHC (at least until December 2015 Council meeting)</p>	

Issue for further consideration	Action/Timelines	Primary Responsibility	Relative Priority
4. The need to further reconcile bycatch and wastage accounting and calculation between the IPHC and NMFS, and identify any implications for setting TCEY.	Ongoing - NMFS/IPHC staff met again in July 2015 to further define appropriate procedures for using NMFS data in IPHC process. Spatial resolution needed.	IPHC/ NMFS/AkFin	
5. Further information on the IPHC 'closed area', including implications with regard to potential changes in that closed area (i.e., area allocations, access to the area, and associated changes to existing catch share plans).	If the closed area were to be eliminated or modified, there will be implications for Council management of IFQ fisheries and the Area 4CDE CSP, which would require Council examination. The IPHC has discussed but not moved forward with changing the closed area for directed halibut fishing. The Council has not initiated any action to consider closing this area to other gear groups.	N/A (unless IPHC decides to pursue elimination or modifications for directed halibut fishing).	
6. The need to address the 'tendering' issue in the GOA as it relates to application of observer coverage.	Council has initiated an amendment to address this issue, with initial review scheduled for February 2016. The Council has also initiated a discussion paper on 100% observer coverage in the GOA (for October 2015).	Council	
7. The need to further refine a common understanding of science and process, as well as a common vocabulary (for example, Blue Line vs ABC vs OFL?).	Ongoing – IPHC developing an expanded 'glossary'; some information/clarification was included in the BSAI Halibut PSC analysis.	IPHC took lead, draft under internal review, will submit for December 2015 Council meeting	
8. Recognition that, subject to stock conservation, it is a domestic choice of how to allocate available halibut in each country's waters.	No action required. However, see #11 which refers to determining the point at which allocation becomes conservation issue.	N/A	
9. A coordinated prioritization of research in areas of mutual concern.	Ongoing dialogue related to several issues. Potential subject for future joint meeting.	IPHC/NMFS And Council	

Issue for further consideration	Action/Timelines	Primary Responsibility	Relative Priority
10. A recognition of the potential benefits of IBQ type management programs for effecting bycatch reductions.	No specific action required. Council to discuss various options for Gulf of Alaska management in October 2015.	Council	
11. A lack of understanding of migration of halibut makes it difficult to determine the extent to which bycatch is an allocation vs conservation issue, and determine the relative impacts across all management areas (and the desire to prioritize migration research).	Ongoing research by IPHC, spatial modelling, etc. relates to item #9. Key issue is recognition that halibut movement out of BSAI areas creates extended impacts of management actions in BSAI in those other areas.	IPHC	
12. The importance of the Council's BSAI bycatch decision (this year) relative to the Commission's decisions in 2016.	Council took actions in June 2015 to reduce halibut PSC caps in BSAI.	Council	
13. Potential Council review of its management objectives relative to the directed halibut fisheries.	Ongoing, Council can review indirectly through its annual programmatic review of goals and objectives, or possibly consider specific review (in conjunction with MSA mandated review of IFQ program?)	Council	
14. Reconciliation of survey information for Area 4B relative to observations from fishermen.	Ongoing, through IPHC research, discussions with Area 4B fishermen, and targeted survey of Area 4B in 2016	IPHC	
15. Potential development of monitoring standards for all fisheries, including directed halibut fisheries.	Ongoing - Council/NMFS working on monitoring standards through groundfish/halibut observer program and EM. No specific plan to jointly develop such standards with IPHC.	Council/NMFS	

Issue for further consideration	Action/Timelines	Primary Responsibility	Relative Priority
16. Recognition of the potential disparities between the fishery and management contexts when making comparisons to bycatch reductions in Area 2B and U.S. west coast fisheries (apples and oranges) relative to managing expectations.	No action required, but short discussion paper may provide useful context. Council received informative written testimony at its June 2015 meeting on this issue. Need to determine need/priority for additional analysis.	NMFS/Council	
17. Development of a more formal meeting schedule, or possible Joint Protocol, between the Council and the Commission.	Part of ongoing dialogue. Should be issue driven, rather than routine. Will assess in fall 2015 to determine need for next joint meeting.	shared	
18. Potential direction to staff and/or Plan Teams to effect the issues listed above.	See above.	N/A	

ATTACHMENT 2

Ongoing AFSC Research related to Pacific Halibut

- *International Pacific Halibut Commission Data Exchange*: The AFSC contracts with the IPHC to collect and edit sablefish logbook data, use IPHC survey data in some AFSC stock assessments, provide the IPHC with data from the AFSC's annual longline survey, and regularly communicate with IPHC assessment scientists on methodology based on the similarity of the sablefish and halibut fisheries. The AFSC has worked with the IPHC to collect halibut food habits data since 1990; the IPHC has provided the AFSC with a research permit to collect 500-1000 stomachs annually during groundfish surveys, and the resulting data are used by both agencies. **Collaboration with IPHC**
- *Scientific Review and Support to the IPHC from AFSC Scientists*: The AFSC provides the Science Advisor to the Halibut Commission. The Advisor provides science research oversight and reviews all the documents submitted for publication by the Commission. The AFSC provides other scientific expertise to the Halibut Commission on a as need basis. Examples are observer sampling issues, surveys issues, advisor on the ad-hoc Scientific Review Board, and serving as an external member of the hiring committee to hire a new lead scientist for the IPHC. **Collaboration with IPHC**
- *Fish Ageing*: The AFSC is working with IPHC staff on developing a new bomb-radiocarbon reference chronology in the Bering Sea and evaluating halibut age determination bias. Historically collected otoliths from early IPHC longline surveys are being used, as well as and using bomb-radiocarbon assays to evaluate ageing bias of other species. **Collaboration with IPHC**
- *Halibut Discard Mortality Rates*: The AFSC is working with the trawl Industry to develop an EFP to test the efficacy of on-deck sorting and discard of halibut in real time to decrease time out-of-water reduce discard mortality rates. A camera chute system and flow scale will be used to image, count, length and/or weigh each individual fish prior to discard with information transmitted in real time.
- *Improving Halibut Estimates*: The AFSC is conducting electronic monitoring (EM) with the NPFMC EM work group and the IPHC to evaluate the efficacy of EM systems to deliver scientific data that can be used to estimate halibut and groundfish discard in the small-vessel fixed gear IFQ fleet. **Collaboration with IPHC**
- *Halibut visual impairment*: The AFSC is currently using electro-physiological and behavioral techniques to study recovery from light-induced visual impairment of Pacific halibut.
- *Socioeconomics of quota leasing market*: Under the Halibut Catch Sharing Plan (CSP) that formalizes the process of allocating catch between the commercial and charter sectors, there is now an allowance for leasing commercial halibut quota by eligible charter businesses to relax harvest restrictions for their angler clients. A survey developed by the AFSC will be fielded in 2015, collecting data from the eligible participants in this market to determine their attitudes towards, and behavior in, the lease market and attitudes and preferences towards alternative programs.
- *Socioeconomics of charter boat fisheries*: The AFSC is conducting an ongoing survey of anglers who utilize the for-hire charter boat recreational fishing sector in Alaska that is being subjected to new bag/possession and halibut size limits. The goal is to provide insights into how economic values for charter boat fishing trips are affected by these regulations.
- *Impacts of active participation measures*: The AFSC is assessing the impacts of active participation measures in the Alaskan halibut and sablefish individual fishing quota (IFQ) program, including a prohibition on IFQ leasing, limitations on the acquisition of quota shares by non-individual entities (corporations, partnerships, etc.), and restrictions on the use of hired skippers.
- *Targeting behavior*: A study is underway to examine how vessels in the Amendment 80 (A80) fishery develop different targeting strategies to attempt to maximize revenue from target species while not

exceeding halibut prohibited species catch (PSC) limits. This modeling work is a pilot project that will contribute to the spatial economics toolbox for fisheries (FishSET).

- *Efficacy of Halibut Excluders*: The AFSC is currently working with the pollock fleet in the Bering Sea to examine the efficacy of a new halibut excluder design made by Greenline Fishing Gear.
- *Flatfish Settlement Success*: An NPRB project predicting settlement success of two slope-spawning flatfish (halibut and Greenland turbot) in the eastern Bering Sea is underway. Collaboration with Oregon State University.
- *Bioenergetics and Ecosystem Modeling*: An NPRB project is underway to study fishery, climate, and ecological effects on halibut Size-at-age. Including diet analyses and bioenergetics modeling. **IPHC collaboration.**
- *Fishery Technical Interactions*: The AFSC is developing a management strategy evaluation with a multispecies groundfish fishery technical interactions model for the Bering Sea that includes halibut bycatch as a constraint in determining Annual Catch Limits for groundfish.
- *Spatial Connectivity*: The AFSC is studying the connectivity between spawning and nursery areas of halibut over the EBS slope and shelf.
- *Larval Transport*: The AFSC is investigating climate-mediated oceanographic variability of currents modulating transport of halibut larvae/juveniles over the Bering Sea shelf. **IPHC collaboration.**
- *Settlement and Recruitment*: The AFSC is studying factors influencing settling and age-0 recruitment success of halibut in the Bering Sea.

Previous AFSC Research Related to Pacific Halibut

- *Halibut excluder development*: The AFSC, IPHC, and industry developed video systems to observe fish (particularly halibut) behavior in trawls, starting in 1990. The AFSC documented behavior of halibut and target species encountering conventional and modified trawls, demonstrating differences both ahead of and within the net. Halibut excluders were developed through industry collaboration and are routinely used and improved in many trawl fisheries. **IPHC collaboration.**
- *On-deck measurements*: The AFSC cooperated with the Amendment 80 fleet to evaluate the efficacy of length-ing and imaging halibut on the deck of a factory trawler using a camera chute system.
- *Visual impairment of halibut*: The AFSC conducted a laboratory study of halibut recovery time after light-induced visual impairment, showing that bright light (such as on the deck of a boat on a sunny day) can impair halibut vision, potentially influencing survival of discards.
- *Sport Fishing Economics*: AFSC surveyed Alaska saltwater anglers in 2007 and 2012 and estimated (1) demand for and economic value of saltwater sport fishing trips for halibut, salmon, and other primary sport fish species, (2) the value of charter boat fishing trips targeting halibut under alternative harvest restrictions for halibut (e.g., bag/possession and size limits). Economic impacts associated with changes to angler harvest restrictions were estimated.
- *Economic Impacts of IFQs*: The AFSC and UC Davis researched the economic efficiency impacts resulting from features of the Alaskan halibut and sablefish individual fishing quota (IFQ) program, such as blocking and vessel class restrictions on quota share.
- *Charter Boat Economics*: AFSC conducted surveys of Alaska charter boat businesses to study the economics of the guided sport sector. Collected costs, earnings, and employment information were collected for the 2011-2013 fishing seasons. Population-level estimates for total costs, revenues, and employment were generated to provide information about the sector; firm-level modeling is expected to provide insights into how behavior may change under alternative management actions.

- *Catch share evaluation:* An extensive set of economic data tables on halibut was reported in the 2013 Economic SAFE. (Section 4, Tables 51-63); economic performance metrics for the halibut IFQ program were calculated and reported in the 2013 Economic SAFE (Section 7.2).

Future AFSC Research Related to Pacific Halibut (planned and/or pending funding availability): Additional IPHC Collaboration Opportunities

- *The AFSC plans to maintain data exchange collaborations with the IPHC in future years.*
- *Survey Improvements:* Collaborative work with the IPHC comprised of an extended IPHC survey in the Bering Sea connected to the AFSC trawl survey with the goal of improved density of IPHC survey stations and improved estimates of halibut catchability by size/age classes in our trawl survey.
- *Efficacy of Halibut Excluders:* The AFSC plans to work cooperatively with the pollock fleet to study the efficacy of currently used halibut excluder devices by using underwater video cameras to monitor the escape hole in the excluder device and to count the fish escaping in the video. This work is expected to occur in late January to March 2015, during A season for pollock. (Submitted to AFSC Cooperative Research RFP)
- *Scientific Review and Support to the IPHC from AFSC Scientists:* The AFSC provides the Science Advisor to the Halibut Commission. The Advisor provides science research oversight and reviews all the documents submitted for publication by the Commission. The AFSC provides other scientific expertise to the Halibut Commission on a as need basis. Examples are observer sampling issues, surveys issues, stock assessments, impacts of halibut interactions with groundfish resources and the environment.
- *Fishery Technical Interactions and Spatial Modeling:* Multi-species, spatial, technical interaction management strategy evaluation (MSE) to study potential impacts of alternative halibut management strategies on groundfish fisheries in the GOA and BSAI. (Funding source not identified).
- *Spatio-Temporal Overlap of halibut and other groundfish:* Conduct a study using generalized additive models (GAMs) to evaluate spatio-temporal overlap of halibut and other groundfish species in the GOA and BSAI. This information could be used to evaluate whether “rolling hot-spot closures” may have the potential to reduce halibut bycatch in groundfish trawl fisheries. (This work can be accomplished by the AFSC through internal prioritization of tasking.)
- *Bioenergetics and Multispecies/Ecosystem Modeling:* Add halibut to an existing multispecies statistical model for the Bering Sea, to examine the effects of halibut (including bycatch specifically) in a multispecies fishery. (Funding source not identified).
- *Local Environmental Conditions and Halibut Bycatch Rates:* Evaluate relationships between environmental conditions and rates of halibut bycatch in the groundfish fisheries. Purchase and initiate the use of miniature data loggers to measure temperature and salinity at depth on longline and trawl groundfish fishing vessels operating in the Gulf of Alaska and Bering Sea and Aleutian Islands areas. (Submitted to AFSC Cooperative Research RFP).

- *Sport Fishery Socioeconomic Survey*: The AFSC plans to regularly conduct the survey of Alaska saltwater anglers to collect updated information on saltwater angler demand and economic values of fishing trips under current harvest restrictions. Funds have been requested to enable the survey to be conducted during 2016-2017. (Submitted to NMFS S/T)
- *Charter Sector Socioeconomic Survey*: The AFSC has received funding from the NMFS Office of Science and Technology to continue collecting costs, earnings, and employment information from the saltwater guided (charter) sector. The survey is expected to be fielded during 2016 and 2017 to collect data for the 2015 and 2016 fishing seasons. These data will be used to evaluate the economic effects of the implementation of the CSP on the charter sector. (Funded by NMFS S/T)
- *Halibut Growth Hot-Spots in Alaska*: The AFSC will apply a recently developed bioenergetics model for Pacific Halibut (Holsman and Aydin in prep) to identify Pacific halibut growth hot-spots in AK. Survey-based diet and temperature data for the GOA, AI, and EBS ecosystems will be used. (Funding source not identified).
- *Modeling Alaska Flatfish Recruitment-Environment Linkages*: A two-year modeling effort with IPHC, UW, and UMass Dartmouth collaboration that has been submitted to the Fisheries and the Environment (FATE) program is the use of simulation testing to explore methods for incorporating recruitment-environment linkages into flatfish assessment models to evaluate methods of selecting among models, and to use the models developed to conduct forecasts of flatfish populations under future climate scenarios. (Submitted to FATE). **IPHC Collaboration**
- *Ecopath Food Web Models*: The AFSC plans to conduct an impact analysis of changes in the multispecies groundfish fishery (using Ecopath food web models currently containing bycatch by fleet and gear). (Funding source not identified).
- *Genetic Population Structure of Halibut*: The AFSC proposes using a next-generation sequencing technique, Restriction site Associated DNA (RAD tags), to provide a genomic assessment of population structure of halibut. (submitted to FATE).
- *Halibut Stomach Analysis*: The AFSC plans to collect and analyze halibut stomachs (there is no set funding for this, as these stomachs have generally been a lower priority compared to our other key groundfish). (Funding source not identified).
- *Diet Analysis to Inform Trophic Models*: The AFSC would like to examine diets of larval Pacific halibut and other fish in the Bering Sea and Gulf of Alaska that can be used to refine trophic models of energy transfer in the most vulnerable stages of the population.
- *Economic Metrics for Halibut*: An extensive set of economic data tables and economic performance metrics for the halibut IFQ program will be reported in future Economic SAFEs.

ATTACHMENT 3

SSC Report June 2015 C-2 Bering Sea Halibut PSC

The SSC received a presentation of the revised draft EA/RIR/IRFA document for the proposed halibut PSC reduction action under consideration by the Council. Presentations were given by Diana Evans (NPFMC), Marcus Hartley (Northern Economics, Inc.), Mike Downs (AECOM), and Josh Keaton (NMFS AKR).

Public testimony was offered by Gerri Merrigan and Chad See (FLC), Arne Fuglvog (Iquique), John Gauvin (Alaska Seafood Cooperative), Jon Warrenchuk (Oceana), Mateo Paz-Soldan and Simion Swetzof (City of St. Paul), Bob Alverson (FVOA), Linda Behnken (ALFA), Paul Olson (The Boat Company), Peggy Parker (HANA), Heather McCarty (CBSFA), Jim Johnson (Glacier Fish), Karl Halflinger (Sea State), Mike Hyde (American Seafoods), Mark Fina (Alaska Seafood Co-op), Joel Hanson (self), Heather Brandon (World Wildlife Fund).

The SSC reviewed the initial draft of this analysis at its February 2015 meeting. While acknowledging the impressive compilation of empirical information describing the commercial activity of a diverse suite of participants in the BSAI groundfish and halibut fisheries, and the thorough characterization of the development of the BSAI halibut PSC management process, the SSC was concerned about several specific deficiencies. In this revised draft, the analysts have made a clear and (by in large) successful effort to address each of these specific concerns. Indeed, what the analysts have accomplished between the February and June meetings is very impressive.

The IMS simulation model at the heart of the RIR has been extended and enhanced in several respects. The SSC was concerned that the original model was not well documented, and it would benefit from a clearer description of the inherent assumptions underpinning the simulation. This has been largely achieved in the revised draft.

The revised simulation model has been less successful in meeting the challenge of identifying “behavioral” responses to proposed PSC reductions. The IMS model results have been usefully supplemented with an imaginative alternative examination of PSC encounter rates and spatio-temporal groundfish fishing activity (Appendix B), and consideration of the distribution across fishery-dependent communities, considering both groundfish dependence and commercial halibut dependence (Appendix C). We commend the analysts and authors.

The revised analysis, while vastly improved, continues to suffer from several shortcomings that limit its utility as a decision-making tool for the Council. The SSC noted that many of these shortcomings can be appropriately attributed to sources beyond the control of the analysts.

Several important elements required for a thorough analysis of the halibut PSC reduction issue (listed below) lack sufficient information and/or have a poor scientific understanding and are based on a few tenuous assumptions. **The SSC, therefore, recommends that the Council approach all portions of the analysis (the primary analysis and the associated appendices) with caution. At best, the analyses can indicate general trends and possibilities, but they cannot provide definitive estimates of likely impacts**

or responses. The SSC identified the following critical deficiencies in the analysis that are important to consider for interpretation of the conclusions:

- The founding assumption of the simulation model is that halibut PSC mortality cannot be reduced without sacrificing groundfish harvest. Indeed, the only behavior change “available” for fishermen to reduce halibut PSC is to stop fishing in a particular directed fishery for a particular month. SSC discussion and public comment identified that this does not represent a realistic characterization of change in fishing behavior, and this assumption should be more clearly stated in the analysis. Moreover, Appendix B highlights many other behaviors that fishermen are currently using to reduce PSC rates. Thus, the results from the simulation model likely do not reflect realistic behavioral changes by the industry in response to the contemplated halibut PSC rate reductions.
- Halibut biomass is assumed to stay constant over the 10-year period considered in the simulation model, while PSC mortality is assumed to be the same as those incurred between 2008 and 2014. However, the IPHC reports that halibut size- and weight-at-age have been declining since the late 1970s, and this is likely to affect the size- and age-composition of PSC and directed fishing mortality in future years. This has alternative-specific impacts on: 1) total and exploitable biomass; 2) the time required for small halibut “conserved” in the simulation to reach legal size; and 3) the size- and age-specific characteristics of the halibut stock (e.g., sexual maturity at size and migratory behavior). These dynamics are not accommodated in the simulation model, and as such, the estimated “PSC savings” are likely not reflective of current or future conditions as reported.
- Another critical assumption in the IMS model is that one pound of U26 PSC mortality results in a one pound loss in the directed fisheries yield. The analysis conducted by the IPHC that identified the size at which there is a 1:1 correspondence between PSC and lost yield to the directed fishery is conditional on a number of dynamic variables, including: natural mortality, all sources of fishing mortality, fisheries selectivity, size-at-age, spatial distribution, *inter alia*. For example, if size-at-age continues to decline, then losses to the directed fishery for each pound of PSC mortality would decrease. Therefore, further reductions in PSC caps would be required in order to accommodate the 1.285 million pound FCEY in area 4CDE. Conversely, if size-at-age were to increase, or PSC selectivity shifted towards larger halibut, reductions in the PSC caps may not be necessary to achieve the same 1.285 million directed fishery.
- Economic performance measures available to Council analysts are strictly limited to “gross” measures, which may not provide meaningful information about “net” performance. This becomes extremely critical when hypothetical “behavioral” changes are ascribed to PSC rate reductions. Gross performance estimates of operational responses to reduced PSC threshold changes, as presented in both the simulation and Appendix B models, and as reflected in the SSC’s questions during public testimony, may be naïve and, thus, misleading. A profit maximizing operator will use informed expectations of the “net” result of their response to an operational change (e.g., achieving reduced halibut PSC). We recognize that the cost data and information about the strategic proprietary decisions fishermen may make are not readily available or amenable to staff analysis. However, they are crucial to anticipating realistic post-implementation effects.

- Species-specific wholesale and ex-vessel prices are critical elements for explaining industry behavior. Unfortunately, the price data that are compiled by NMFS and made available to the analysts are compressed and smoothed over time and species, effectively eliminating the usefulness of much of this crucial economic signal when modeling fishing behavior under the range of PSC threshold reductions in the simulation model.
- The analysis limits its evaluation of serious impact to directed halibut fisheries (principally in the BSAI) and groundfish fisheries. Some treatment of subsistence use of halibut has been added in this draft (Appendix C), but it remains insufficient and likely underestimates the potential impacts.
- The analysis uses the AFSC fishery involvement indices to do a quantitative assessment of halibut community dependence and engagement. This method only assesses the current level of direct involvement in halibut and other BSAI fisheries, based upon existing information. The analysis should also consider direct or indirect community impacts that may have already occurred due to changes in the status of the halibut resource. It likely underestimates the number of communities dependent on halibut and their levels of dependency because it neglects the unique histories and recent challenges of each. Further, the analysis assesses a level of vulnerability for each community; but again, these are likely underestimates because the indices do not consider the cultural and historical contexts of multi-generational fishing communities or their investments.
- Subsistence halibut harvest data are provided only through SHARCs. The author notes that “caution” should be used in their interpretation, because they show a bare minimum of subsistence halibut harvest for each community, but a more developed description of the low utility of the data are warranted. The analysis should frame these data in terms of SHARC permit return rates, which are drastically low, and explore the ADF&G Subsistence Division’s Community Subsistence Information System for current information from household surveys to show these deficiencies.
- The uneven treatment between sectors (e.g., income plurality only for halibut permit holders and demographics of employment only for trawl CPs) further confounds the ability to evaluate impacts. With respect to employment data, the analysis uses jobs as a measure of fishery engagement only for one Seattle-based sector, and projects a greater level of engagement based upon these numbers. The analysis should consider jobs provided by the directed fisheries, by CDQs, and by processors, and consider the types of jobs provided between sectors. Attributable fishing-based employment numbers as a measure of community engagement could be expressed on per capita basis for the community of interest, which could produce a different conclusion.

Based on the deficiencies outlined above, the SSC can discern scientific support for only the following general statements, around which the Council can frame a policy decision:

- Halibut is worth several times its nominal gross ex-vessel value in the directed fishery in foregone revenues to the groundfish fleet. The specific range reported is a factor of 7 to 15, but this is based on the aforementioned assumption that halibut PSC can only be reduced by not fishing during times when high PSC encounter rate fisheries were pursued historically. Thus, the reported range of foregone gross revenues likely provides an upper bound as harvesters can

mitigate their foregone revenue by fishing in other fisheries, in cleaner areas, or changing gear deployment or fishing practices.

- The economic and cultural footprint of the directed halibut fishery is larger than that of the groundfish fishery in many small communities; the economic footprint of the groundfish fishery is larger in Seattle. However, the relative degree of dependence and involvement varies by community, and many small communities are heavily involved with fisheries that are impacted by halibut PSC. The current analysis does not allow a systematic quantification or detailed characterization of likely impacts on a community or regional level.

The SSC acknowledges that the underlying issue being addressed by this measure is pressing. However, within a highly dynamic environment, such as BSAI, any policy resolution will likely require adjustment and refinement over time. Moreover, the implications of declining size- and weight-at-age on the halibut total and exploitable biomass in the BSAI are not well understood, but are critical for identifying a long-term solution to the halibut PSC reduction effort. Since the present analysis uses a static set of data, employed in a static modeling framework, its probative value is short-term. Further, many of the questions posed during the SSC discussion may be far better addressed with existing methods on existing data; others require additional data or new methods. **Therefore, the SSC recommends the Council adopt a continuous or horizon-based programmatic evaluation for action performance** (e.g., a planned five-year review). The SSC recommends that the scientific work to support a review be initiated immediately, to identify critical data gaps. The review should better quantify the avoidance impacts to the groundfish fishery along the many margins of behavior actually observed to be used (a question about which any current reduction will allow far more insight) and a quantitative and narrative understanding of how the engagement, dependence, and vulnerability of communities are impacted by changes in these fisheries.

The SSC also makes the following important points for consideration for both present and future analyses for PSC reduction:

- The Council's objectives are not specified in well-defined, measurable/quantifiable thresholds (e.g., "reduce halibut PSC by X%" or "reduce halibut PSC until it costs \$Y in foregone gross revenue", rather than "reduce PSC... to the extent practicable.").
- There is phrasing in the main analysis (p. 28, p. 381) that "the analyst asserts" that a behavioral change has occurred. This is misleading as the analyst has simply adopted a procedure for removing records from a historical database and then recalculated groundfish and PSC totals from the remaining records. In other words, the supposed "behavioral change" is solely due to the assumptions of the model, as opposed to actual behavioral changes observed in the groundfish fisheries.
- Discussion in the 2015 Observer Report (included under the C-4 agenda item at this meeting) of observer intimidation and fouling of halibut PSC data has potentially important implications for the entire analysis of the halibut PSC agenda item. The SSC did not receive a report on Chapter 5 of the Observer Report and cannot fully assess the scope of the issues discussed there. The SSC merely notes that data integrity is essential and requests a presentation of Chapter 5 in the Observer Annual Report at a future meeting.

- Specific to Appendix C, limited time available, resource constraints, and no budgeted fieldwork severely restricted the ability of the analyst to explore potential impacts and benefits to BSAI communities. Within these limitations, the analysis attempts to cover a lot of ground using large, mostly publicly available datasets and, thus, aptly frames the appendix with a number of cautionary statements on the utility of the data. The SSC notes that the potential effects of this action warranted the initiation of a more in-depth analysis from the start.
- Appendix C makes generic references to the intangible elements of fishery engagement and attendant cultural considerations in coastal communities. These intangibles are too comprehensive to cover in this report, but it would benefit from a few examples that illustrate these in greater depth.