

**DRAFT REPORT**  
**of the**  
**SCIENTIFIC AND STATISTICAL COMMITTEE**  
**to the**  
**NORTH PACIFIC FISHERY MANAGEMENT COUNCIL**  
**June 1<sup>st</sup> – 3<sup>rd</sup>, 2015**

The SSC met from June 1<sup>st</sup> through 3<sup>rd</sup> at Centennial Hall, Sitka, AK.

Members present were:

Farron Wallace, Chair  
*NOAA Fisheries—AFSC*

Robert Clark, Vice Chair  
*Alaska Department of Fish and Game*

Chris Anderson  
*University of Washington*

Jennifer Burns  
*University of Alaska Anchorage*

Sherri Dressel  
*Alaska Department of Fish and Game*

Brad Harris  
*Alaska Pacific University*

Anne Hollowed  
*NOAA Fisheries—AFSC*

George Hunt  
*University of Washington*

Seth Macinko  
*University of Rhode Island*

Steve Martell  
*Intl. Pacific Halibut Commission*

Lew Queirolo  
*NOAA Fisheries—Alaska Region*

Terry Quinn  
*University of Alaska Fairbanks*

Kate Reedy  
*Idaho State University Pocatello*

Matt Reimer  
*University of Alaska Anchorage*

Members absent were:

Milo Adkison  
*University of Alaska Fairbanks*

Alison Whitman  
*Oregon Dept. of Fish and Wildlife*

### **B-1 NS1 Guidelines**

Following the recommendation of the SSC in April 2015, an SSC subgroup met with representatives of the Council Workgroup to prepare a draft SSC report to the Council on the NMFS-proposed rule that makes changes to National Standard 1 Guidelines (and also National Standards 3 and 7). Participants were Terry Quinn (chair), Farron Wallace, Chris Anderson, and Anne Hollowed of the SSC; and Grant Thompson (AFSC), Gretchen Harrington (NMFS RO), Ben Fissel (AFSC); and Jim Armstrong (Council staff) of the Council Workgroup. The goal was to blend the Council Workgroup report to the SSC with SSC comments from the April SSC meeting. Following some discussion about the Workgroup report and the SSC comments, Jim Armstrong volunteered to extract the relevant material from the Council Workgroup report, and Terry Quinn agreed to blend the SSC comments into the extraction. The merged report was then sent to the participants for suggestions. Terry Quinn presented the draft report to the SSC. **The SSC was satisfied with the report and has placed the report in Appendix A of this report for the use of the Council in making its comment letter to NMFS, which is due June 30.**

Overall, “most of the proposed [NMFS] changes provide flexibility for the Council to adopt fishery conservation and management protocols that will align with region specific needs and concerns (April 2015 SSC Report).” However, the SSC has identified the places in the proposed rule that it believes need further clarification or that may not be appropriate for NPFMC or in general.

## **C-1 BSAI Crab**

At this meeting, the SSC is providing the OFL/ABC recommendations for three crab stocks (Tables 1 and 2). We also received a presentation on Plan Team modeling advice on EBS snow and Tanner crab, Bristol Bay red king crab, Pribilof Island red king crab, and St. Matthew Island blue king crab, and recommendations on a variety of other issues. Bob Foy (NMFS AFSC) and Jack Turnock (NMFS AFSC) presented Crab Plan Team (CPT) recommendations for these three stocks, model reviews, and CPT discussions on other issues.

### General recommendations

Previously, the SSC recommended the Plan Teams conduct a workshop on uncertainty to address procedures for assigning ABC buffers for data-poor stocks. The SSC is glad to see a workshop is planned for fall 2015 and notes that the May 2015 Lowell Wakefield Symposium on data-poor stocks provided ideas for methods that could be used. Presentations from this symposium can be accessed on-line and manuscripts are currently in review.

The SSC would like to reiterate a request to stock assessment authors for consistency in units used in the assessment. The SSC appreciates the author's inclusion of standard and metric units in the text, but requests consistency in which units are used (e.g. lb, thousand lb, or million lb and t, mt, or kg). The SSC also requests consistency in what units are chosen for tables and figures, requests that the units cited in the table legends match the values in the tables, and suggest authors refer to the terms of reference for chapters.

Dr. Foy summarized the crab plan teams' meeting including a recommendation to all assessment authors that all final assessments consider stepwise changes to data and individual model runs such that the effects of a single change to the model structure or data elements on estimates of stock status and catch recommendations can be evaluated. **The SSC also endorsed this recommendation.** The SSC also heard reports from the CPT on model developments for other crab species, a proposed survey plan for the AIGKC, and updates on the developments of a General Model for Alaskan Crab Stocks (or GMACS).

The SSC encourages the continued efforts to bring the assessment model for AIGKC to the plan team and SSC for approval.

### Aleutian Islands Golden King Crab

Dr. Robert Foy presented the Crab Plan Team report on the Aleutian Island Golden King Crab (AIGKC). There was no public testimony for AIGKC. The AIGKC stock is assessed under Tier 5 and OFL recommendations were based on the same approach used in 2012/13. The CPT recommends a 25% buffer for this stock. There is no approved stock assessment model for this stock, therefore there are no estimates of MMST or mature male biomass. **The SSC recommends adopting the Crab Plan Team OFL recommendation of 5,690t (12.53 Mlb) and the ABC recommendation of 4,260t (9.40 Mlb).**

The CPT had a number of other recommendations including: splitting the CPUE trend data into areas east and west of 174 degrees so that trends in CPUE can be tracked in the Tier 5 assessment. **The SSC also endorses this recommendation.**

**In addition the SSC endorses** efforts by ADF&G to conduct a cooperative survey, which the SSC believes will be helpful in improving this assessment.

#### Pribilof Islands Golden King Crab

**The SSC concurs with the author and CPT that the Pribilof Island golden king crab (PI GKC) stock be managed as a Tier 5 stock for the 2016 season with a recommended OFL of 91 t.** While the SSC has raised concerns about the relatively short time period for the OFL estimation in the past, using the 1993 through 1998 time period is consistent with recent assessments. Since complete data from all crab fisheries in 2014 are not presently available, total catch in 2014 cannot be estimated for comparison with the 2014 OFL and ABC at this time, but will be updated for the September CPT meeting. Retained catch and total catch are often confidential throughout the fishery history due to limited participation. **The SSC shares the CPT's concern about not having an estimate of harvest in years when the catch was confidential and supports the CPT recommendation that the author add notation to tables specifying whether or not the GHL was reached. The SSC also requests that the author approach the harvester(s) regarding whether they would voluntarily allow confidential data to be presented in assessments.** No overfished status determination is possible for this stock, given the lack of a biomass estimate.

The PI GKC is managed on a calendar-year basis and currently bycatch from groundfish fisheries is reported by crab fishery year (July-June) instead of calendar year. **The SSC and CPT recommend that NMFS assess if it is feasible to provide groundfish bycatch data for the PI GKC by calendar year.**

The author and CPT recommended an ABC reduced by 25% from the maximum permissible. The rationale includes: 1) consistency with the uncertainty of other golden king crab assessments (e.g., Aleutian Islands GKC), 2) increased concern because of the cancellation of the 2014 EBS slope survey and 3) the sharp decrease in the estimated biomass in the Pribilof Islands area from 2010 – 2012 (the most recent data). **The SSC agrees with Crab Plan Team's recommendation for a 25% buffer due to uncertainty, resulting in an ABC of 68 t.**

In response to a SSC recommendation, an alternative Tier 4 assessment was intended to be presented to CPT in September 2014, but was not prepared due to the cancellation of the EBS biennial slope survey. **The SSC supports the CPT recommendation that a preliminary Tier 4 assessment be brought to September 2015 meeting using existing slope data and applying a Kalman filter approach.** The SSC requests that the author include a discussion in the Tier 4 assessment of what stock delineation was chosen (what slope data was used) and the reason for that delineation. **The SSC also asks that a Stock Structure Template be completed for PI GKC.**

The SSC appreciates the summary of PI GKC data from the EBS slope survey that is included in the current document and concurs with the CPT recommendation that future versions of the document should include a summary of available slope survey data with appropriate graphs and plots, regardless of whether the Tier 4 assessment is adopted or stock remains Tier 5. Although the slope data is not used for determining the Tier 5 OFL and ABC, it is particularly helpful due to the large amount of confidential catch data. NMFS will provide the author with slope survey CPUE data based on State statistical areas or

other stratification instead of the entire slope survey area because the entire survey extends beyond the Pribilof management area.

#### Western Aleutian Islands Red King Crab

The SSC reviewed the 2015 SAFE chapter for the Western Aleutian Islands red king crab (WAI RKC). Public testimony was provided by Linda Kozak (Golden King Crab Coalition). There is no assessment model for this stock. The WAI RKC fishery has been closed since the end of the 2003/04 season. In agreement with the CPT, **the SSC continues to recommend that this stock be managed as a Tier 5 stock for the 2015/16 season with an OFL of 54 t (0.12 million pounds)**. This OFL is based on the 1995/96 – 2007/08 average total catch, as recommended by the SSC in 2010. Catch in the 2013/14 season did not exceed the OFL; therefore, overfishing is not occurring. No overfished status determination is possible for this stock, given the lack of a biomass estimate.

In agreement with the author and CPT, the **SSC recommends a 40% buffer between ABC and OFL, resulting in an ABC of 32 t (0.07 million pounds)**. The 40% buffer was originally put in place by the SSC in 2012 for the 2013/14 season to allow for bycatch and groundfish prohibited species catch in non-directed fisheries and the proposed test fishery catch. The test fishery has not occurred, but industry is working with ADF&G to perform a “reconnaissance survey” for RKC in the vicinity of Adak during the September 2015 golden king crab fishery. No retention of RKC is planned, but handling mortality is expected and will be accounted for in the 2016/17 assessment.

The CPT recommended that as much biological data as possible be collected during the “reconnaissance survey” to help assess stock structure and that collecting genetic samples is a top priority. The SSC supports this recommendation and adds that the lack of survey design will require attention when trying to interpret data collected. The SSC appreciates the efforts to collect data for this stock since that is a topic suggested previously in SSC meetings.

The SSC concurs with the CPT recommendation that the author try to recover length and effort information in historical data to inform an assessment and to provide a plot of CPUE through time in the 2016/17 assessment, if possible.

The Alaska Board of Fisheries in March 2014 established two districts for the management of commercial red king crab fisheries west of 171° W longitude. The Adak District was established from 171° to 179° W longitude, and the Petrel District was established west of 179° W longitude. There is interest by industry to split the annual OFL for WAI RKC, but the SSC cannot provide a recommendation on this issue until there is additional information on the status of this stock. The SSC supports recommendations by the CPT for analyses to inform this issue:

1. “During the reconnaissance survey, take genetic samples to determine if a genetic difference occurs across Amchitka Pass and measure crabs to identify size distribution.
2. Investigate if Amchitka Pass as a potential stock boundary. Research could address movement of larvae using models and what is known about currents. The oceanographic models may not work well in the Aleutian region because of boundary issues and because of the extent of models that are currently available.

3. Use the template from the AFSC Stock Structure Working Group to evaluate red king crab stock structure and extent of available information.
4. Data are needed on crab abundance throughout the Aleutian Islands. A more standardized pot survey would be needed after the planned reconnaissance survey before a fishery could be prosecuted.
5. A larger analysis could be conducted to identify if there is evidence for stock boundaries in this area.”

Table 1. SSC recommendations for three crab stocks for 2015/16. Dark shaded fill indicates parameters not applicable for that tier. Light shaded sections are to be filled out for the final SAFE in September 2015. Values are in thousand metric tons (kt).

Chapter	Stock	Tier	Status (a,b,c)	F <sub>OFL</sub>	B <sub>MSY</sub> or B <sub>MSYproxv</sub>	Years <sup>1</sup> (biomass or catch)	2015/16 <sup>2 3</sup> MMB	2015 MMB / MMB <sub>MSY</sub>	γ	Mortality (M)	2015/16 OFL	2015/16 ABC	ABC Buffer
1	EBS snow crab												
2	BB red king crab												
3	EBS Tanner crab												
4	Pribilof Islands red king crab												
5	Pribilof Islands blue king crab												
6	St. Matthew Island blue king crab												
7	Norton Sound red king crab												
8	AI golden king crab	5				See intro chapter					5.69	4.26	25%
9	Pribilof Islands golden king crab	5				See intro chapter					0.091	0.068	25%
10	Western AI red king crab	5				1995/96–2007/08					0.054	0.032	40%

<sup>1</sup> For Tiers 3 and 4 where B<sub>MSY</sub> or B<sub>MSYproxv</sub> is estimable, the years refer to the time period over which the estimate is made. For Tier 5 stocks it is the years upon which the catch average for OFL is obtained.

<sup>2</sup> MMB as projected for 2/15/2016 at time of mating.

<sup>3</sup> Model mature biomass on 7/1/2015

Table 2. Maximum permissible ABCs for 2015/16 and SSC recommended ABCs for three stocks where the SSC recommendation is below the maximum permissible ABC, as defined by Amendment 38 to the Crab FMP. Values are in thousand metric tons (kt).

Stock	Tier	2015/16 <i>MaxABC</i>	2015/16 ABC
EBS Snow Crab			
Bristol Bay RKC			
Tanner Crab			
Pribilof Islands RKC			
Pribilof Islands BKC			
Saint Matthew BKC			
Norton Sound RKC			
Aleutian Islands GKC	5	5.12	4.26
Pribilof Islands GKC <sup>1</sup>	5	0.08	0.07
Western Aleutian Islands RKC	5	0.05	0.03

<sup>1</sup> For Pribilof Islands golden king crab, this is for the 2016 calendar year instead of the 2015-2016 crab fishing year.

### 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 is 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 realistic 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 from the industry.
- 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 1 pound of U26 bycatch results in a 1 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 bycatch 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 bycatch 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



bycatch 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 described in the analysis. Gross performance estimates, as presented in both the simulation and Appendix B models, of operational responses to reduced PSC threshold changes may be naïve and misleading. A profit maximizing operator will use informed expectations of the “net” result of their response. 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 serious impact evaluation 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 underestimated the potential impacts. The analysis is lacking any consideration of potential impacts of halibut PSC savings on recreational users of halibut (both charter and unguided).
- 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 halibut. It likely underestimates the number of communities dependent on halibut and those 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 is 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 use 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.

### **C-3 Observer Program Supplemental EA**

The SSC received presentations from Gretchen Harrington, Cathy Tide, and Jason Gasper. Public testimony on C3 and C4 were provided by Paul Olson (The Boat Company); Jon Warrenchuck (Oceana); Dan Falvey (ALFA); Julie Bonnie (Alaska Groundfish Data Bank); Robert Savage (CBSFA); Bob Alverson (FVOA).

This supplemental EA was prepared in response to a court order to consider whether the observer deployment plan under the revised program is likely to yield high quality and reliable data. This concern is raised because overall observer coverage rates have declined due to actual costs being higher than projected costs, and year-to-year variation in the landings-based fee revenue that supports the program.

The Supplemental EA adopts the notion that data quality and reliability is measured by whether the sample is representative of the post-strata relevant for in-season management. This measure is chosen because it was the primary reason for restructuring the observer program. The analysis clearly conveys that there is adequate evidence to show that revised observer deployment plan is unbiased from a design perspective, that the restructured program achieves its goal of expanding the sampling frame to include vessels under 60ft and vessels targeting halibut, and as such it substantially improves the representativeness of the data collected. **The SSC is satisfied that the Supplemental EA adequately addresses the statement of need.**

The analysis explores the realized effects of the smaller than expected sampling rates by examining the possibility that a post-stratum lacks an observed trip. At rates comparable to the 16% which have been possible with fee revenue, it was shown that there are observed trips to match with 97-98% of the trips taken within the sampling frame. At lower partial coverage (i.e. sampling rates below 10%), a much higher number of trips are unmatched. Thus the Supplemental EA shows that, at the current

deployment/coverage rates, the data is credible and reliable in that it captures activity throughout the sampling frame.

In addition, the SSC recognizes that the quality of the data returned by the revised program will continue to improve as the ADPs are developed and refined. As the program evolves, the SSC encourages the analysts to evaluate the small sample statistical properties of the estimators derived from the observer data. Coverage probability and estimator variance at alternative sample sizes will be important factors in interpreting the products of the observer program. Many measures (e.g., total catch) used for in-season management sum over post-strata, and thus the best measures will incorporate differences in means and variances across post-strata into their sampling plans. The SSC acknowledges that estimating the variance in these parameters is not straightforward, and appreciates the time and thought that the analysts have already invested in this area. The SSC also notes that because observer data is used in a number of ways (catch accounting, in-season management, biological sampling), designing an unbiased deployment plan will likely involve making tradeoffs in quality among the multiple measures produced by the observer program.

#### **C-4 Observer Program Annual Report**

A presentation was given by Craig Faunce (NMFS-AFSC) on the North Pacific Groundfish and Halibut Observer Program Annual Report (Annual Report). Public testimony was provided by Paul Olson (The Boat Company), Jon Warrenchuk (Oceana), Dan Falvey (ALFA), Julie Bonney (AGDB), Robert Savage (CBSFA), and Bob Alverson (FVOA).

The SSC received the second Annual Report of the revised observer program, which pertains to trips observed during 2014. We acknowledge the dedication and tireless work of the observer program staff to provide this information. The Annual Report is concise and well written. It provides useful information on the implementation of the restructured observer program in 2014 and is largely responsive to SSC comments about the program provided during the February and June 2014 meetings. Observer-collected data provide essential biological samples and fishery-dependent information for management of sustainable fisheries in waters off Alaska. The Annual Report provides an overview of the program, including coverage levels, description of the fee collection program, programmatic and contract costs, compliance and enforcement, as well as metrics on the performance of the deployment plan. The overview provided by the analysts and the SSC focused primarily on the performance metrics provided in the report. The SSC greatly appreciates the enhanced analysis of selection and observer effects that can be the cause of biases with respect to differences between observed and unobserved trips. The analyses revealed that there is the potential for bias in landed catch for the hook and line and trawl fleets in the trip selection stratum. It appears that observer and temporal effects are more important than spatial effects in terms of bias.

The SSC offers the following comments and recommendations to the Council:

- As stated previously by the SSC, we agree with the analysts' decision to discontinue the vessel-selection method for the large vessel stratum and to create two vessel-length based strata, each using trip selection. This was the sampling method used in 2015.
- **The SSC recommends developing the necessary procedures for calculating the variances associated with point estimates.**

- While we agree with the analysts that it is not the sole determinant of quality of the sampling program, there is a critical need to calculate the variances associated with the point estimates (e.g. target catch, by-catch) to aid with optimization of the observer deployment sampling design and to assess uncertainty in estimates of catch. For example, the observer effect detected in landed catch in the HAL and TRW gears could have been better assessed for significance if there had been variances of these landed catches. In this way the potential for bias detected by the observed versus unobserved trips could be weighed against measurement error in the estimates of landed catch for these two gears. Variances would also aid assessment authors in their understanding of the uncertainty associated with estimates of catch.
- **The SSC recommends that the appropriate level of stratification for sampling beyond, or as a replacement for, vessel length.** There was discussion of the potential for stratifying by gear type and or area. Matching the sampling design stratification with the needs of the assessment and management processes is required to optimally use the observer deployment budget.
- **The SSC recommends that sampling issues with tendered trips be addressed. There is a critical need that regulatory action be considered.** Our primary concerns are with the potential for bias caused by trips that are tendered versus those that are not, and the inability to collect a representative sample of PSC catch of salmon from tendered trips.
- The report detailed problems associated with trip cancellation in the Observer Declare and Deploy System (ODDS). Selected trips were cancelled at nearly four times the rate of trips not selected. However, this may be a function of the ODDS software which requires selected trips to be cancelled and rescheduled while the dates of unselected trips can be changed. **The SSC recommends that the policy of allowing trip cancellation and logging multiple trips prior to sailing be reevaluated.**
- **The SSC recommends that methods to link data from the ODDS to the e-Landings system be developed.** Inclusion of a trip identifier is required for some data analyses.

The SSC offers the following recommendations to the Observer Program:

- This year we were provided with an overview of Chapter 3 (Performance Review) at the meeting. While the material is provided in the written report, the SSC would also like to see an overview of Chapter 5 (Compliance and Enforcement) given in future reviews of the Annual Report.
- Evaluate performance relative to the success of observer deployments. For example, report on that statistics associated with numbers of successfully completed trips versus total observed trips, and differences in trip metrics associated with trips where there were observer complaints versus those without complaints.
- The SSC is particularly concerned that reported instances of observer intimidation and crew tampering of the observer environment (e.g., hiding halibut) could prevent the collection of accurate and unbiased information. The high level of reported incidences of intimidation should be addressed immediately and stopped. These acts should never occur.
- Examine the potential association of prohibited species catch (PSC) with trip attributes on observed vessels. If associations are found, PSC rates in shoreside offloads from unobserved vessels could be compared for evidence of bias. We recognize that accounting for PSC of rarely encountered species (e.g., birds, mammals) is difficult and will likely require alternative methods such as design-based estimators.

- We encourage the analyst to work with Catch Accounting System staff for potential steps for identifying the appropriate trip target to minimize trip targets resulting from the ‘largest proportion’ protocol.
- We request that a specific section with responses to SSC comments be provided in the written report, as is done for SAFE documents.
- Consider, as a first-step, the calculation of variance using standard multi-stage cluster sampling (Thompson 2012), wherein the stage-specific variance is calculated along with the mean.
- In addition to sample size needs for spatial and temporal coverage, develop accuracy and precision objectives for catch and bycatch.
- Use of the term “non-target” should be better defined within the trip definition.

### **D-1 Research Priorities**

Jim Armstrong (Council Staff), Anne Hollowed (SSC sub-group) and Sherri Dressel (SSC sub-group) presented the proposed revisions to the research priorities database that were developed by the SSC subgroup and the Crab and Scallop Plan Teams. Michelle Ridgeway (Oceanus Alaska) provided public testimony.

In recognition of the importance of clearly stating the NPFMC’s research priorities, the Council elected to develop a standardized method for ranking research priorities. In addition, the NPFMC developed a database to retain a history of the Council and Plan Team rankings for research priorities and to provide easy access to research priorities. The SSC used the research priorities database for the first time in 2014 and we had several recommendations for improvement. In April 2015 the SSC reviewed the new categories for prioritizing research that were developed by a sub-group of Council, Plan Team and SSC members. The SSC and Council accepted the following categories for research priorities: Critical Ongoing Monitoring, Urgent, Important (Near-term), and Strategic (Future Needs).

The SSC formed a subgroup of the SSC and Council staff to review the existing research priorities and rank these using the revised categories. The subgroup included representatives from Council Staff (Jim Armstrong), academia (George Hunt, Terry Quinn, and Matt Reimer), ADF&G (Sherri Dressel), and NMFS (Anne Hollowed). The SSC-subgroup met in early May to review all of the existing research priorities. This list incorporated the proposed consolidations and deletions recommended in June 2014.

The SSC discussed the SSC-subgroup revisions and the proposed changes requested by the CPT and SPT. Sherri Dressel also described how ADF&G would use new information derived from selected research themes relevant to some crab and scallop stocks. The SSC made a few modifications to the SSC-subgroup list and is now providing our recommendations on research priorities to the Council for its use in determining its research priorities.

In general, the SSC found that most of the research priorities could be categorized using the new system. In a few cases, projects required re-phrasing to separate the strategic, long-term and short-term elements of a single consolidated entry. The SSC continues to struggle with finding a balance between a long and comprehensive list of all of the specific research projects considered by the Council’s scientific advisory bodies and striving to identify research themes that are relevant to a number of science questions. The SSC agrees with the CPT’s recommendation that when research topics are consolidated, that an additional

column be added to the database to indicate some of the high priority species that might be candidates for targeted research under a consolidated research theme. The proposed modifications to the research priorities list are provided as a separate document to the SSC minutes.

The SSC reiterates that its recommendations be retained and accessible in the database for comparison in future years and we recommend that the priorities generated by each of the Plan Teams be accessible for each project.

The SSC added three new research priorities all relevant to halibut: a) a priority focused on the collection of relevant socio-economic information from halibut fishery-dependent communities; b) a focused study on factors underlying fishers responses to halibut PSC caps, and c) a research project focused on quantifying the relative importance of historical closed areas in the vicinity of the Pribilof Islands as juvenile nursery habitat for halibut relative to other regions coast-wide.

Jim Armstrong reported that the Council plans to prioritize research relevant to the management goals and objectives of the North Pacific Fishery Management Council. He reported that a potential starting point for this exercise might be a review of the goals and objectives for the NPFMC as identified in the PSEIS. The SSC would benefit from this prioritization of management issues and they will consider ways to incorporate this information into future reviews of research priorities.

## **D-2 Adak Crab Offload**

The SSC received a presentation by Sarah Marrinan (NPFMC). Public testimony was offered by Dave Fraser (ACDC) and Linda Kozak (Golden King Crab Coalition). The document is an initial draft of an EA/RIR/IRFA for a potential regulatory exemption that would allow vessels participating in the Western Aleutian Islands golden king crab (WAG) fishery to continue fishing after offloading a portion of their retained catch. Under current regulations, a vessel participating in a crab rationalization fishery is not permitted to deliver a portion of their retained harvest to a processor and subsequently resume fishing for additional crab.

The SSC appreciates the effort staff have demonstrated in interpreting recent Council discussions and public testimony on this action to craft an initial document for Council consideration. If the Council intends to proceed with evaluation of this action, the SSC recommends that the Council formally adopt a Purpose and Need statement, and articulate its objectives for this proposed management change.

Assuming the Council adopts a Purpose and Need statement and alternatives that are equivalent with those assumed by the authors of this draft, the SSC believes that this initial draft does an effective job of identifying the key elements of the action; characterizing the context within which the action would be implemented; specifying how and to whom the expected benefits and costs of the management change may accrue; enumerating enforcement concerns; and assessing the potential for significant adverse economic impacts to be imposed upon directly regulated small entities. Given that the original intent of the regulation under consideration is to prevent highgrading, the document would benefit from further elaboration on why a regulatory exemption is not expected to increase the likelihood of discarded deadloss. Moreover, the analysis would be more complete with a discussion of how allowing vessels to

continue fishing after a partial delivery would affect (if at all) how observers are deployed and any potential related effects on the amount of observer coverage for the vessels under consideration.

The analysis addresses an action alternative that would be limited exclusively to the Western AI golden king crab fishery. If the Council limits action on this item to that area and fishery, the SSC recommends release of this draft for public review (presumably after the Council adopts a Purpose and Need statement and alternatives). The SSC offers this caveat because when the draft discusses enforcement considerations, it is suggested that the partial offload exemption perhaps should be considered for extension to all Crab Rationalized fisheries. If this action alternative is adopted for analysis, the present draft is not sufficiently complete for public review.

### **D-3 Pacific Cod Modeling Report**

Dr. Grant Thompson (AFSC) presented a report about the first of three stages of stock assessment of Pacific cod in the three areas eastern Bering Sea (EBS), Aleutian Islands (AI), and Gulf of Alaska (GOA). In this stage, a committee reviews models used in the previous year, examines proposals for new models and analyses, and recommends a suite of models and analyses to be used. Gerry Merrigan (Freezer Longline Coalition) gave public testimony. **The SSC agreed that this suite of models was appropriate and practicable and had no suggestions for additional models and analyses.**

Members of the SSC were confused by the model numbering, which often gets changed when going from the preliminary analysis (second stage, reviewed in September/ October) and the final analysis (third stage, reviewed in November/ December). The source of confusion in this case was the renaming of models between assessment cycles. For example, this year's proposed Model 2 was the same as last year's proposed Model 6. Previously, the SSC recommended numbering Model 0 as last year's base model and Model 1 as last year's base model with only updated data. **The SSC recommends that the Groundfish Plan Teams further refine the numbering system to avoid confusion and ensure that the origin of the model can be traced back to the original derivation. Our initial suggestion is to keep the numbering system the same throughout all three stages of the annual stock assessment cycle.**

During the first-stage committee review, it was suggested that the time series of the ratio of catch to survey biomass be examined as metric of model suitability. The SSC could not interpret this metric biologically and rather prefers to use the standard metrics of model performance in the stock assessment to guide its selection of useful model(s). Discussion ensued about the desirability of the ensemble model approach of Stewart and Martell (2015) to improve stock assessment. As this issue is general to all stock assessments, it was deferred to a later time.

Stewart, I. J., & Martell, S. J. (2015). Reconciling stock assessment paradigms to better inform fisheries management. *ICES Journal of Marine Science: Journal du Conseil*, fsv061.



## **SSC Comments on Proposed Revisions to the Guidelines for National Standards 1, 3, and 7 of the Magnuson-Stevens Fishery Conservation and Management Act**

### ***Background***

On January 20, 2015 NMFS published a proposed rule (80 FR 2786) for revisions to National Standards (NSs) 1, 3, and 7 with a June 30, 2015 comment deadline. The revisions are described by NMFS as a product of lessons learned since the implementation of annual catch limits (ACLs) and accountability measures (AMs). NMFS states that the purpose of the proposed changes is to facilitate compliance with requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) “without establishing new requirements or requiring Councils or the Secretary to revise their Fishery Management Plans.” The objectives of the revisions are “to improve and clarify the guidance within the NS guidelines, address concerns that have been raised during the implementation of [ACLs] and [AMs], and provide flexibility to address fishery management issues.”

In response to the proposed rule, the North Pacific Council formed a special working group to review the proposed rule and develop draft comments on the proposed revisions. Those comments were reviewed by the SSC during the April 2015 Council meeting; and the SSC and Council were also given a presentation on the proposed revisions by Wes Patrick of NMFS Headquarters. In its consideration of the draft comments and presentation, the SSC identified a few additional or complementary issues that it wished to communicate to the Council in addition to its endorsement of the working group’s comments. It appointed a subgroup of the SSC to work with the NS1 subgroup to blend all comments into a single report. After review by the whole SSC at the June 2015 meeting, the SSC offers this report to the Council for its review at the June 2015 Council meeting, where the Council will develop a comment letter to NMFS headquarters.

The SSC comments below are arranged according to the enumerated topics in the proposed rule preamble. Additional editorial remarks are also provided in an attached redline version of the proposed rule.

### ***III. Goals and Objectives of Fishery Management Plans (FMPs).***

#### **Amended Section(s): 600.305(b)**

#### **Comments:**

600.305(b)(2) - The proposed rule suggests that Councils “should reassess the objectives of the fishery on a regular basis.” “Fishery objectives” are not addressed or mandated by the MSA, but the Council routinely reviews the “management objectives” within its groundfish FMPs and is considering doing so for its other FMPs. Within the revised guideline language itself, the added text is vague and open-ended in terms of the expected periodicity of review. We recognize that, because of the wide spectrum of objectives in FMPs, it would be difficult to develop specific criteria to guide the frequency of reassessments. Appropriately developed FMP objectives should not have to be revisited very often. If, however, the intent of this modification is to encourage action from Councils with outdated objectives in their FMPs, then this proposed change could accomplish that.

The term “objectives of the fishery” is different than that used in the preceding paragraph 600.305(b)(1) (“management objectives to be obtained in regulating the fishery”) and the following paragraph 600.305(b)(3) relating objectives to the management process and problems of a particular fishery, while proposed 600.310(e)(3)(iii)(B) that says “Councils should consider the management objectives of their FMPs...”.

*Suggested Improvement:*

Replace “objectives of the fishery” in paragraph 600.305(b)(2) with “FMP’s management objectives.”

***IV. Stocks That Require Conservation and Management***

**Amended Section(s): 600.305(c), 600.305(d), 600.340(b)**

**Comments:**

600.305(c) - This section is entirely new except for items (iii) and (vi)-(x) of the enumerated factors in paragraph (1) and one sentence in paragraph (2) regarding identification of ecosystem component (EC) species at either the species or stock level. Subsection (c)(3) is responsive to the Council’s/SSC’s interest in including stocks as EC in FMPs if they do not require conservation and management, while Subsection (c)(4) allows inclusion of stocks as EC in FMPs that do not directly manage those stocks, even if those stocks are overfished.

600.305(c)(1) - This paragraph includes a (non-exhaustive) list of ten factors that “should be used by a Council when deciding whether stocks require conservation and management,” six of which were taken from the existing guidelines for NS7 (existing paragraph 600.340(b)(2)). The first factor in the list reads, “the stock is an important component of the ecosystem.” Although paragraph 600.305(c)(2) states that “no single factor is dispositive,” the inclusion of ecosystem importance as the first factor listed in paragraph (1) and its identification in paragraph (2) as one of the first three factors to consider may give the impression that all important components of the ecosystem require specification of maximum sustainable yield (MSY), optimum yield (OY), acceptable biological catch (ABC), ACL, and status determination criteria (and all other MSA 303(a) required provisions). It is not clear what problem the addition of the list in paragraph (1) is intended to solve. If the goal is to provide the Councils with more flexibility to include stocks not currently managed under FMPs, this can be accomplished without adding a list that might easily be interpreted as requiring all stocks caught to be included in FMPs. Instead of simply providing more flexibility, this list may appear to remove any discretion by the Council to decide that a stock does not require conservation and management, thereby requiring the MSA 303(a) provisions for every stock caught in every Federal fishery.

600.305(c)(3) - The proposed rule deletes the four existing criteria for determining whether a stock can be included in the EC (must be a non-target, must not be overfished, must not be likely to become overfished, must not be generally retained), thus providing significant new flexibility. To this extent, the proposed rule is responsive to the SSC’s comment on the advanced notice of proposed rule (ANPR) that the guidelines should allow overfished stocks to be listed in the EC of an FMP if those stocks are managed primarily under another FMP. However, paragraph (4) of the proposed rule suggests that such stocks should be identified as “other managed stocks” rather than being included in the EC. Paragraph (3) is also confusing in that EC species are defined as FMP species not requiring “conservation and management,” yet the same paragraph states that they can be the object of “management measures” designed to minimize bycatch, protect their role in the ecosystem, and “other.”

The proposed rule is not responsive to the SSC’s ANPR request for clarification regarding the need to protect species even if they are not “in” an FMP and the Council’s ability to do so without adding them to the species that are “in” the FMP.

While most of the existing provisions of the NS7 guidelines at 600.340(b) were moved to proposed 600.305(c), two concepts of the NS7 guidelines were deleted, 600.340(b)(1) and 600.340(b)(2)(vii):

- 600.340(b) Necessity of Federal management—(1) General. The principle that not every fishery needs regulation is implicit in this standard. The Magnuson-Stevens Act requires Councils to prepare FMPs only for overfished fisheries and for other fisheries where regulation would serve some useful purpose and where the present or future benefits of regulation would justify the costs....
- 600.340(b)(2)(vii) The costs associated with an FMP, balanced against the benefits...

The preamble to the proposed rule does not explain why these concepts were deleted. Unless the goal is to require specification of status determination criteria, EFH, and all MSA 303(a) required provisions for all species, the Council would benefit from having guidance that allows a balance of costs and benefits and consideration of whether management serves some useful purpose. This is particularly important with the addition of proposed 600.305(c)(1)(i) and (ii), which basically encompass everything caught in every fishery.

Overall, the proposed rule misplaces the emphasis on “stocks” requiring conservation and management, whereas the Act is explicit that a “fishery” is to be the subject of conservation and management. The following text describes an alternative approach to this issue that is simple, sensible, fully protective of both target and non-target stocks, and explicitly consistent with the language of the Act (note that this is intended as a description of an overall approach rather than as substitute text for a particular section of the proposed rule; adoption of this approach would probably require an extensive rewrite of several parts of the proposed rule):

“A management plan must be developed for a fishery if, absent Federal management, the fishery is not expected to be prosecuted in a manner that results in achievement of optimum yield, prevention of overfishing of the target stocks, and protection of the marine ecosystem (or results that are reasonably equivalent to these). All stocks targeted by the fishery must be identified in the FMP, with the understanding that references to ‘stocks’ in MSA 303(a) apply to those stocks only. References to ‘fishery’ in MSA 303(a) may be interpreted as applying to individual stocks or groups of stocks within the set of target stocks, or to any fishing for such stocks, to the extent that the context allows. In addition to containing all items required by MSA 303(a), the FMP must contain conservation and management measures sufficient to protect the marine ecosystem from the effects of the managed fishery. The ‘marine ecosystem’ is understood to consist of all non-target species impacted directly or indirectly by the fishery as well as all physical features of the marine environment impacted directly or indirectly by the fishery. While protection of the marine ecosystem is mandatory, Councils have flexibility in determining how to accomplish this goal. For example, in providing protection to non-target species, reference points based on MSY may or may not be relevant or necessary. Listing a particular non-target species in the FMP is not a prerequisite for providing protection to that species; neither does failing to list non-target species exempt a Council from its obligation to protect them. Moreover, listing a non-target species in the FMP does not thereby create a requirement to include all MSA 303(a) items for that stock.”

*Suggested Improvements:*

600.305(c)(1) - Either strike the list of ten factors; or, if the list in paragraph (1) is to be retained, item (vii) of the existing list in paragraph 600.340(b)(2), which recognizes the need to consider the costs of including a stock in an FMP, should be added (it is deleted in the proposed rule). Also, consider moving (iv) to the top of the list because this should be the primary factor in determining whether a stock requires conservation and management. This new section could result in FMP amendments to add new stocks to

FMPs and establish status determination criteria, and all other 303(a) required provisions, for stocks that meet these new broad criteria.

600.305(c)(2) - This paragraph should be revised to include the possibility of removing a stock from an FMP, to read “(2) When considering whether a stock should be added to or removed from an FMP....” This would make (c)(2) consistent with (c)(5).

600.340(b) - Retain provisions 600.340(b)(1) and 600.340(b)(2)(vii) in NS7 in order to preserve guidance that acknowledges that the decision to include a species in an FMP will involve evaluation of costs and benefits.

Rewrite the proposed rule from the perspective of the alternative approach described above.

#### ***V. Data Limited Stocks***

##### **Amended Section(s): 600.310(e)(2)(ii) , 600.310(h)(2)**

##### **Comments:**

600.310(e)(2)(ii) - The proposed rule includes new options for proxies that can be used in place of the standard status determination criteria in cases where data are especially sparse or uninformative. The insertions represent improvements, as they acknowledge the reality that certain currently required reference points simply cannot be estimated in data-poor situations, and they identify achievable alternatives. Although these changes are not directly responsive to the SSC and Council comments on the ANPR, other language in the proposed rule does suggest that not all stocks require conservation and management.

#### ***VI. Stock Complexes and Indicator Stocks***

##### **Amended Section(s): 600.310(d)(2), 600.310(e)(1)(iii)**

##### **Comments:**

600.310(d)(2)(i) - The current definition of “stock complex” is, “a group of stocks that are sufficiently similar in geographic distribution, life history, and vulnerabilities to the fishery such that the impact of management actions on the stocks is similar.” The proposed rule retains this definition (with some non-substantive modifications), but prefaces it with the phrase, “Where practicable.” While providing somewhat greater flexibility, the addition still implies that the current definition should normally apply, which seems a bit contrary to the argument used to modify the current definition in the first place (viz., that the methods used to identify stock complexes in practice often differ from the current definition; see preamble to the proposed rule).

600.310(e)(1)(iii) - The existing suggestion that MSY for a stock complex “should” be estimated on a stock-by-stock basis is proposed to be replaced by a suggestion that it be estimated for one or more indicator stocks or the complex as a whole. This is an improvement, given that non-indicator stocks are often data-poor, making estimation of MSY difficult if not impossible.

#### ***VII. Aggregate Maximum Sustainable Yield (MSY) Estimates***

##### **Amended Section(s): 600.310(e)(1), 600.310(e)(3)**

##### **Comments:**

600.310(e)(1) - The proposed rule retains the requirement that each FMP include an estimate of MSY for the stocks and stock complexes that require conservation and management, and adds that MSY “may also” be specified for the fishery as a whole. “Also” implies that specification of MSY at the fishery level is in addition to, rather than a substitute for, specification at the stock/complex level. This goes beyond the requirement of the Act, which states simply that MSY must be assessed and specified for the fishery.

*Suggested Improvement:*

Replace “MSY may also be specified for” with “MSY may alternatively be specified for” at 600.310(e)(1).

***VIII. Developing a Definition for ‘Depleted’***

**Amended Section(s): 600.310(e)(2)(i), 600.310(e)(2)(ii)**

**Comments:**

600.310(e)(2)(i)(F) - The proposed rule allows for a distinction between “Depleted” and “Overfished” stocks that have fallen below the MSST. Attempting to clearly distinguish environmental impacts from fishery- induced impacts is a complex undertaking. Unless there is a clear reason why the actions of the Council would differ under these two definitions, it is not clear why additional nomenclature is needed. Previous comments by various SSCs and Councils have suggested the **replacement** of “overfished” with “depleted”, not the addition of “depleted”, because “overfished” gets used for stocks for which no overfishing ever took place. Given the difficulty of separating environmental effects from fishing effects on the status of the stock, the proposed rule’s attempt to tie the term “depleted” to stocks that meet stringent conditions that tie the low stock condition to environmental effects effectively creates the addition of the new term “depleted” that has no role in the process of setting ABCs and overfishing levels (OFLs) and of any fisheries management measures.

The definition of “depleted” in the proposed rule is: “An overfished stock or stock complex is considered depleted when it has not experienced overfishing at any point over a period of two generation times of the stock and its biomass has declined below MSST [minimum stock size threshold]....” NMFS is attempting to address the ongoing concern that “the term ‘overfished’ implies that fishing is the sole cause for a decline in stock biomass, when other factors such as environmental conditions may be the leading cause for the stocks biomass decline....” However, the proposed revision does not accomplish the purpose, because it says that only an overfished stock or stock complex can be considered depleted under the proposed rule. It would be better to add an option for a stock that has declined below MSST for reasons other than overfishing. It does not make sense to say that a stock is overfished when it has never been subjected to overfishing.

600.310(e)(2)(ii) - The proposed rule changes the definition of MSST by eliminating the requirement for rebuilding to BMSY within 10 years and instead adding this to a list of several new factors that “could” be considered when specifying MSST: life history of the stock, long-term natural fluctuations expected when fishing at maximum fishing mortality threshold (MFMT), socio-economic impacts associated with rebuilding to BMSY, international agreements, and “other” factors. While these changes would not necessitate revising the MSST specifications currently contained in the NPFMC’s FMPs, they would provide additional flexibility should the Council wish to revisit those specifications.

*Suggested Improvement:*

Change the new “depleted” sub-category of the “overfished” category to its own stand-alone category.

***IX. Developing an Alternative Definition of Overfishing To Include a Multi-Year Approach***

**Amended Section(s): 600.310(e)(2)(ii)(A)**

**Comments:**

Editorial improvements are suggested in the redline document.

## ***X. Revising Optimum Yield (OY) Guidance***

### **Comments:**

600.310(e)(3) - The proposed rule says that OY may be specified at the stock, stock complex, or fishery level. The phrase “FMP level” should be added to this list, since many FMPs cover multiple fisheries. A similar change should also be made in other sections (e.g., MSY) where appropriate.

600.310(e)(3)(iii)(B) - The potential factors listed in (B)(1)-(B)(3) are too loosely defined to provide and operational guidance on what factors to consider. Item (B) is list of factors to consider when determining (A), hence is more appropriately nested under (A).

600.310(e)(3)(iv)(A) - The proposed rule strikes the existing sentence, “All catch must be counted against OY, including that resulting from bycatch, scientific research, and all fishing activities,” but this is inconsistent with the proposed rule’s new language requiring that all these sources of mortality be taken into account when making status determinations, (600.310(e)(2)(ii)(C)). It should also be noted that the issue of how to account for all sources of anthropogenic mortality, which was highlighted in the ANPR, is not addressed in the proposed rule.

Because the overall issue remains unresolved, the specific sub-issues identified in the SSC’s associated ANPR comment are shown below:

“The guidelines state that all sources of fishing mortality must be accounted for. However, a number of points remain ambiguous, particularly with respect to removals from sources other than the directed fishery (hereinafter referred to as ‘other’ catches). Specifically, the guidelines should clarify each of the following points:

- When considering use of ‘other’ catches in assessment and management, it will be necessary to distinguish between:
  1. listing those catches but not using them for determination of catch limits,
  2. using those catches to estimate reference fishing mortality rates (F35%, etc.),
  3. using those catches to estimate reference harvest amounts (maxABC, OFL, etc.) given the reference fishing mortality rates, and
  4. including those catches in the total against which harvest specifications are compared.
- It will also be necessary to determine whether the use of ‘other’ catches should differ depending on the source of the removals (e.g., should research catches be treated differently from catches taken in non-directed commercial fisheries?).
- In the event that ‘other’ catches will be used to estimate either reference fishing mortality rates or reference harvest amounts, methods will need to be devised for doing so (e.g., does the calculation of F35%, etc., assume that ‘other’ catches are zero, that they are equal to the long-term average, or something else?).
- What to do about years for which ‘other’ catches were known to have occurred, but for which no direct estimate of magnitude is available (e.g., years in which surveys occurred but from which data no longer exist).
- What to do about sources for which ‘other’ catches were known to have occurred, but for which no direct estimate of magnitude is available (e.g., catches taken in recreational fisheries).
- Can Councils preempt scientific research by allocating the entire ACL to the commercial fishery?”

The proposed rule does not respond to the SSC's request for additional guidance on accounting for social and ecological effects. However, the existing text does include two fairly lengthy paragraphs on the types of social and ecological factors that might be appropriate to consider in the OY specification.

600.310(e)(iii) - The first sentence of the existing text reads as follows: "An FMP must contain an assessment and specification of OY, including a summary of information utilized in making such specification, consistent with requirements of section 303(a)(3) of the Magnuson-Stevens Act." The proposed rule would add a requirement that each FMP "documents how the OY will produce the greatest benefits to the nation and prevent overfishing." This change would require amendments to most, if not all, of the NPFMC's FMPs because they do not document how the OY will produce the greatest benefits to the Nation and prevent overfishing. Documenting how the OY will prevent overfishing seems contrary to NS1, which says, "conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery..." and inconsistent with the proposed guidelines at 600.310(f)(4)(iv) on the relationship between OY and the ACL framework.

The proposed rule is sufficiently vague in use of the phrase, "documents how the OY will produce the greatest benefits to the Nation and prevent overfishing," that there are a number of possible problematic implications of this new requirement. The new language (unless loosely interpreted to be equivalent to the existing text) requires changes to the FMPs that could be both significant and operationally infeasible. We elaborate on these concerns below.

The MSA defines OY, in part, as the yield that "will provide the greatest overall benefit to the Nation" (section 3(33)), which sets a very high bar. The main problem with the new requirement in the proposed rule is not its use of the statutory definition, but rather its mandate for documenting how the statutory definition has been satisfied in each FMP together with its lack of any guidance on how this can be accomplished in practice. Any specification of OY in practice will necessarily be an estimate, and use of proxy values will often be required, just as in specification of MSY. NMFS should commit to providing technical guidance as to the types and use of allowable proxies for specification of OY. Without such guidance, the proposed text could be interpreted as broadening the positive (practical) determination of OY to include factors which we currently have no practical means of defensibly estimating; thereby creating a burden that is untenable.

Requiring that FMPs must "document," as opposed to "summarize" (as prescribed in MSA), creates a regulatory burden that may not be appropriate for all FMPs. If the methods used to assess and specify OY are sufficiently simple in a given instance, it is conceivable that such documentation might reasonably fit within the FMP. However, it is easily conceivable that the methods used to assess and specify OY might be highly technical and span a great many pages, in which case it would be awkward to include full documentation within the FMP itself. Therefore, the language in the proposed rule should be amended to allow documentation either in the FMP itself or in other documents such as environmental assessments or regulatory impact reviews.

The MSA requires each FMP to "assess and specify" OY (section 303(a)(3)). Given this, it seems reasonable to assume that some sort of documentation would exist describing how the specified OY will provide the greatest benefit to the Nation. It is critical that we continue to make progress in accounting for previously unaccounted economic values in the specification of OY, but doing so without a clear, defensible methodology for many of the factors may put the cart before the horse and potentially undermine this objective. The proposed text goes beyond what should be its intent, namely, achieving more comprehensive documentation so that we might determine whether an alternative specification would produce greater "benefits to the Nation."

*Suggested Improvement:*

The final rule should retain the existing text in 600.310(e)(iii) and NMFS should provide a technical guidance document describing in precise and pragmatic terms whether and how any existing OY specifications should be amended so as to satisfy the statutory definition.

In section 600.310(e)(3) the proposed rule should say that OY may be specified at the stock, stock complex, fishery level or FMP level.

In section 600.310(e)(3)(iii)(B) - Item (B) should be nested under (A). The potential factors listed in (B)(1)-(B)(3) should be concretely defined.

In section 600.310(e)(3)(iv)(A) retain the existing language, “All catch must be counted against OY, including that resulting from bycatch, scientific research, and all fishing activities,” and amend to account for all sources of anthropogenic mortality, as described in the SSC’s comments on the ANPR detailed above.

## **XI. Acceptable Biological Catch and Annual Catch Limit Guidance**

### **Amended Section(s): 600.310(f)**

#### **Comments:**

600.310(f)(1) - The proposed rule adds two new sub-paragraphs (v and vi) defining management uncertainty and scientific uncertainty. These additions are responsive to the first of the SSC’s two comments on the corresponding issue in the ANPR.

600.310(f)(2)(i) - The proposed rule removes the requirement that ABC control rules be based on the P\* approach and explicitly allows for use of “other appropriate methods.” The preamble to the proposed rule goes so far as to mention decision theory as an acceptable alternative to the P\* approach, and even cites a discussion paper on the subject that was prepared for the NPFMC SSC. This change is completely responsive to the SSC’s comments on the ANPR, and constitutes total victory in a struggle that has spanned the last 8 years.

600.310(f)(2)(ii)(A) - The proposed rule allows a phase-in period for adoption of status determination criteria. The use of this option should be accompanied with an evaluation of the implications of this phase-in on stock status. If scientific information indicates that the stock has become much larger, a phase-in of 3 years may be prudent if there is much uncertainty in the information or if the stock is not assessed very often. NPFMC has used a 10-year stairstep in one case, so rather than specifying a limit of 3 years, it would be better to examine the rationale in the evaluation. If scientific information indicates that a stock has unexpectedly decreased for whatever reason, a phase-in may be unwise. The burden of proof should be put on the evaluation to justify the phase-in in this case.

600.310(f)(2)(ii)(B) - The proposed rule allows for carry-over of total allowable catch (TAC) or catch to the next year if it does not result in catch exceeding ABC. The proposed rule should mention the problem with doing this carry-over when stocks are assessed annually. The problem is that the carry-over is based on the previous assessment, but the current year may have updated values of ABC and OFL. The current assessment automatically adjusts for any changes to stock condition resulting from the previous catch being lower than the previous TAC. Thus, no carry-over should be allowed when new information is available that indicates a change in stock condition.

600.310(f)(4)(i) - See comment under Topic XII below.

600.310(f)(4)(iv) - Clarification is needed in terms of conflicting characterizations of ABC in the second and sixth sentences of this paragraph. The second sentence implies that the only purpose of ABC is to prevent overfishing, while the sixth lists several other considerations that may go into determining the



risk policy for an ABC control rule. The latter is more appropriate. If the only purpose of ABC is to prevent overfishing, this could be accomplished most simply by setting ABC equal to zero.

*Suggested Improvement:*

In the second sentence of 600.310(f)(4)(iv), replace “and is designed to prevent overfishing” with “that prevents overfishing within an established framework of risk and other considerations.”

## ***XII. Accountability Measures***

### **Amended Section(s): 600.310(f), 600.310(g)**

#### **Comments:**

600.310(f)(4)(i) and 600.310(g)(4) - Paragraph 600.310(f)(4)(i) of the proposed rule adds new language suggesting that “management uncertainty should be accounted for in the ACL” whenever the (optional) concept of annual catch target (ACT) is not used. This is a significant change that may warrant revisiting the ABC control rules currently specified in the Crab and BSAI and GOA Groundfish FMPs or, alternatively, formally adopting use of ACT terminology in the NPFMC’s FMPs. When the NPFMC’s FMPs were amended to bring them into compliance with the Magnuson-Stevens Reauthorization Act of 2006, TACs were not equated with ACTs, in part because the current guidelines require use of an ACT control rule whenever the concept of ACT is used, and this would be inconsistent with the Council’s current procedure for setting groundfish TACs. However, paragraph 600.310(g)(4) of the proposed rule relaxes the requirement for use of an ACT control rule, stating instead that such control rules “can” be used.

*Suggested Improvement:*

Given that the NPFMC’s groundfish FMPs use TAC as a functional equivalent of ACT, it would be helpful if the proposed rule used the phrase “ACT, or functional equivalent,” in places such as the second sentence of 600.310(f)(4)(i): “If an annual catch target (ACT), *or functional equivalent*, is not used, management uncertainty should be accounted for in the ACL.”

## ***XIII. Establishing Annual Catch Limit (ACL) and Accountability Measure (AM) Mechanisms***

### **Amended Section(s): 600.310(h)**

#### **Comments:**

The proposed rule’s addition of data-limited cases to the set of circumstances under which “alternative approaches” is helpful, and simply acknowledges the reality that some things cannot be estimated without data.

Regarding the Council’s comment on the corresponding issue in the ANPR, the proposed rule does not provide a more straightforward exemption for salmon, although the exemption in the current guidelines is already explicit.

*Suggested Improvement:*

At 600.310(h)(2) the proposed rule mischaracterizes the spawning potential of Pacific salmon (“the spawning potential is concentrated in one year”). This could be fixed by inserting the phrase “of each run” after “potential,” or by retaining the current language (“the spawning potential for a stock is spread over a multi-year period”).

600.310(h)(2) “Flexibility in application of NS1 guidelines” is nested under (h) “Establishing ACL mechanisms and AMs in FMPs.” It would be more appropriately elevated to full paragraph status as 600.310(i), which would require renumbering subsequent paragraphs, or added as new paragraph

600.310(n). This change would make it clear that the Councils have flexibility under the complete set of NS1 guidelines, not just flexibility under (h).

#### ***XIV. Adding Flexibility in Rebuilding***

##### **Amended Section(s): 600.310(j)**

##### **Comments:**

600.310(j)(3)(i)(A) - The proposed rule identifies the starting date for calculating the minimum time for rebuilding ( $T_{min}$ ) as the first year that the rebuilding plan is expected to be implemented, which is a helpful clarification.

600.310(j)(3)(i)(B) - The proposed rule retains the existing discontinuity in the formula for the maximum rebuilding time ( $T_{max}$ ), wherein  $T_{max}$  can be no greater than 10 years if  $T_{min}$  is slightly below or equal to 10 years, but  $T_{max}$  can be substantially greater than 10 years if  $T_{min}$  is even slightly above 10 years. Although the discontinuity is difficult to rationalize, it is also difficult to see how the Act can be interpreted otherwise. For stocks with  $T_{min}$  greater than 10 years, the proposed rule adds two new alternative methods for calculating  $T_{max}$ , which provides helpful flexibility, particularly in cases where estimates of generation time are unavailable or unreliable. But it would be helpful for guidance on which of the three approaches should be chosen if more than one can be calculated. Is it permissible to choose the longest of the three for management flexibility?

600.310(j)(3)(iv) and 600.310(j)(3)(v) - Paragraph 600.310(j)(3)(iv) of the proposed rule provides significant new text on determination of “adequate progress” under a rebuilding plan, which is an issue that the current guidelines do not address; thus the proposed rule is responsive to the SSC’s first ANPR comment on this issue. However, the new text does not address data-poor cases separately from the general case, so is not responsive to the SSC’s second ANPR comment.

The proposed rule emphasizes keeping catch below the level associated with the specified fishing mortality rate under the rebuilding plan (“Frebuild”). This is helpful in that it places the focus on something that managers can actually control, but it may also de-emphasize the progress of the stock biomass toward BMSY (which managers can at best control indirectly, and sometimes not at all), thereby resulting in insufficient scrutiny of the Frebuild estimates. For example, paragraph 600.310(j)(3)(v) states that revision of Frebuild is not necessary unless adequate progress is not being made, which implies that, if Frebuild is initially overestimated and catches stay below the level associated with the (overestimated) Frebuild, there may be no incentive to revisit Frebuild even if biomass makes no progress toward BMSY. A possible remedy might be found in the proposed rule’s option wherein progress “may also” be found to be inadequate if “rebuilding expectations of a stock or stock complex are significantly changed due to new and unexpected information about the status of the stock.” For example, if the unexpected information consists of a finding that biomass is not increasing as rapidly as expected under Frebuild, this clause could allow for a determination of inadequate progress, thereby necessitating a re-evaluation of Frebuild. However, it is not clear that such an interpretation is consistent with NMFS’ understanding that “the primary objective of a rebuilding plan should be to maintain fishing mortality at or below Frebuild.”

##### ***Suggested Improvement:***

The proposed rule includes the following text at 600.310(j)(3)(iv): “The Secretary may find that adequate progress is not being made if Frebuild or the ACL associated with Frebuild are exceeded, and AMs are not correcting the operational issue that caused the overage and addressing any biological consequences to the stock or stock complex resulting from the overage when it is known (see paragraph (g)(3) of this section). A lack of adequate progress may also be found when the rebuilding expectations of a stock or stock complex are significantly changed due to new and unexpected information about the status of the

stock.” These sentences should be modified by changing “may” to “will” in the first sentence, and replacing the second sentence with the following: “Each rebuilding plan should identify a reasonable level of statistical significance that will be used to evaluate progress of the stock toward BMSY. The Secretary will also find that adequate progress is not being made if the status of the stock relative to BMSY is significantly different from that projected in the rebuilding plan.”

Consider revising 600.310(j)(3)(vi) to read:“(vi) If a stock or stock complex has not rebuilt by Tmax or the Secretary finds that adequate progress is not being made, then the fishing mortality rate should be maintained at F rebuild or 75 percent of the MFMT, whichever is less, until the stock or stock complex is rebuilt.”

## ***XV. Recreational Fisheries***

**Amended Section(s): 600.305(b)(2), 600.310(g)(3), 600.310(e)(2)(ii), 600.310(h)(2)**

### **Comments:**

Comments provided above on Sections III, V, XII. No comments are offered specific to recreational fisheries

### ***National Standard 3***

**Amended Section(s): 600.320**

600.320(e) - The proposed rule leaves this paragraph, which deals with analysis of management units, largely as it appears in the current guidelines. Although the NPFMC’s FMPs do not address the items enumerated in this paragraph, most of them are addressed in the analytical documents that support the FMP (EAs, RIRs, etc.). It is not clear why this analysis would belong in an FMP, and it could create excessively long FMPs.

### ***Suggested Improvement:***

Consider changing the beginning of the first paragraph from “An FMP should include discussion of the following:” to “The supporting analyses for FMPs should demonstrate:” This change would make the analysis paragraph for NS3 consistent with the analysis paragraph for NS7 (proposed 600.340(c)).

### ***National Standard 7***

See comments under IV above.

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
144	District-wide survey for demersal shelf rockfish in Southeast Alaska	Conduct a district-wide survey for demersal shelf rockfish in Southeast Alaska on a biennial or triennial basis. Survey information is becoming extremely dated.		Critical Ongoing Monitoring		No action
145	Continuation of State and Federal annual and biennial surveys	Continuation of State and Federal annual and biennial surveys in the GOA, AI, and EBS, including crab pot surveys, is a critical aspect of fishery management off Alaska. It is important to give priority to these surveys, in light of recent federal budgets in which funding may not be sufficient to conduct these surveys. Loss of funding for days at sea for NOAA ships jeopardizes these programs. Budgetary concerns have resulted in cuts to not only days at sea, which increases uncertainty, but also sampling the deepest strata, which threatens the value of trawl surveys as a synoptic ecological survey. These surveys provide baseline distribution, abundance, and life history data that form the foundation for stock assessments and the development of ecosystem approaches to management. Although an ongoing need, these surveys are considered the highest priority research activity, contributing to assessment of commercial groundfish and crab fisheries off Alaska.		Critical Ongoing Monitoring		Underway
146	Improve surveys in untrawlable habitat, particularly for rockfish, Atka mackerel, and sculpins	For groundfish in general, and rockfish and Atka mackerel in particular, continue and expand research on trawlable and untrawlable habitat to improve resource assessment surveys. For example, improved surveys, such as hydro-acoustic surveys, are needed to better assess pelagic rockfish species that are found in untrawlable habitat or are semi-pelagic species such as northern and dusky rockfish. A number of publications specific to untrawlable grounds and rockfish sampling have been published recently, but have not been incorporated directly into routine stock assessment routine survey designs.		Urgent		Partially underway
147	Life history research on data-poor or non-recovering stocks	Why certain stocks have declined and failed to recover as anticipated is a pressing issue (e.g., Pribilof Island blue king crab, Adak red king crab). Research into all life history components, including predation by groundfish on juvenile crab in nearshore areas, is needed to identify population bottlenecks, an aspect that is critically needed to develop and implement rebuilding plans.		Important (Near Term)		No action
148	Spatial distribution and movement of crabs relative to life history events and fishing	There is a need to characterize the spatial distribution of male snow crab at time of mating relative to reproductive output of females in the middle domain of the EBS shelf.		Important (Near Term)	Consolidated with 391, 391 deleted	Partially underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
149	Improve handling mortality rate estimates for crab	Improve estimate of discarded crab handling mortality rate. These studies should include an assessment of the long-term mortality due to injury. This will require improving understanding of the post-release mortality rate of discarded crab from directed and non-directed crab pot fisheries and principal groundfish (trawl, pot, and hook and line) fisheries. The magnitude of post-release mortality is an essential parameter in the determination of the overfishing level used to evaluate overfishing in stock assessment and projection modeling. Empirical data exist for snow crab so new handling mortality data are needed for Tanner and king crab by size, sex, and fishery type with consideration of temperature. Methodology needed for king crab.		Important (Near Term)		Partially underway
150	Maintain the core biological and oceanographic data (e.g., biophysical moorings, stomach data, zooplankton, age 0 surveys) necessary to support integrated ecosystem assessment	Maintain the core data and process studies needed to support integrated ecosystem assessments. Core data include inputs for single- or multi-species management strategy evaluations, food web, and coupled biophysical end-to-end ecosystem models (e.g. biophysical moorings, stomach data, zooplankton, age 0 surveys (i.e. BASIS surveys)). Develop and maintain indices of sea ice formation, sea ice retreat, and timing/extent of the spring bloom for the EBS. For this, maintenance of moorings, especially M-2, is essential. If recent changes in ice cover and temperatures in the Bering Sea persist, these may have profound effects on marine communities.		Critical Ongoing Monitoring		Underway
151	Apply a spatially-explicit model for BSAI pollock	Conduct studies to determine stock structure and potential spatial management for BSAI pollock (e.g., movement). Evaluate interactions of BSAI pollock with those in Russian waters. These studies should lead to a detailed spatial age-structured stock assessment model with at least 3 regions (Russia, NW EBS, SE EBS).		Important (Near Term)	mark status as completed - change "develop" to "apply"	Completed
153	Study vertical distribution of Pacific cod to better understand catchability	Research is needed on the vertical distribution of Pacific cod relative to the EBS bottom trawl and comparisons of gear between the EBS and GOA trawl gear. This is because there is controversy about fishery and survey catchability.		Important (Near Term)		Underway
154	Pacific cod stock assessment for the Aleutian Islands	Develop an age-structured Pacific cod stock assessment for the Aleutian Islands region. In 2014 the Aleutian Islands and eastern Bering Sea regions were split and have separate ABCs and OFLs. There is need to develop an assessment model for cod in the Aleutians.		Urgent		Underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
155	Evaluation of salmon PSC mitigation measures	Develop a research program that will facilitate evaluation of salmon (both Chinook and non-Chinook) PSC mitigation measures in the BSAI and GOA. This includes updated estimates of the amounts reasonably necessary for subsistence, timing of runs and openings relative to subsistence requirements, and access to cost data for the commercial pollock and salmon industries so that impacts on profits (not gross revenues) can be calculated.		Urgent	likely can't be done in one or two years, could be listed as ongoing monitoring but not a survey	Underway
156	Improve knowledge for salmon PSC impact assessment	Improve the resolution of Chinook and chum salmon genetic stock identification methods (e.g., baseline development, marker development), improve precision of salmon run size estimates in western Alaska, and initiate investigations of biotic and abiotic factors influencing natural mortality rate during ocean migration in the GOA and BSAI. Baseline development is nearing completion, but more work on Cook Inlet chum is needed.		Urgent	consistent with examples	Underway
157	Improve methods of monitoring fishery interactions	Develop improved catch monitoring methods of fishery interactions including direct and alternative options (e.g., electronic logbooks, video monitoring), particularly on smaller groundfish, halibut, and commercially guided recreational fishing vessels, including an assessment of feasibility for small vessels.		Urgent	consistent with examples	Underway
158	Research ecosystem indicators and their thresholds for inclusion in ecosystem-level management strategy evaluation.	Initiate/continue research on the synthesis of ecosystem indicators, developing and evaluating thresholds for ecosystem indicators, and ecosystem-level management strategy evaluation.		Important (Near Term)	consistent with examples	Underway
159	Evaluate interactions between fisheries and pinnipeds	Studies of the interactions between fisheries and protected species, such as Steller sea lions in the Central and Western Aleutian Islands (areas 541, 542, 543), and northern fur seals on the eastern Bering Sea shelf are needed. These studies should be conducted at appropriate spatial and temporal scales with an emphasis on seasonal prey fields, diet, and movement of fisheries and pinnipeds.		Urgent	consistent with examples, but unlikely to be done in 1-2 yrs	Underway
160	Assess vital rates of Steller sea lions	Assess vital rates (i.e., reproduction and survival) of Steller sea lions in the western DPS (including Russia) at sufficient frequency to track population dynamics.		Urgent	consistent with examples, but unlikely to be done in 1-2 yrs. Could be crit ongoing monitoring, but not a major survey.	Underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
161	Assess the health of Stellar sea lions	Assess possible indirect effects of fisheries removals via periodic health assessments, indices of body condition, survival of pups and juveniles, and natality of Steller sea lions in the western DPS.		Urgent	consistent with examples, but unlikely to be done in 1-2 yrs. Could be crit ongoing monitoring, but not a major survey.	Underway
162	Quantify killer whale predation of Steller sea lions (M)	Quantify killer whale predation of Steller sea lions, particularly in the western and central Aleutian Islands.		Urgent		Underway
163	Conduct routine fish, crab, and oceanographic surveys in the northern Bering Sea and Arctic Ocean	Dynamic ecosystem and environmental changes in the northern Bering Sea and Arctic are occurring. Assessment of the current baseline conditions and trophic interactions is important. This effort should not supplant the regular surveys in the BSAI and GOA, which are of critical importance to science and management.		Critical Ongoing Monitoring		Partially underway
164	Effects of trawling on female red king crab and subsequent recruitment	Research is needed on the effects of trawling on the distribution of breeding and ovigerous female red king crab and subsequent recruitment. Relevant studies include effects of potential habitat modifications on the distribution of females, particularly in nearshore areas of southwest Bristol Bay (partially underway), and environmental effects (e.g., trawling overlap in warm vs. cold years). Retrospective studies, the use of pop-up tags to identify larval release locations, and larval advection using Regional Ocean Modeling System would help address this need.		Important		Partially underway
165	Conduct routine surveys of subsistence in the northern Bering Sea and Arctic Ocean	Conduct routine surveys of subsistence use of marine resources in the northern Bering Sea and Arctic Ocean. These surveys will become increasingly important under ongoing warming ocean temperatures because range expansions of harvested fishery resources may occur. If range expansions or shifts occur, data will be needed to adjust standard survey time series for availability.		Critical Ongoing Monitoring		Partially underway
166	Estimate scallop stock abundance	Estimate scallop stock abundance in unsurveyed areas using fishery independent methods including analysis of current camera sled data.		Urgent		Partially underway
167	Alternative approaches to acquire fishery-independent abundance data for unsurveyed crab stocks	Explore alternative approaches to the triennial ADF&G Aleutian Islands golden king crab pot survey to acquire fishery-independent abundance data on stock distribution and recruitment of Aleutian Islands golden king crab, including the potential for future cooperative research efforts with Industry.		Urgent	Focus on data-limited	No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
168	Assess seasonal diets and species interactions of fish and shellfish	Collect seasonal or species-specific information for use in improved assessment and management (e.g., expand or continue cooperative research). The data would be useful in studies of species interactions in spatially explicit stock assessments.		Important (Near Term)		No action
169	Studies on factors that affect catchability particularly for King and Tanner crab	For groundfish and crabs, studies are needed on factors that affect catchability, as they directly bear on estimates of the stock assessment. Research to refine the estimates of survey catchability, $q$ , used to infer absolute, rather than relative, abundance would substantially improve the quality of management advice. Particular emphasis should be placed on Tanner crab and Red King Crab because of recent trends in stock status, and on fishery and for Aleutian Island golden king crab to improve the stock assessment model.		Important (Near Term)		Partially underway
170	Quantitative reproductive index for the surveyed BSAI crab stocks	Advance research towards developing a quantitative reproductive index for BSAI crab stocks. Research on mating, fecundity, fertilization rates, and, for snow and Tanner crab, sperm reserves and biennial spawning, is needed to develop annual indices of fertilized egg production that can be incorporated into the stock assessment process and to model the effects of sex ratios, stock distribution, and environmental change on stock productivity. Priority stocks for study are eastern Bering Sea snow and Tanner crab and Bristol Bay red king crab.		Urgent		Underway
171	Acquire basic life history information (e.g., natural mortality, growth, size at maturity) for data-poor stocks	Basic life history information is needed for stock assessment and management of data-poor stocks, such as scallops, sharks, skates, sculpins, octopus, grenadiers, squid, and blue king crab (Bering Sea), golden king crabs (Aleutian Islands), and red king crab (Norton Sound). Specifically, information is needed on natural mortality, growth rates, size at maturity, and other basic indicators of stock production/productivity.		Urgent		Partially underway
172	Develop and validate aging methods for crabs.	Develop and validate aging methods for crabs to improve estimates of $M$ for stock assessments.		Urgent		No action
173	Expand studies to identify stock and management boundaries	To identify and refine stock boundaries and understand source/sink dynamics (e.g., scallop metapopulations). Conduct studies to evaluate all crab stock boundaries relative to management boundaries (e.g., Bristol Bay red king crab, Adak red king crab, Pribilof blue king crab). Expanded studies are needed in the areas of genetics, mark-recapture, reproductive biology, larval distribution, and advection. Such boundaries are to be evaluated so that the risks and consequences of management actions are clear.		Urgent		Underway



SSC Prioritization

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
174	Develop spatially explicit stock assessment models	Develop spatially explicit stock assessment models. High priority species for spatially explicit models include: walleye pollock, snow and Tanner crab, Pacific cod, sablefish, yellowfin sole, rock sole, arrowtooth flounder, Pacific ocean perch, black spotted rockfish, rougheye rockfish, and Atka mackerel.		Urgent	This is underway.	Underway
175	Develop age-structured models for scallop assessment	Age structured models for scallops are needed to increase understanding of population dynamics and harvestable surpluses.		Strategic (Future Needs)		Partially underway
176	Refine methods to incorporate uncertainty into harvest strategies for groundfish	Refine P* and decision theoretic methods to incorporate uncertainty into harvest strategies for groundfish for ACL estimation. Continue existing management strategy evaluations at the stock level.		Urgent		Underway
177	Conduct prospective and retrospective analyses of changes in the spatial and temporal distribution of fishing effort in response to management change	Conduct prospective and retrospective analyses of changes in the spatial and temporal distribution of fishing effort, in response to management actions (e.g., time/area closures, marine reserves, PSC and other bycatch restrictions, co-ops, IFQs).		Strategic (Future Needs)		Underway
178	Develop a framework for collection of economic information	Develop a framework for collection of economic information on commercial, recreational, and charter fishing, as well as fish processing, to meet the requirements of the MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A.		Critical Ongoing Monitoring	The description for this research topic is rather vague given that economic information is currently collected. Perhaps what is needed here is a description of how the current framework for economic data collection is not consistent with the requirements of the MSFCMA.	Partially underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
179	Conduct pre- and post-implementation studies of the benefits and costs, and their distribution, associated with dedicated access privileges	Conduct pre- and post-implementation studies of the benefits and costs, and their distribution, associated with changes in management regimes (e.g., changes in product markets, characteristics of quota share markets, changes in distribution of ownership, changes in crew compensation) as a consequence of the introduction of dedicated access privileges in the halibut/sablefish, AFA pollock, and crab fisheries. Benefits and costs include both economic and social dimensions.		Urgent	Important and relevant for the impending design of GOA trawl bycatch management measures.	Partially underway
180	Economic, social, and cultural valuation research on protected species	Economic, social, and cultural valuation research on protected species is needed (i.e., non-market consumptive use, passive use, non-consumptive use).		Important (Near Term)	Important but does not seem to meet the criteria for urgent.	Underway
182	Evaluate current and alternative Council PSC/bycatch reduction initiatives for non-halibut, non-salmon species	Analyze the effects of recent Council actions on PSC and bycatch, including the interaction among PSC and bycatch reduction initiatives (e.g., halibut, salmon, crab). Attention should be given to different incentives that have the potential to cost-effectively reduce PSC.		Important (Near Term)	Add "for non-halibut, non-salmon species"	Partially underway
183	Research the role of habitat in population dynamics and ecosystem processes	Research is needed on the role of habitat in population dynamics and ecosystem processes. Specifically, studies are needed to evaluate how habitat-forming species (e.g., corals) influence life history parameters (e.g., mortality, growth, movement) of FMP species and their preferred prey. Such research will identify key habitats (including essential fish habitat and habitat areas of particular concern), improve the design and management of marine protected areas, and ultimately improve stock assessments and restoration efforts.		Important (Near Term)		Partially underway
184	Evaluate efficacy of habitat closure areas and habitat recovery	Establish a scientific research and monitoring program to understand the degree to which impacts on habitat, benthic infauna, etc., have been reduced within habitat closure areas, and to understand how benthic habitat recovery of key species is occurring. (This is an objective of EFH research approach for the Council FMPs).		Important (Near Term)		Partially underway
186	Collect and maintain zooplankton and meroplankton biomass and community composition time series	Collect and maintain zooplankton and meroplankton biomass and community composition time series in the eastern Bering Sea. Develop, collect and maintain time series of zooplankton biomass and community composition for the GOA, AI, Arctic.		Critical Ongoing Monitoring	Differs from other plankton surveys that focus on primary producers	Partially underway
187	Maintain indicator-based ecosystem assessment for EBS.	Maintain indicator-based ecosystem assessment for EBS.		Important (Near Term)	Being done	Underway
188	Develop indicator-based ecosystem assessments for AI (in progress), GOA, Arctic.	Develop indicator-based ecosystem assessments for AI (in progress), GOA, and the Arctic.		Important (Near Term)	Being done	Partially underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
189	Develop stock-specific ecosystem indicators and incorporate into stock assessments	Develop stock-specific ecosystem indicators and incorporate into stock assessments. (in progress)		Important (Near Term)		Partially underway
190	Collect and maintain time series of ocean pH	Collect and maintain time series of ocean pH in the major water masses off Alaska to improve understanding of ocean acidification and its effects on managed species, upper level predators and lower trophic levels		Critical Ongoing Monitoring		Partially underway
191	Assess whether changes in pH and temperature would affect managed species, upper level predators, and lower trophic levels.	Assess whether changes in pH and temperature would affect managed species, upper level predators, and lower trophic levels. Laboratory studies are needed to assess the synergistic effects of ocean acidification and changes in temperature on productivity of marine species.		Strategic (Future Needs)		Partially underway
192	Collect, analyze, and monitor diet information	Collect, analyze, and monitor diet information (species, biomass, energetics), from seasons in addition to summer, to assess spatial and temporal changes in predator-prey interactions, including marine mammals and seabirds. The diet information should be collected on the appropriate spatial scales for key predators and prey to determine how food webs may be changing in response to shifts in the range of crab and groundfish.		Critical Ongoing Monitoring	Being done	Underway
193	Improve species identification	Improve species identification, by both processors and observers, for priority species within species complexes in catches, to meet requirements of total removals under ACLs. Methods that quantify and correct for misidentifications are desired.		Strategic (Future Needs)	Seems like a minor issue at present	Partially underway
194	Identification and integration of archived data	Identification and recovery of archived data (e.g., historical agency groundfish and shellfish surveys) should be pursued. Investigate integrating these data into stock and ecosystem assessments. Some archival acoustic data have been cataloged, and most trawl surveys have been included in databases. Some one-time research surveys remain neglected.		Strategic (Future Needs)		Partially underway
196	Evaluate hybridization of snow and Tanner crabs.	Evaluate the assessment and management implications of hybridization of snow and Tanner crabs.		Strategic (Future Needs)		No action
197	Develop methodologies to monitor for new/emerging diseases and/or parasites among exploited species and higher trophic levels	Develop methodologies to monitor for new/emerging diseases and/or parasites among exploited species and higher trophic levels.		Urgent	Develop methodology (Urgent) then monitor (Critical Ongoing Monitoring)	No action
198	Initiate and expand non-market valuation research of habitat, ecosystem services, and passive use considerations	Initiate and expand non-market valuation research of habitat, ecosystem services, and passive use considerations.		Strategic (Future Needs)		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
200	Monitor contaminant flux and loads in lower and higher trophic levels, and assess potential for impact on vital rates.	Monitor contaminant flux and loads in lower and higher trophic levels, and assess potential for impact on vital rates. Laboratory studies are needed to assess the effects of oil dispersants on the productivity of marine species.		Strategic (Future Needs)		No action
202	Methods for reliable estimation of total removals	Develop methods for reliable estimation of total removals (e.g., surveys, poorly observed fisheries) to meet requirements of total removals under ACLs. Catch Accounting System now provides total removals annually. Improved reporting on some data such as subsistence catches and Pacific cod bait in crab fisheries is needed. Improvements are needed for catch accounting by sex and size for crab in non-directed fisheries with high bycatch or PSC rates, particularly for blue king crab in the Pacific cod pot fishery in the Pribilof Islands.		Urgent	Improve description, Split methodology from monitor	Underway
203	Improve discard mortality rate estimates for scallops	Field and laboratory studies are needed to estimate Alaskan scallop discard mortality by evaluating relationship between capture, release condition and deck time, and subsequent survival.		Critical Ongoing Monitoring	Check on progress	Partially underway
204	Tagging studies of Aleutian Islands Pacific cod and Atka mackerel	Tagging studies of Aleutian Islands Pacific cod, Atka mackerel, Alaska skate, and walleye pollock are needed to create models of short-term movement of fish relative to critical habitat (tagging for Atka mackerel and skates are partly underway).		Important (Near Term)		Partially underway
205	Age determination methods for Pacific cod, Pacific sleeper sharks, and spiny dogfish	Studies are needed to validate and improve age determination methods for Pacific cod, Pacific sleeper sharks, and spiny dogfish. Conventional tagging studies of young of the year and/or one-year old Pacific cod would be useful in this regard (partially underway for cod and dogfish).		Important (Near Term)		Partially underway
206	Biomass indices and alternate methodologies for lowest tier groundfish species	Develop biomass indices for lowest tier species (Tier 6 for groundfish), such as sharks and octopus. Explore alternative methodologies for Tier 6 stocks such as length-based methods, catchability experiments (e.g., net selectivity), or biomass dynamics models.		Important (Near Term)		Partially underway
207	Analyses of fishery effort and observer data for scallops	As fishery independent surveys are conducted on only a few beds in Central Region, it is important to confirm the validity of fishery-dependent CPUE as an index of local abundance. Concerns about the utility of CPUE as an abundance index for fishery management are compounded by the limited number of vessels in the current fishery. Emerging methods from other data-limited stock assessments should be explored as alternatives to CPUE as indices of stock status.		Critical Ongoing Monitoring		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
208	Research on stock- recruit relationships	New information and data are needed that would inform our understanding of the stock- recruit relationship for groundfish, Pacific halibut, and crab to project year-class strength.		Urgent	We are getting close on predicting pollock year-class strength in the EBS; We have not really started on the other species or regions	Underway
209	Investigate factors affecting the guided angler sector of the halibut fishery	Continue to investigate factors that affect angler demand and trip supply in the guided angler sector of the halibut fishery.		Critical Ongoing Monitoring		Underway
210	Develop bioeconomic models	Develop bioeconomic models with explicit age- or size-structured population dynamics for BSAI and GOA groundfish fisheries to estimate maximum economic yield and other bioeconomic reference points under uncertainty.		Important (Near Term)	This is distinct from 251. Appears to meet the criteria for Important.	Partially underway
211	Benefits and costs of directed halibut catch and halibut PSC utilization	Research the benefits and costs of directed halibut catch and halibut PSC utilization in different fishing sectors. For halibut and other PSC and bycatch species, conduct research to better identify where regulations restrict the utilization of fish from its most beneficial use and evaluate how changes in existing regulations would affect different sectors and fisheries		Important (Near Term)	This is distinct from 210. Clearly important for impending halibut PSC measures, but probably not urgent.	Underway
212	Develop methods to estimate sea lion abundance	Develop new methods to estimate sea lion abundance, such as the use of unmanned aerial vehicles, which could increase the probability of acquiring abundance estimates in remote areas.		Important (Near Term)		Underway
213	Assess the impact of the displacement of the groundfish fleet on Northern fur seals	Assess the impact of the displacement of the groundfish fleet due to Steller sea lion protection measures on the prey availability, foraging ecology, diet, movements, and vital rates for Northern fur seals.		Urgent	This may take a while, but N Fur Seals are a time bomb. Need to assess what is pushing them down before they go critical	Partially underway
214	Evaluate the impact of seabird bycatch in fisheries on bird populations, and methods to reduce	Assess the extent and impact of seabird bycatch in fisheries on bird populations, and develop methods to reduce seabird bycatch, particularly protected species, such as short-tailed albatross.		Important (Near Term)		Underway
215	Determine potential impacts of fishing activities on cetaceans	Determine potential impacts of fishing activities on marine mammals (e.g., state managed gillnet fisheries), and in particular on North Pacific right whales and the Eastern North Pacific blue whales, particularly in identified critical (NPRW) or essential (NPBW) habitat.		Strategic (Future Needs)		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
216	Assess whether Bering Sea canyons are habitats of particular concern	Assess whether Bering Sea canyons are habitats of particular concern by assessing the distribution and prevalence of coral and sponge habitat, and comparing marine communities within and above the canyon areas, including a comparison of mid-level and apex predators to neighboring shelf/slope ecosystems.		Important (Near Term)		Partially underway
217	Impact of fisheries on benthic habitat and trophic interactions	Conduct studies to assess the impact of bottom trawl fisheries on invertebrate abundance and species composition in benthic habitats. This is especially relevant to the foraging ecology of walrus (candidate species for listing under ESA), but also bearded seals, and gray whales.		Urgent		Underway
218	Survey capability for forage fish	Develop a long-term survey capability for forage fish (partially underway). The NPRB funded GOA and Bering Sea projects are currently describing the spatial and temporal variability in the structure of forage fish communities and the effect of this variability on predators. This work should be continued and methods for long-term monitoring should be developed.		Critical Ongoing Monitoring		Partially underway
219a	Investigate skate egg concentration areas as EFH and HAPC	The HAPC action for skate egg case concentration sites included two recommendations that the Council suggested should be addressed during the annual research priority discussion: (a) skate egg case concentrations should be monitored every 2 to 3 years using non-invasive research design, such as in situ observation; and (b) skate conservation and skate egg concentration areas remain a priority for EFH and HAPC management and within Council and NMFS research plans.		Important (Near Term)	split into two (a) Critical, (b) Important	No action
219b	Monitor skate egg case concentrations every 2 to 3 years using non-invasive research design, such as in situ observation	The HAPC action for skate egg case concentration sites included two recommendations that the Council suggested should be addressed during the annual research priority discussion: (a) skate egg case concentrations should be monitored every 2 to 3 years using non-invasive research design, such as in situ observation; and (b) skate conservation and skate egg concentration areas remain a priority for EFH and HAPC management and within Council and NMFS research plans.		Critical Ongoing Monitoring	split into two (a) Critical, (b) Important	No action
220	Research on survey analysis techniques for species that exhibit patchy distributions	Continue research on the design and implementation of appropriate survey analysis techniques, to aid the Council in assessing species (e.g., Pribilof Island king crabs and rockfish) that exhibit patchy distributions and, thus, may not be adequately represented (either over- or underestimated) in the annual or biennial groundfish surveys.		Important (Near Term)		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
221	Collect maturity scans during fisheries that target spawning fish	Expand existing efforts to collect maturity scans during fisheries that target spawning fish (e.g., pollock). Time series of maturity at age should be collected to facilitate the assessment of the effects of density-dependence and environmental conditions on maturity. Maturity information for pollock and Pacific cod is collected by observers and should be analyzed. Maturity information for rockfish species near Kodiak has been collected recently, both during the fishery and dedicated scientific cruises, and should be analyzed. A dedicated survey to examine spawning sablefish has also been conducted. Efforts to collect maturity data, and then analyze for rockfish and other species should continue. In particular, retrospective studies to identify factors (e.g., fishing, climate, prey quality and quantity) influencing the maturity schedule should be conducted.		Strategic (Future Needs)		Underway
222	Improve estimates of natural mortality (M) for Pacific cod.	Improve estimates of natural mortality (M) for several stocks, including Pacific cod.		Important (Near Term)		Partially underway
223	Develop and evaluate global climate change models (GCM) or downscaled climate variability scenarios to assess impacts to recruitment, growth, and spatial distributions.	Quantify the effects of historical climate variability and climate change on recruitment, growth, and spatial distribution. Develop standard environmental scenarios (e.g., from GCMs) for present and future variability based on observed patterns.		Strategic (Future Needs)		Underway
224	Climate and oceanographic information covering a wider range of seasons	There is a need for climate and oceanographic information that covers a wider range of seasons than is presently available.		Strategic (Future Needs)		Partially underway
225	Development of projection models to evaluate the robustness and resilience of different management strategies under varying environmental and ecological conditions	There is a need for the development of projection models to evaluate the robustness and resilience of different management strategies under varying environmental and ecological conditions. Projection models are also needed to forecast seasonal and climate related shifts in the spatial distribution and abundance of commercial fish and shellfish.		Strategic (Future Needs)		Partially underway
226	Continue to evaluate the economic effects from fishery policy changes on coastal communities.	Continue to evaluate the economic effects from fishery policy changes on coastal communities. This includes understanding economic impacts (both direct and indirect) and how the impacts are distributed among communities and economic sectors.		Urgent		Underway
227	Improve estimation of fishery interactions with non-target groundfish, and prohibited species.	Improve estimation of fishery interactions (including catch) and non-target groundfish (e.g., sharks, skates), and prohibited species.		Urgent		Underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
228	Conduct studies documenting the subsistence harvest (patterns, norms, quantities) in communities affected by Council actions.	Conduct studies documenting the subsistence harvest patterns, norms and quantities in communities that depend upon resources that may be affected by Council action.		Critical Ongoing Monitoring		Partially underway
229	Evaluate the effectiveness of setting ABC and OFL levels for data-poor crab stocks	Evaluate the effectiveness (e.g., potential for overharvest or unnecessarily limiting other fisheries) of setting ABC and OFL levels for data-poor stocks (Tiers 4 and 5 for crab).		Urgent		Partially underway
230	Examine social and economic interactions between coastal communities and commercial and recreational fisheries	Examine social and economic interactions between coastal communities and commercial and recreational fisheries (e.g. subsistence-commercial linkages, adaptations to changes in resource use, economic opportunities for coastal communities).		Important (Near Term)		Underway
231	Retrospective analysis of the impact of Chinook salmon PSC avoidance measures on the BSAI pollock fishery	Conduct retrospective analyses to assess the impact of Chinook salmon PSC avoidance measures on the BSAI pollock fishery. Analyses should include an evaluation of the magnitude and distribution of economic effects of salmon avoidance measures for the Bering Sea pollock fishery. In this case, it is important to understand how pollock harvesters have adapted their behavior to avoid bycatch of Chinook and "other" salmon, under various economic and environmental conditions and incentive mechanisms.		Important (Near Term)		Partially underway
232	Develop management strategy evaluations that incorporate changing climate and market economic conditions.	Develop management strategy evaluations under differing assumptions regarding climate and economic conditions. Promote the standardization of "future scenarios" from different models to promote comparability of model outputs.		Urgent	Change examples in definition	Partially underway
233	Develop an ongoing database of product inventories	Development of an ongoing database of product inventories (and trade volume and prices) for principal shellfish, groundfish, Pacific halibut, and salmon harvested by U.S. fisheries in the North Pacific and eastern Bering Sea.		Strategic (Future Needs)		No action
234	Analyze current determinants of demand for principal seafood products	Analyze current determinants of ex vessel, wholesale, international, and retail demand for principal seafood products from the GOA and BSAI.		Strategic (Future Needs)		Partially underway
235	Investigate gear modifications and changes in fishing practices to reduce bycatch and PSC	Gear modifications and changes in fishing practices to reduce bycatch and PSC are needed.		Urgent	This type of research can be conducted through focused studies	Partially underway
236	Conduct studies of sperm whale and killer whale depredation of catch in long-line fisheries and surveys	Studies of sperm and killer whale depredation of catch in long-line fisheries and surveys are needed to improve the quality of long-line abundance estimates.		Important (Near Term)		Underway
237	Improved habitat maps	Improved habitat maps (especially benthic habitats) are required to identify essential fish habitat and distributions of various substrates and habitat types, including habitat-forming biota, infauna, and epifauna in the GOA, BS, and Aleutian Islands.		Important (Near Term)		Partially underway



Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
238	Develop a GIS relational database for habitat, to include a historical time series of the spatial intensity of interactions between commercial fisheries and habitat.	Develop a GIS relational database for habitat, including development of a historical time series of the spatial intensity of interactions between commercial fisheries and habitat. Such time series are needed to evaluate the impacts of changes in fishing effort and type on EFH.		Strategic (Future Needs)	This research is already underway	Partially underway
239	Assess the extent of the distribution of corals	Assess the extent of the spatial distribution of corals and conduct routine monitoring of these areas.		Urgent	If corals were treated as a species complex within the FMP rather than as habitat, this would be Critical	Partially underway
240	Develop a multivariate index of the climate forcing of the Bering Sea shelf	Develop a multivariate index of the climate forcing of the Bering Sea shelf. Three biologically significant avenues for climate index predictions include advection, setup for primary production, and partitioning of habitat with oceanographic fronts and temperature preferences.		Important (Near Term)		Partially underway
241	Develop bottom and water column temperature database and indices	Develop bottom and water column temperature database and indices for use in EBS, GOA, and AI stock assessments.		Important (Near Term)		Partially underway
242	Collect and maintain primary production time series	Collect and maintain primary production time series in the EBS, AI, GOA, and Arctic; particularly in relationship to key climate and oceanographic variables.		Strategic (Future Needs)	If threshold for Council action were associated with this project then this could be moved to critical	No action
244	Collect and maintain time-series data on the community composition, production and biomass of benthic invertebrate and vertebrate fauna	Collect and maintain time-series data on the community composition, production and biomass of benthic invertebrate and vertebrate fauna.		Strategic (Future Needs)	The value of this exercise lies in the time series, and thus is not consistent with the important categorization	Partially underway
245	Assess the impact of increases in recovering whale populations on lower trophic level energy pathways	Assess the impact of increases in recovering whale populations (e.g., gray, humpback and fin) on lower trophic level energy pathways.		Important (Near Term)		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
246	Cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species-specific information on upper trophic levels	Continue and expand cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species-specific information on upper trophic levels (seabirds and marine mammals). Updated surveys to monitor distribution and abundance of seabirds and marine mammals are needed to assess impacts of fisheries on apex predators, improve the usefulness of apex predators as ecosystem indicators, and to improve ecosystem management.		Important (Near Term)	Given the Council's new categorization, we need to split this into two projects. One for development of an ecosystem indicator and one to assess the severity of impacts	Partially underway
247	Assess the relative importance of non-commercially exploited species to human communities	Assess the relative importance of non-commercially exploited species (invertebrates, fish, marine mammals, and seabirds) to human communities, particularly in Arctic.		Important (Near Term)	A lot of overlap with 180. Consider combining with some rewording.	Partially underway
248	Conduct focused studies to map and understand assemblage distribution and the spatial importance of predator-prey interactions in response to environmental variability	Measure and monitor large scale fish composition: evaluate existing data sets (bottom trawl surveys, acoustic trawl surveys, and BASIS surveys) to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, monitor changes in the distribution of assemblages, and understand the spatial importance of predator-prey interactions in response to environmental variability. Additional monitoring may be necessary in the Aleutian Islands, northern Bering Sea, and areas of the Gulf of Alaska.		Strategic (Future Needs)	Possibly split into two	Partially underway
249	Assess the movement of Steller sea lions, northern fur seals, Tanner crab, snow crab, and Pacific cod	Assess the movement of Steller sea lions, northern fur seals, Tanner crab, snow crab, and Pacific cod in response to environmental variability to understand the spatial changes of predator-prey interactions.		Critical Ongoing Monitoring		Partially underway
250	Conduct ecosystem structure studies	Studies are needed to evaluate the effects of global warming, ocean acidification, and selective fishing on food webs. For instance, studies are needed to evaluate differential exploitation of some components of the ecosystem (e.g., Pacific cod, pollock, and crab) relative to others (e.g., arrowtooth flounder).		Important (Near Term)		Underway
251	Modeling studies of ecosystem productivity	Modeling studies of ecosystem productivity in different regions (EBS, GOA, and AI). For example, studies could evaluate the appropriateness of the 2 million t OY cap.		Important (Near Term)	Important with respect to 2 million t cap. Should be merged with MSE lines	Underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
361	Effects of Ocean Acidification on Scallops	Laboratory studies are needed to understand the mineralization of scallop shells through their life cycle and under current spatial variability and future scenarios of ocean acidification.		Strategic (Future Needs)		No action
362	Monitoring potential water quality impacts	Seasonal water quality monitoring in known scallop areas are needed to determine whether conditions are detrimental to scallop growth and survival.		Important (Near Term)		No action
363	Area-specific variability in scallop population processes	Investigate area-specific variability in vital population processes including growth, recruitment, natural mortality and movement including mark-recapture tagging studies.		Important (Near Term)	Note: Project description should be re-named Area-specific variability in population processes	No action
364	Updated sperm whale stock assessment	Updated sperm whale abundance estimates are needed. Sperm whale depredation interactions with longline fisheries have increased, but little is known about sperm whale populations. Updated population estimates and defined PBR's are needed to effectively respond if a take occurs in the longline fishery.		Critical Ongoing Monitoring		No action
365	Retrospective analysis of the impact of Chinook PSC avoidance measures on communities of western Alaska	Conduct retrospective analysis using qualitative and quantitative methods on salmon dependent communities of western Alaska that may be affected by Chinook salmon PSC avoidance measures in the BSAI. Analysis should evaluate long-term changes in local Chinook abundance and uses, and provide detailed ethnographic work exploring the meaning of salmon to these communities in the context of industrialized offshore fisheries.		Urgent		No action
366	Continue to investigate time variation and the shape of fishery and survey selectivity models	There is considerable controversy about (1) whether selectivity should be dome-shaped or asymptotic, and (2) whether selectivity should be time-varying by default. Using a dome-shaped curve can create a large increase in biomass which may not be real. Treating selectivity as time-varying increases the number of model parameters greatly, which may lead to confounding among parameters. Better scientific guidance through research studies is needed to address these two problems.		Urgent		Underway
367	Continue to improve stock assessment methodology with respect to uncertainty	Recent studies have made advances in determining effective sample size, effective number of parameters, Bayesian parameterizations, and how to weight datasets in assessments with multiple datasets. However, results appear to vary from paper to paper, and no general rules have emerged. Thus, our ability to characterize uncertainty remains elusive.		Urgent		Underway
368	Develop a simulation model of Steller sea lion fishery interactions	Management strategy evaluation tools based on coupled bio-physical models with fishing and top trophic level foragers (e.g., Steller sea lions) should be developed to evaluate the performance of different harvest strategies, to inform future management decisions, and to prioritize field studies.		Urgent		No action

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
381	Effects of changes to the observer program	Evaluate the effects on biological parameter estimates and on estimated catch, bycatch, and PSC from changes to data collection protocols that occur because of the observer restructuring. Ensure that data can be compared easily to the previous data collection methods so that time series remain intact. Improve biological data collection including representative length and age samples from all sectors of the fleet. Attempt to separate temporal changes from sampling design effects.		Urgent		No action
382	Investigate in situ methods of tagging species that experience barotrauma	Species with swim bladders experience barotrauma, so that tagging studies result in high mortality and little information. Icelandic and Norwegian scientists have developed in situ methods for tagging, so that these fish never change depth. This could provide precise estimates of movement rates from tagging studies needed for spatial stock assessments. Such a recommendation for walleye pollock is found in a 2011 Report of a Workshop on Spatial Structure and Dynamics of Walleye pollock (AFSC Processed Report 2011-04).		Important (Near Term)		No action
383	Determine quantitative indicators of spatial structure, particular for walleye pollock and Pacific cod	The next generation of stock assessment models will be spatial age- and length-structured assessment models, in line with the goal of ecosystem-based fishery management. Current distributions of spatial location have been empirically summarized, but methods should be explored to convert these to movement patterns for biological and/or management regions.		Important (Near Term)		No action
385	Study Pacific halibut PSC, bycatch, and discard behavior in fisheries	Continue to explore management actions that reduce the incentives for PSC-, bycatch- and discard-related mortality of Pacific halibut. Evaluation of observer coverage, accuracy, and representativeness of PSC and bycatch estimates should be included.		Urgent		Underway
386	Investigate long term effects of fishing on Pacific halibut	Collect genetic samples for future comparison.		Strategic (Future Needs)		Underway
387	Determine effects of migration on the Pacific halibut population and management	Extend existing analyses of tagging studies to include age-specific components. Continue to evaluate the role of migration in contributing to population dynamics and trends associated with area-specific catch, PSC levels, and downstream effects.		Important (Near Term)	Change to strategic if long term	Underway
388	Study temporal and spatial patterns in size-at-age of Pacific halibut	Reanalyze historical records of Pacific halibut size-at-age. Requires identifying samples from consistent spatial areas as well as re-ageing of older samples that utilized differing methods for age determination. Relate observed patterns to somatic growth via otolith increment analysis and development of bioenergetics model relating long-term environmental and ecological drivers to halibut size-at-age. Continue to explore the potential role of fishing in observed size-at-age trends via direct or evolutionary pathways and the interaction with size-selective fishing, include these analyses in harvest policy analyses.		Urgent		Underway

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
389	Investigate ecosystem effects and inter-species interactions of halibut	Investigate potential ecosystem effects and inter-species interactions on Pacific halibut recruitment and size-at-age. Includes integration of existing IPHC and NOAA trawl survey observations of size-at-age, diet, and population distribution and trends for multiple species in the GOA and BS.		Important (Near Term)		Underway
390	Assess the population status of harbor seals in the Aleutian Islands and determine factors affecting their population trajectories	Assess the population status of harbor seals in the Aleutian Islands and determine factors affecting their population trajectories		Critical Ongoing Monitoring	Should split assessment from process	No action
431	Develop tools for analyzing coastal community vulnerability to fisheries management changes	Develop tools for for assessing and predicting coastal community vulnerability to fisheries management changes. Assess changes in community vulnerability over time by FMP and individual catch share fishery.		Important (Near Term)		Underway
451	Pending - Arrowtooth flounder stock structure and movement	Arrowtooth flounder studies to support information related to stock structure and movement for Alaskan flatfish species		Important (Near Term)		Pending
452	Pending - Dusky Rockfish and Shortspine Thornyhead genetics research for improved population structure	Genetic research to better study dusky rockfish and shortspine thornyhead population structure.		Important (Near Term)		Pending
453	Pending - Cod density in untrawlable areas in the AI	Evaluation of survey data (including IPHC long line, AFSC long line and NMFS trawl) in comparison with fishery data to better understand the proportion of cod biomass in untrawlable areas of the NMFS trawl survey.		Important (Near Term)		Pending
454	Pending - Sculpin natural mortality, seasonal food habits	Research to determine natural mortality for sculpin species in the GOA. Data gaps exist in sculpin species life history characteristics, spatial distribution, and abundance. GOA-specific mortality estimates would be beneficial, rather than using the M derived from BSAI sculpin species. Additionally, the collection of seasonal food habits data would help clarify the role of both large and small sculpin species within the GOA ecosystem		Important (Near Term)		Pending
455	Pending - Shark aging, size at maturity, natural mortality	For sharks - data needed on size at maturity, natural mortality, better aging methodology. May be possible to collect age data from large" sleeper sharks that are caught in IPHC surveys. Access to those animals could enhance size and maturity data."		Important (Near Term)		Pending
472	Evaluate causes of variable meat size, undersize meats in scallops	Exploratory tows in the Bering Sea (District Q) and some areas open to harvest around Yakutat (District D) have shown scallops with disproportionately small meats relative to shell height. The cause of this condition as well as potential for recovery is unknown to industry.		Important (Near Term)	Relates to biomass and abundance	Pending
NNN	Assess dependence and impacts of halibut management actions on communities	Quantitatively and qualitatively examine the suite of engagements, dependencies, and vulnerabilities of halibut dependent communities and impacts of halibut management actions.		Urgent		Pending

Res. ID	Title	Description	Council Priority	SSC Priority	SSC Comments	Research Status
NNN	Investigate factors underlying fishery responses to halibut PSC caps	There is need to understand the underlying factors through which industry can adjust its behavior and its corresponding halibut encounter rates, in response to potential changes in halibut PSC caps. Investigations under this category could be conducted in combination with evaluations of alternative management actions for halibut PSC under Research Priority 385.		Urgent		Pending
NNN	Examine the relative importance of historical closed areas in the vicinity of the Pribilof Islands as juvenile halibut nursery habitat relative to other regions coast-wide.	Evaluate the biological effects of establishing spatial protections of juvenile halibut from fishing gear on BSAI halibut stock health.		Urgent		Pending
<del>181</del>	<del>Foraging ecology studies of Steller sea lions</del>	<del>Foraging ecology studies of Steller sea lions in the Gulf of Alaska, Aleutian Islands, and Russia are needed, including at sea tracking of older animals, and diet composition of sea lions throughout the region.</del>		<del>Important (Near-Term)</del>	<del>Overlaps with 159 - Delete</del>	<del>Underway</del>
<del>195</del>	<del>Conduct multivariate analysis of bycatch data from the scallop observer program</del>	<del>Analyze benthic communities associated with scallop beds by conducting multivariate analysis of bycatch data from the scallop observer program (haul composition data) and camera sled data.</del>		<del>Strategic (Future-Needs)</del>	<del>Delete</del>	<del>Completed</del>
243	Collect and maintain data on forage fish community composition and abundance	Collect and maintain data on forage fish community composition and abundance in the Bering Sea, GOA, AI, Arctic.		Critical Ongoing Monitoring	Even though forage fish are in the ecosystem component, these populations should be monitored. DELETE	Partially underway
384	Effects of changes to the observer program	Evaluate the effects on biological parameter estimates and on estimated catch, bycatch, and PSC from changes to data collection protocols that occur because of the observer restructuring. Ensure that data can be compared easily to the previous data collection methods so that time series remain intact. Improve biological data collection including representative length and age samples from all sectors of the fleet. Attempt to separate temporal changes from sampling design effects.		Delete and put description into 381	Delete	Partially underway
391	Investigate spatial stock dynamics and population connectivity for Tanner Crab (2 stocks)	Investigate spatial stock dynamics and population connectivity for Tanner Crab (2 stocks)		Important (Near-Term)	Delete	Pending
471	Develop assessment methods for data poor and data moderate stocks			Strategic (Future-Needs)	Too general to be useful	