

# North Pacific Fishery Management Council

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**REPORT  
of the  
SCIENTIFIC AND STATISTICAL COMMITTEE  
to the  
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL  
April 7<sup>th</sup> – 9<sup>th</sup>, 2014**

The SSC met from April 7<sup>th</sup> through 9<sup>th</sup> at the Hilton Hotel, Anchorage, AK

Members present were:

Pat Livingston, 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*

Alison Dauble  
*Oregon Dept. of Fish and Wildlife*

Anne Hollowed  
*NOAA Fisheries—AFSC*

Gordon Kruse  
*University of Alaska Fairbanks*

Steve Martell  
*Int'l. 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:

Sherri Dressel  
*Alaska Department of Fish and Game*

George Hunt  
*University of Washington*

Seth Macinko  
*University of Rhode Island*

Franz Mueter  
*University of Alaska Fairbanks*

Farron Wallace  
*NOAA Fisheries—AFSC*

## **C-2 GOA Trawl Bycatch Management**

The SSC received a briefing on a discussion paper, presented by Darrell Brannan (Council Consultant) and Sam Cunningham (NPFMC). Public testimony was offered by Rachel Donkersloot (AMCC) and Jon Warrenchuk (Oceana).

The discussion paper arose from a request by the Council to review a partial framework for a program to regulate Prohibited Species Catch (PSC) avoidance in the GOA groundfish trawl fisheries. The resulting discussion paper contains a preliminary analysis of program elements that the Council is considering including in a final measure. Although this is earlier in the review process than the SSC is used to seeing such analyses, the SSC welcomes the opportunity for earlier input. This will ensure that the subsequent documents address program elements that warrant analytical focus, and that the policy scenario evaluations put before the Council reflect the best available science. Early inclusion of the SSC may be particularly important for programs such as GOA trawl bycatch management, which alter the institutional rules for harvesting and pricing fish, and where appropriate methods may be highly tailored to the specific proposal.

## **Presentation Issues**

The intent of the Council, and intended effects of the prospective programs, would be clearer with the appropriate application of the terms “bycatch” (i.e., discards of groundfish) and “prohibited species catch” (e.g., interception and catch mortality of Pacific halibut, Chinook salmon) attributable to groundfish fishing in the GOA. In the first several pages of the discussion paper, it is unclear whether the authors intend to identify “discarded groundfish” (i.e., bycatch) or “prohibited species catch” (e.g., Pacific halibut, Chinook salmon) mortality. The Council’s problem statement actually references both sources of removals, appropriately distinguishing between the two categories. The document would be improved by consistently framing the analytical presentation in terms of *PSC avoidance* management.

At times, the language used in the narrative seems to favor a particular point of view. For example, in the consideration of duration of shares, references are made to "sanctions," "forfeited quota", and "punitive action." This is in the context of a societal interest in creating a program that makes the award of fishing privileges conditional upon some desired avoidance performance standards. The language employed seems to reflect an implicit starting point that assumes something is being taken from quota owners in a program that has not yet been created. This impedes the objective consideration of policy options. Another example of possible imbalance appears in the statement, “The prospect of lost revenue, due to (PSC triggered) groundfish closures before the TAC is taken, is a concern to harvesters, processors, communities, and other stakeholders,” implicitly those vested in groundfish. The same concern can and should be acknowledged in connection with the Chinook PSC and halibut PSC losses, because each species represents a significant economic, social, and cultural asset associated with its own stakeholders and communities. It is important that some balance be maintained with respect to accrual of impacts and identification of those impacted.

Later in the paper, there are references to pollock and Pacific cod allocations affecting inshore and offshore sectors in the GOA groundfish fisheries. Several of these assertions appear to be in error. The authors should carefully consult the controlling terms of access as set forth by GOA Inshore/Offshore actions, as amended.

While the draft working paper covers an impressive array of issues pertaining to GOA trawl fishing behavior and practices, the trade-offs implicit within the list of Council objectives could be more effectively contrasted and weighed. This could be accomplished through a list containing each of the Council’s proposed management strategies, followed by a concise summary of how each objective contributes (positively or negatively) to the Council’s program goals and objectives.

In addition to our comments here, the SSC will provide a detailed list of technical edits to the authors for their consideration.

## **Program Design Features**

The SSC identified several features or elements of the proposal that are somewhat beyond the common experience in the design of rationalization programs, and whose implications need further thought and analysis.

### *Constitution of Cooperatives*

The fisheries economics literature has broadly demonstrated that successful rationalization programs rely on well-functioning markets, both for quota and for landed product. However, there are aspects of the proposed program that differ from most rationalization programs in a way that may significantly impede functioning of the ex-vessel market. It is proposed that quota and PSC allowance be allocated to groups consisting of multiple harvesters contracting with one processor to form a cooperative, with no option to change processors during a season, and without control over which processor they are linked to for the first two years. In the case where BSAI crab rationalization effectively binds harvesters to processors, the ex-vessel market is cleared with the help of a mandatory arbitration system. Other harvesting cooperative

programs centered around processors leave some (sometimes limited) option for harvesters to sell to other processors, but economic theory suggests this threat is important to giving harvesters bargaining power.

Even following the two year phase-in, the scenario evaluated in the discussion paper suggests restricted movement: “Though not explicitly part of the Council’s motion, the fact that a CV can exit from the processor-linked cooperative to which it was initially assigned (after two years) means that the involved parties will have to negotiate terms for leaving the cooperative (an ‘exit strategy,’ as discussed in Section 2.1.4.3.3). It could be the case that the terms require a harvester to leave behind some of their quota share upon exit.” The SSC notes that any additional penalty imposed upon a CV that chooses to change processors would further impede functioning of the ex-vessel market.

Comparing the effects on the ex-vessel price market from other programs that significantly or completely limit harvesters’ landings options, where harvesters are either independent or vertically integrated may be informative. It would be important to consider alternatives and options that ensure processors and their communities are not unfairly disadvantaged by a shift to rationalization, but also assure that the market for landed product remains competitive.

A secondary, practical issue is that including a single processor in each cooperative may make key data on the performance of the program confidential, under NOAA’s interpretation of current regulations. If operations of single cooperatives are confidential, it will not be possible to evaluate aspects of the Council’s actions, such as performance of the community protection goals of the rationalization program.

#### *PSC Allowance Linked to Target Quotas*

The discussion paper suggests initial allowances of PSC would be set in proportion to the allocated groundfish quota, rather than based on historical encounter rates. While this is intended to reward past clean fishing, it presumes opportunities for, and control over, PSC utilization are comparable across the regions in the fishery. If avoidance opportunities vary—spatially or temporally—PSC may bind harvesters in regions differently and differentially affect communities, conflicting with community stability goals. An evaluation of the possible extent of spatial or fleetwide ability to avoid PSC, and whether this would lead to regional variation in the costs associated with avoiding PSC would be useful. This could be compared to severing PSC allowance from the associated target quota, both in allocation and transfer, so that the Council may evaluate alternative ways to reward clean fishing.

#### *Incentives to Avoid PSC*

The program described in the discussion paper seeks to provide additional explicit incentives to avoid PSC, through several potential mechanisms. In designing such mechanisms, it is important to document the extent to which harvesters have the ability to avoid PSC, or whether variation in PSC encounters is essentially random among harvesters or between years. The program should not be predicated on rewarding ‘good luck’ or punishing ‘bad luck.’ It is also possible that the best program design differs for Chinook PSC avoidance and halibut PSC avoidance.

One proposed mechanism sets a finite life to the PSC distribution system and adjusting allocations toward “cleaner” vessels over time. The SSC is concerned this will introduce uncertainty that will inhibit investment in long-term beneficial PSC avoidance technologies in the fishery. Further, the proposed 10 years is practically equivalent to “indefinite”, in the return on investment that businesses use, and so would do little to reduce the price of access to the fishery. The investment and avoidance incentives induced by this program element should be more closely examined in future analyses.

On page 6, the narrative discusses the potential for gaming of PSC performance records in the context of ‘PSC avoidance rewards programs’. This is a legitimate concern, as we currently have experience with gaming of PSC performance, in the form of the so-called observer effect. We also know that catch-

history based allocations invite speculative "fishing for quota history." In general, the Council may wish to consider these implications before a formal proposal is put forward.

Without dictating redistribution based on successful PSC avoidance, rationalization programs can be structured to incentivize avoidance internally. It should be noted that if PSC is constraining, failing to avoid PSC carries a cost in foregone future groundfish harvest opportunities. If access to remaining PSC allowance is transferable within or between groundfish sectors, the market price should express the implicit value of access to these groundfish harvesting opportunities. If the limits are not constraining, PSC allowance can be given an option value. An example can be found in the PSC allowance banking or rollover mechanisms that incentivize Chinook avoidance for the AFA inshore pollock cooperatives, which are enabled by PSC caps set as multi-year moving averages. The SSC encourages evaluation of program mechanisms that provide incentives to avoid PSC, but also provide flexibility to harvesters to respond to predictable or random changes in natural or market conditions.

The implications of gear conversion opportunities or constraints deserve full consideration. Rationalization may render obsolete the division between sectors targeting the same stock with different gear-types. Thus, vessels accumulating history with trawl gear may determine that they can best utilize their quota and avoid PSC by changing to pot or longline gear. This has happened in the post-rationalization West Coast trawl program, where harvesters are utilizing pot gear for sablefish, and testing it for lingcod. There may be implications for effort redistribution, target species changes, total catch composition effects, habitat impacts, and rates of prosecution of fisheries, all of which may have stock impacts and management effects. Likewise, the Council may wish to contemplate how fishery expansion might accompany attainment of PSC avoidance goals. Discussion should include the relationship between initial allocation and how (and to whom) resulting benefits may accrue. This has implications for concepts such as fishery entry opportunities and the role of community fishing associations (CFAs) in fishery dependent community stability and welfare.

Direct and indirect coastal community participation measures are explicitly included in the Council's motion, but there is little specificity or guidance as to how they should be structured, thus far. Because the Council is early in the creation process of the program, this is a critical opportunity for building community participation directly into the program. These may include direct allocations, entry opportunities, and employment opportunities, for example. With the exception of the CDQ program, the history of catch share programs in Alaska and globally have a record of negatively affecting community participation and stability following the initial allocation, and there are numerous community impact studies available that should be examined to inform this analysis of the benefits and consequences of different options. Stakeholder proposals in which CFAs anchor quota in communities should be analyzed for their ability to meet the Council's goals and objectives, as the program elements are being selected.

### **Program Evaluation**

The SSC also heard from Brian Garber-Yonts (NMFS-AFSC) on drafts of the CV, CP, and shoreside processor economic data reports (EDRs). Current drafts are focused on collecting baseline data prior to rationalization, against which the eventual rationalization program will be evaluated. The draft forms are largely based on revisions of the crab and Amendment 80 EDRs. As those programs are now coming up for review, the SSC encourages that the many strengths and few weaknesses of those programs be evaluated and used to inform the design of these EDRs.

The EDR design process would additionally benefit from going through the exercise of identifying likely industry responses to the rationalization. Then, gaps in the data needed to monitor the extent of each change can be identified. Based on effects of previous rationalization programs, the SSC identified at least the following as plausible effects of rationalization:

- Changes in product form, including packaging and value-added
- Lengthening of the season

- Changes in the number of individuals working as crew or processing workers
- Changes in days worked by individual captains, crew or processing workers
- Changes in gear used, including excluders or changes in types of gear
- Changes in other fisheries in which vessels participate have constituted half or more of the benefits of rationalization programs in other fisheries:
  - Changes in timing or extent of participation across other fisheries, including BSAI, GOA, West coast trawl, rockfish.
  - Specialization in fisheries (this fishery appears to lose vessels, but some vessels leave for other, separately managed fisheries).

The draft EDRs appear focused on spatial changes associated with finding grounds with low levels of PSC species. For example, the CV EDR focuses primarily on fuel use. Each of these changes will carry with it a separate data need, which may be met through existing non-EDR programs, but may not. Particular attention should be paid to ensure that analysts can track the distribution of rents between processors and harvesters, and can link income from fisheries to communities, including residency of crew and processing workers.

One metric identified in the report for program monitoring is identifying regulations and preventing accumulation of excessive shares. It is difficult to identify what this will mean in a context where harvesters receive collective allocations, and there is no mechanism for moving among processors.

#### **C-5 Amendment 80 Program 5-year Review**

The SSC received a rough draft report and a presentation reviewing the Amendment 80 (AM80) program from Marcus Hartley (Northern Economics) and Jon McCracken (NPFMC). There was no public testimony.

The analysts are conducting a thorough and comprehensive 5-year review of AM80 that satisfies the requirements of the MSA and Council motion. The review indicates that the program has met and even exceeded the improved retention and utilization of fishery resource goals set forth by the Council. The review has many parts, some of which are more complete than others, and all of which will need to be finalized before it is released to the public for review. The SSC offers the following suggested improvements.

**The utility of the document could be significantly improved with an expanded Executive Summary that highlights the major findings for all the components of the review.** Currently, the reader must search for conclusions. Thus, a ‘report card’ or bullet point list of major findings is needed. In addition, the document would be improved by including a list of the Council’s original objectives for the program with a concise summary of how these objectives are (or are not) being met.

The review evaluates the quality and the accessibility of the economic data report (EDR) data being collected in conjunction with AM80. It rightly points out places where the EDR duplicates data collection and the potential misinterpretations of the questions asked, and suggests rephrasing and improvements to data collection. It is clear that some revisions to the EDR are warranted and the SSC supports subsequent efforts to use this review when making adjustments to the AM80 and GOA Trawl EDR forms.

The report reviews information from the voluntarily supplied public versions of AM80 cooperative reports. **The SSC remains concerned about confidentiality and fishing cooperatives in which vessel-level data are effectively quarantined due the NOAA General Counsel’s prevailing interpretation of cooperatives as single entities.** This is troubling, given the planned formation of cooperatives in other fisheries.

The use of qualitative data, gathered from owners and operators to evaluate some of the effects of AM80, could be improved with an explication of the methodology for this qualitative data collection. There are conclusions made from these data, for example, that there are “plenty of opportunities” for fishing crew and skippers or that marginally performing vessels “left the fleet willingly,” that warrant further explanation.

The safety section of the report supplied by NIOSH provides a great deal of useful information about the risks and casualties of this fishery. The high injury and fatality rates before AM80’s implementation are essentially unchanged under this program. The SSC suggests that the Alternative Compliance and Safety Agreement (ACSA) for AM80 vessels, which is having a positive effect on vessel safety but currently appears to be voluntary, could be made mandatory given the inability of many vessels to meet current safety regulations of loadline and classification.

The Community Impacts section should be expanded beyond its current emphasis on port calls and Adak to include similar impacts to Unalaska/Dutch Harbor, as was specified in the work plan. The report should further explain the community baseline against which the program is being assessed. The SSC supports the authors’ expressed interest that the EDRs include reported payments to CDQ groups. These data could potentially aid in estimating community impacts. Also, it was shown that more than half of the impacts from the fleet on total economic output and about 80 percent of the impacts on household income accrue outside Alaska. The SSC is interested to see how this compares with other fisheries.

The 5-year review contains ample evidence that the AM80 sector has succeeded in avoiding PSC, perhaps beyond the program’s expectations. However, the document does not currently contain a description of how catcher processors (CPs) in the AM80 sector have been successful in their PSC avoidance. Understanding how CPs have avoided PSC under AM80 has important implications for design features of future PSC reduction programs, such as the proposed GOA trawl bycatch (and PSC) program. For instance, if PSC avoidance under AM80 is facilitated primarily by the flexibility of harvesters to adjust where and when they fish, then any elements of future programs that restrict the fishing flexibility of harvesters may limit the extent to which the program is successful in reducing PSC. **The SSC therefore recommends that the 5-year review include a description of how harvesters have avoided PSC under AM80.** The analysts should make use of a recent paper, which contains all the relevant information for such a description (Abbott, J.K., Haynie, A., Reimer, M.N. “Hidden Flexibilities: Institutions, Incentives, and the Margins of Selectivity in Fishing.” In Press. Land Economics).

#### **C-7 BS and GOA Salmon PSC Genetics Update**

Jeff Guyon (NMFS-AFSC) gave a presentation on two NOAA Technical Memoranda concerning Chinook and chum salmon PSC (referred to as bycatch in the documents) in trawl fisheries in the BSAI and GOA. These reports update a developing time series of estimates of stock contribution by adding data from 2012. Also the reports present both the stock contribution estimates from a census of PSC from some individual hauls made during salmon excluder studies and the area-wide estimates. Graphical, but limited statistical, comparisons were made. Public testimony was provided by John Gauvin (North Pacific Fisheries Research Foundation).

**The SSC commends the authors and analysts for their excellent work that yields major insights into spatial and temporal (seasonal and annual) stock compositions.** In particular the data collections in the GOA are much improved by the use of proportional systematic sampling. Highlights of the results regarding stock composition estimates include: (1) inter-annual variability in estimates, suggesting that annual data collection is necessary for accuracy (lack of bias), (2) seasonal variability in estimates, suggesting that data collection is needed through the season, (3) spatial variability in estimates, showing that the proportional systematic design now in place is critical for accuracy, and (4) similar stock compositions for the small areas used in the salmon excluder studies compared to the BSAI or GOA as a whole.

The SSC has the following suggestions regarding the ongoing genetic studies:

- 1) Use the term PSC, rather than bycatch, to describe these catches of salmon. Because bycatch of Pacific salmon is designated as PSC in a NPFMC groundfish management context, the SSC uses PSC in its reports to differentiate it from incidental removals and discards of other fish species (i.e., bycatch).
- 2) Use “northwest Bering Sea” in place of “Central Bering Sea”, which usually denotes the Donut Hole.
- 3) Conduct statistical chi-square (or similar) analyses of the stock composition frequencies to test for differences compared to the total PSC.
- 4) Investigate weighting the samples by PSC for statistical areas or appropriate subareas to obtain estimates with less bias, particular in years (all but 2011 and 2012 in BSAI and 2012 in GOA) and areas in which the sampling was opportunistic.
- 5) Expand the statistical analyses to estimate the age composition of the PSC, either using existing age-length keys or ageing the scales collected from the genetic studies.
- 6) Include a discussion of how the stock composition results from salmon excluder studies should be interpreted in terms of stock and age structure and in terms of mixing of stocks.
- 7) Compare and discuss the BAYES and SPAM methods used in the analyses, both in terms of methodology and results. The standard errors of the SPAM estimates are generally lower than for the BAYES estimates; how should this result be interpreted?
- 8) Provide the results of work being done by the UAF graduate student that corrects for bias in Chinook salmon stock composition from the BSAI once those are available. The SSC supports this type of analysis for chum salmon PSC in the BSAI.
- 9) We are pleased that results from genetic sampling of PSC in the BSAI and GOA during 2012 are now available. However, for this kind of information to aid in the reduction of salmon PSC, it will have to be analyzed and reported much more rapidly than has been achieved to date. Efforts should be made to achieve a more efficient turnaround of collecting and processing samples and the access to the associated haul data for samples of Chinook salmon from the GOA where the Council is currently formulating potential actions to manage for caps in PSC.
- 10) There is the potential for specific stocks or groups of stocks of Chinook salmon (e.g., hatchery releases) to “drive” contributions to PSC within a reporting group, especially in the GOA. We request that dendograms of the Chinook and chum salmon baselines be included in the reports to aid the reader in determining if there are particular populations within a baseline that might be genetically distinct enough to permit an analysis of stock compositions as subsets of the current reporting groups.
- 11) In this same light, we view coded wire tag (CWT) recoveries as another source of data for determining stock composition of PSC, and ask that sampling designs for genetics be augmented with sampling to scan for CWT recoveries (i.e., complete counts of adipose-clipped fish and a minimum 20% sample of heads from these fish) so that contributions from tagged stocks can be estimated.

### **C-8 Scallop SAFE**

A presentation of the Scallop SAFE and February 2013 Scallop Plan Team (SPT) Report was given by Gregg Rosenkranz (ADF&G). He was accompanied by Diana Stram (NPFMC), and Ken Goldman (ADF&G) of the SPT. George Hutchings (former scallop fisherman, President of Americans for Equal Access) provided public testimony.

The SSC appreciates the SPT’s continued application of the stock structure template to weathervane scallops. The template provides several lines evidence that suggests that the stock is composed of regional meta-populations including: (a) regional differences in growth rate, age composition (possibly an indicator of regional differences in recruitment), and morphology; and (b) weak evidence of genetic

partitioning between the Bering Sea and GOA populations. **This evidence suggests that although current harvest practices are consistent with local area management, further refinement of the stock delineations for the purposes of setting the OFL and ABC for this species should be considered during the proposed workshop in 2015.**

The SAFE document showed strong evidence that scallops are found outside of the local fishing areas throughout the GOA and Bering Sea shelf. In 2012/13 the total catch was well below the area-wide ABC and OFL. **The SPT recommended setting the 2014/15 scallop ACL equal to an ABC of 1.161 million pounds of shucked meats and OFL equal to 1.29 million pounds.** The ACL is estimated using the  $max_{ABC}$  control rule of 90% of the OFL, which includes discards. **The SSC supports the Plan Team's recommended OFL and ABC for 2014/2015.**

To the extent practicable, the ADF&G manages scallop based on time trends in fishery independent and/or fishery dependent abundance indices in local fishing areas. The ADF&G applies a variety of conservation measures. For example, the Central Region (Prince William Sound and Cook Inlet) applies a 0.05 harvest rate to the biomass estimate derived from the survey expanded by an efficiency correction, and used whole weight to meat weight conversions to assign the GHL for each area. The use of 0.05 is at the low end of estimates of natural mortality. Additionally, the GHL may be lowered or closed to encourage local population recovery. For example, results from the most recent dredge survey indicate that the biomass in the Kamishak bed declined to its lowest level in the history of the survey, and ADF&G closed both the Kayak and Kamishak regions to allow an increase in recruitment. Finally, in-season management is applied in several beds where minimum thresholds for fishery CPUE are used to evaluate whether continued fishing should be allowed.

Fishery independent surveys are conducted in only a few scallop beds in the Central Region. Therefore, confirmation of the validity of fishery-dependent CPUE as an index of local abundance is important. The SAFE document contains a comparison of trends in survey biomass estimates and fishery CPUE in Kamishak Bay. The analysis showed a positive correlation between dredge survey biomass and fishery CPUE in North Bed, a negative relationship in the South Bed, but a positive correlation overall. It was also noted that an observed decline in fishery CPUE in the Kodiak Shelikof area was potentially due to Tanner crab avoidance. These observations suggest that time trends in fishery CPUE are uncertain indicators of local abundance trends. **The SSC recommends that during the workshop proposed for 2015, analysts review the processes that may influence fishery CPUE.**

Initial runs of an age-structured model for Kamishak Bay were brought forward at the 2014 SPT meeting. **The SSC is very supportive of continued model development for Kamishak Bay, supports plans for the development of a model for the Kayak Island area and requests a full description of the model.** The SSC agrees with the SPT that the authors consider a range of fixed natural mortality estimates and, if possible, annually variable natural mortality. In addition, the SSC recommends that the authors investigate how gear efficiency and uncertainty in survey data impact model results.

It was confusing to read the document's descriptions that jump back and forth among multiple districts within the areas. For example in Section 3.2 on the Yakutat Registration Areas, the text jumps back and forth between District 16 and the rest of the Yakutat region (referred to as Area D). The SSC recommends that each of the beds or districts within a registration area be discussed completely before moving on to the next district.

The SSC wishes to clarify that last year, when the Depletion Corrected Average Catch (DCAC) model was mentioned, this modeling approach was advanced just as an example. It should be noted that the DCAC modeling approach was developed for west coast groundfish stocks, and caution should be taken when applying this modeling approach to species other than groundfish. **The SSC encourages authors to**



**examine a variety of alternative data-poor management approaches during the workshop to determine which, if any, could be applied to scallop.**

### **C-9 Bering Sea Canyons**

The SSC received a presentation from Steve MacLean (NPFMC) regarding the most recent discussion paper on the Bering Sea canyons. Public testimony was provided by: John Gauvin (Alaska Seafood Co-op), Jon Warrenchuck (Oceana), Heather Brandon (World Wildlife Fund), and Jackie Dragon (Greenpeace).

At the June 2013 meeting, the Council requested additional information to: (1) identify and validate where necessary areas of coral concentrations for possible management measures for the conservation and management of deep sea corals in the Bering Sea slope, and specifically in the Pribilof and Zhemchug canyons, and (2) develop a discussion paper that addresses management measures to be considered for conserving and/or managing areas of coral concentration and associated fish productivity. A workshop was organized in Seattle in February 2014 to provide the public with information on the AFSC predictive coral concentration model and other relevant research, and to provide a forum for discussions regarding collaboration and tools to reduce fishing impacts on corals. The workshop and the discussions resulting from that forum were very informative.

The April 2014 discussion paper summarizes the February 2014 workshop, includes new information presented at the workshop, and characterizes attendee concerns and discussions. In addition, the discussion paper provides relevant background information and introduces a suite of tools and options for the Council to consider if and when they choose to move forward with potential measures to conserve and manage deep-sea corals. **Overall, the discussion paper, combined with the recent research efforts mentioned in the discussion paper, provide a good starting point for discussions to develop objectives to protect and manage deep-sea coral in the Bering Sea slope and the Pribilof and Zhemchug canyons.**

The SSC echoes a common theme in the discussion paper and **encourages the Council to be explicit in their choice of objectives for any protections or management measures to be put into place, as the specific objectives selected could alter the scope, spatial scale, and the toolkit appropriate for achieving those objectives.** As an example to illustrate how changes in objectives alter the data and process necessary to inform decision-making processes, we considered three possible objectives for the protection of Bering Sea slope habitat: (a) protection of coral habitats, (b) to preserve existing unfished or lightly fished areas in outer shelf and slope regions of the Bering Sea (e.g., freezing the fishing footprint), and (c) establishment of marine protected areas to serve as control habitats for the purposes of conducting before-after-control-impact type analyses. If the primary objective is limited to protecting coral habitat in the Bering Sea outer shelf and slope, then groundtruthing the coral concentration model is a high priority. Verification of the predictive accuracy of the coral concentration model via the recently funded stereo camera survey would be an excellent way to refine this model. If the primary objective is to protect Bering Sea slope ecosystems by freezing the trawl footprint, then the analysts would need to work closely with industry and NMFS to identify the spatial distribution of trawled areas, potentially in a manner similar to what was done in the Aleutian Islands, to define areas to focus specific management actions. If the primary objective is to establish closed areas that would serve as representative unfished control habitats to quantify ecosystem effects of fishing on coral habitats, then the analysts would need to consider the size, location, and attributes of any proposed areas in relation to the Bering Sea slope habitat overall. In addition, when designing closed areas to address one or more of the goals outlined above, the analysts should also consider the connectivity of habitats. These examples clearly demonstrate how explicitly defined objectives are necessary to develop alternatives and to identify the data needed to support management actions. Depending on the choice of objectives, the Council may want to consider aligning this process with the upcoming EFH 5-year review, as this could potentially yield additional

tools (e.g., fishing effects model) and information to the process to develop management actions for deep-sea corals in the Bering Sea slope.

Though extremely dependent on decisions regarding specific goals and objectives, a wide variety of approaches are available for the Council to put forward as potential measures for the conservation and management of deep-sea corals. Changes in fishing effort, modifying gear configurations and area closures are three common approaches to reducing impacts of bottom contact gear, as discussed by the National Academy of Sciences in their 2002 report. Once the specific measures have been identified, the SSC recommends that a monitoring plan be developed alongside any management changes to assess potential impacts, including ecological, economic, and social, as appropriate. This is also required by some management authorities.

In terms of addressing the Council motion from June 2013, both the discussion papers and the recent AFSC research do provide information on coral distribution and concentrations, both in the canyons themselves and in the surrounding slope areas. **However, the SSC reiterated that information on the dependence of managed species on these habitats is still lacking**, a point previously made in the June 2013 SSC report. While recognizing the difficulty of quantifying the importance of these habitats to fish and invertebrate populations, if this was the true intent of that Council motion, at this time, there are no data to inform that discussion.

One of the options the Council could consider would be to use the AFSC predictive coral concentration model to define areas of high coral concentrations in which to focus future efforts. This potential use of the AFSC predictive model underscores how critical it is to further validate the model with the planned stereo camera work in the summer of 2014. While overlaying the currently available data from other visual surveys did not strongly contradict model results, differences in the spatial scale and the identification of coral to species from these different sources of data reduced the usefulness of these data to truly validate the predictive model. While the predictive model itself was promising, **management alternatives and decisions based on the predicted coral concentrations from this model without verification of the predictive skill of the model would be premature.**

Because this is an area of ongoing research, if the process to develop management measures moves forward, it might benefit from some flexibility to incorporate new information as these become available. However, it is uncertain how this flexibility could be maintained. The SSC is supportive of the planned cooperative research to further validate the AFSC predictive coral model, and notes that this research will provide valuable information beyond verification of model results, such as information on fish-habitat associations and sponge distribution and abundance. In addition, the final field year of the Alaska Coral and Sponge Initiative (2012-2014) will also provide more information on distribution and growth of these species, and potentially begin to connect this information with fish and invertebrate productivity.

#### **D-2 EFH 5-year Review**

The SSC received a presentation on the 2015 Essential Fish Habitat (EFH) 5-year review approach by Matt Eagleton (NMFS-AKR) and Diana Evans (NPFMC). A plan to develop updated fishing effects models was presented by John Olson (NMFS-AKR) and Brad Harris (Alaska Pacific University).

The proposed three-pronged approach for the 2015 EFH 5-year review encompasses all six FMPs for the NPFMC region.

1. Update EFH with new information and develop new methods for EFH descriptions. These methods may facilitate replacement of Level 1 (distribution data only) descriptions currently in place for all FMP species with Level 2 (habitat-related densities) and/or Level 3 (growth, reproduction, or survival rates within habitats) designations, when possible. A technical subgroup will be responsible for development of new methodology. Each assessment author will update information on EFH for each stock and will work with the technical subgroup to apply new

methods to Level 2 and Level 3 information, as appropriate. These new methods may take advantage of newly available information on habitat, such as smooth sheets (archived bathymetry and bottom type data) for the BS/AI and GOA regions and distributions of BS/AI corals and sponges and other species (e.g., GOA spiny dogfish). In conducting these updates, stock assessment authors will also be asked to identify any potential new Habitat Areas of Particular Concern (HAPC) priorities.

2. A second technical subgroup will re-examine the Fujioka-Rose Long-term Evaluation of Fishing Effects Index (LEI) model and will review potential utility of a Swept Area Seabed Impact (SASI) model. The SASI model was developed for application for implementation by the New England Fishery Management Council. Dr. Harris has experience in applying SASI in New England. The LEI model will be migrated from Matlab to R software, streamlined, and some new features may be added based on the SASI review. Habitat-specific applications of an improved fishing effects model will take advantage of finer-scale information on catches owing to VMS, the Catch-in-Areas database, and improved geospatial habitat data.
3. A third technical subgroup will reassess non-fishing effects by developing a tool for spatial analysis of information on activities unrelated to fishing, such as fiber optic cables on the seafloor and locations of mines.

**The SSC appreciates the excellent efforts of staff on this issue and fully supports the proposed approach for the EFH 5-year review.** It is well thought out and this advance planning will facilitate Council decision making on EFH issues in 2015. Internal NMFS funding has been secured for successful execution of planned activities. Updated information for each species, coupled to new description methodology, should greatly advance our understanding of EFH for many FMP-managed species. If successful, these improvements in EFH designations may warrant omnibus amendments to all six FMPs.

An improved fishing effects model should provide an excellent tool to the Council for future considerations of additional management measures (e.g., effort reduction, gear modifications, and area closures) to mitigate fishing effects on benthic habitats. The improved model might also be useful to re-evaluate the ability of existing marine protected areas (e.g., crab area closures) to achieve their originally stated goals.

The SSC would like to hear a presentation on the new EFH designation methodology in October 2014, and a presentation on the results of its implementation in April 2015. The SSC offers the following specific advice to staff:

1. Prepare a one-page “cheat sheet” that compares the advantages and disadvantages of the LEI and SASI models.
2. Compare outcomes from the “old” and “new” versions of the LEI model. For instance, when and where has scoring changed?
3. Seek feedback from stock assessment authors about linkages between stock assessments and EFH. For instance, do habitat-specific rates of growth, reproduction, or survival under Level 3 inform stratified field sampling plans, stock assessment model specifications, and/or harvest control rules?
4. Clarify the ability of the improved fishing effects model to facilitate evaluation of alternative management scenarios and how habitat has changed as a result of historical (e.g., demise of shrimp trawl fisheries) or potential future fishery changes.

### **D-3 PSEIS SIR Review**

Diana Evans (NMPFC) provided an overview of the Programmatic Supplemental Environmental Impact Statement (PSEIS) Supplemental Information Report (SIR) draft to the SSC. No public testimony was received.

In 2004, a PSEIS for the BSAI and GOA groundfish fisheries led to the development of a preferred alternative (PA) that informs the Council's current groundfish management. The PA was purposefully designed to be flexible, and to allow Council to phase in changes over a lengthy timeframe. In April 2012, the SSC reviewed a document, developed at the Council's request, discussing whether there was a need to update the 2004 PSEIS in light of changes in management strategies, FMP amendments, and changes in fisheries and environmental conditions. In June 2012, Council requested that a SIR be developed to consider the limited question of whether there had been sufficient changes to require supplementing the current PSEIS.

Council staff clarified that the requirements for a new PSEIS are focused around whether either of two triggers had been met. The triggering conditions for a new PSEIS are (1) changes to the overall program that fall outside the previously approved PA, or (2) new knowledge/circumstances that would alter conclusions about the impact of the program on the quality of the human environment in a significant manner. Provided that neither trigger has been met, when finalized, this SIR may provide sufficient justification to defer the need for a new PSEIS until a later date. However, even if it is determined that a PSEIS is not required, the Council may opt to initiate revisions anyway.

This is the first time that the SSC has reviewed any programmatic SIR, and we commend Council staff for developing a clear and detailed document that lays out the history and need for this review. It was noted that the SIR addresses the fairly narrow question of whether a PSEIS is required under NEPA policy, not whether it might be desirable from Council's perspective. In addressing this question, the document does a very thorough job, and the SSC did not note any missing considerations.

**The draft document finds that there have not been sufficient changes in groundfish fisheries management to trigger a new PSEIS at this time.** As a result, the SIR focuses on the second criterion concerning new knowledge or information that might alter previous conclusions of impact. In evaluating this question, staff solicited expert opinion on the status of individual target, non-target, prohibited species, marine mammals and seabirds, habitat, socioeconomic, and ecosystem concerns. Details of the expert opinion are provided in a comprehensive appendix and summarized in section 6 of the SIR. The document notes that in several cases where specific actions taken by Council were likely to have focused impacts on species of concern (e.g., Steller sea lions, Pacific salmon), those changes have undergone separate NEPA review, and emphasizes that the question being considered here is at the program, not species, level.

The SIR noted inconsistencies in how some experts responded to some questions on the SIR template. The SSC supports the stated intention that staff will revisit those conclusions to ensure consistency prior to release of a final SIR to the public. The SSC discussed whether expert opinion was consistent when applied to the question of whether new analyses using the latest methods and information would lead to significantly different conclusions. The SSC noted model 2 in the 2014 Greenland turbot assessment, which, if adopted, would have indicated overfished status, as well as declining trends in Bering Sea sleeper sharks, which could be interpreted with new/ongoing analyses to lead to different determination of the impact of the fishery on these stocks. These situations may warrant at least a comment, but the SSC defers to the experts whose opinions were solicited for these particular stocks. Even in these cases, staff pointed out that the current management system is set up to address changes in stock status determinations and that a "decision to supplement the PSEIS must be based on consideration of the proposed action as a whole."

The stated timeline for Council action (October 2014) should satisfy a written public comment request for a 60-day public review period. The document should be checked for grammatical errors prior to public release. Unless requested by the Council, the SSC does not see the need to review the final SIR prior to final action.

#### **D-4 Research Priorities**

Diana Evans (NPFMC) and Michael Fey (AKFIN) provided an update on efforts to develop a web-based online application and database for submitting, reviewing, and managing the prioritization of research needs identified by the scallop, crab, and groundfish Plan Teams (Figure 1). No public comments were received. The application under development will allow the Plan Teams to submit and edit research needs identified by each of their teams. It will also allow the SSC to review these submissions and approve of (or not) their inclusion in the list of research priorities presented to the Council at their June meeting. The public will also be able to access this database online and export the information to an Excel spreadsheet.

Diana Stram (NPFMC) also updated the SSC on tentative plans the Groundfish Plan Teams have for addressing the review and update of their research needs during upcoming cycle of Plan Team and Council meetings. Groundfish Plan Teams were unable to update their research priorities this past fall due to the government shutdown. Therefore, they will not have any new priorities to incorporate into the database in June 2014. Instead, they plan to form a subcommittee from members of the two groundfish Plan Teams that will use the new application to review research priorities that result from the June 2014 Council meeting. Updates to groundfish research priorities by the subcommittee would then be reviewed and further updated by the assessment authors and Plan Teams during their September and November meetings, respectively, and submitted to the SSC in October and December. The SSC could then review and accept, modify, or reject these at their October and December meetings or wait until the following February meeting to address them together when there is more time for review and discussion.

The SSC thanks Council and AKFIN staff for their efforts to develop the application and their goal to have the application available for use by the SSC during their June 2014 meeting. A schematic of the process envisioned for the database has been constructed (Figure 1). We look forward to using the application to review and prioritize an updated list of research needs identified by the Scallop and Crab Plan Teams, as well as the overall list of research priorities, at the June meeting. We also agree with the Groundfish Plan Teams' plan for addressing the review and updating of research priorities during the upcoming year. The SSC also has the following general comments and suggestions:

- We reiterate our desire for input from the Council in the form of an updated list of ongoing (long-term), current, and upcoming management actions, along with a prioritization of these management actions to help inform our ranking of research priorities.
- Once the online application and cycle for updating research priorities within the application are successfully implemented, we envision potential involvement of the Advisory Panel in reviewing the list of research priorities as part of the annual cycle of review.
- The database field named "SSC Priority" should be renamed "SSC/Council Priority."
- There should be some consideration of a process for discussing with the Plan Teams and SSC on when to remove a research item from the priority list.
- Develop a method for archiving the annual priority reports of the Plan Teams, the SSC, and the Council
- A notification system for when changes to priorities are made by the Council would be helpful.
- A way to screen priorities by year, and some way to track the history of changes by year might be helpful, if not too logistically difficult.

## Navigation Overview

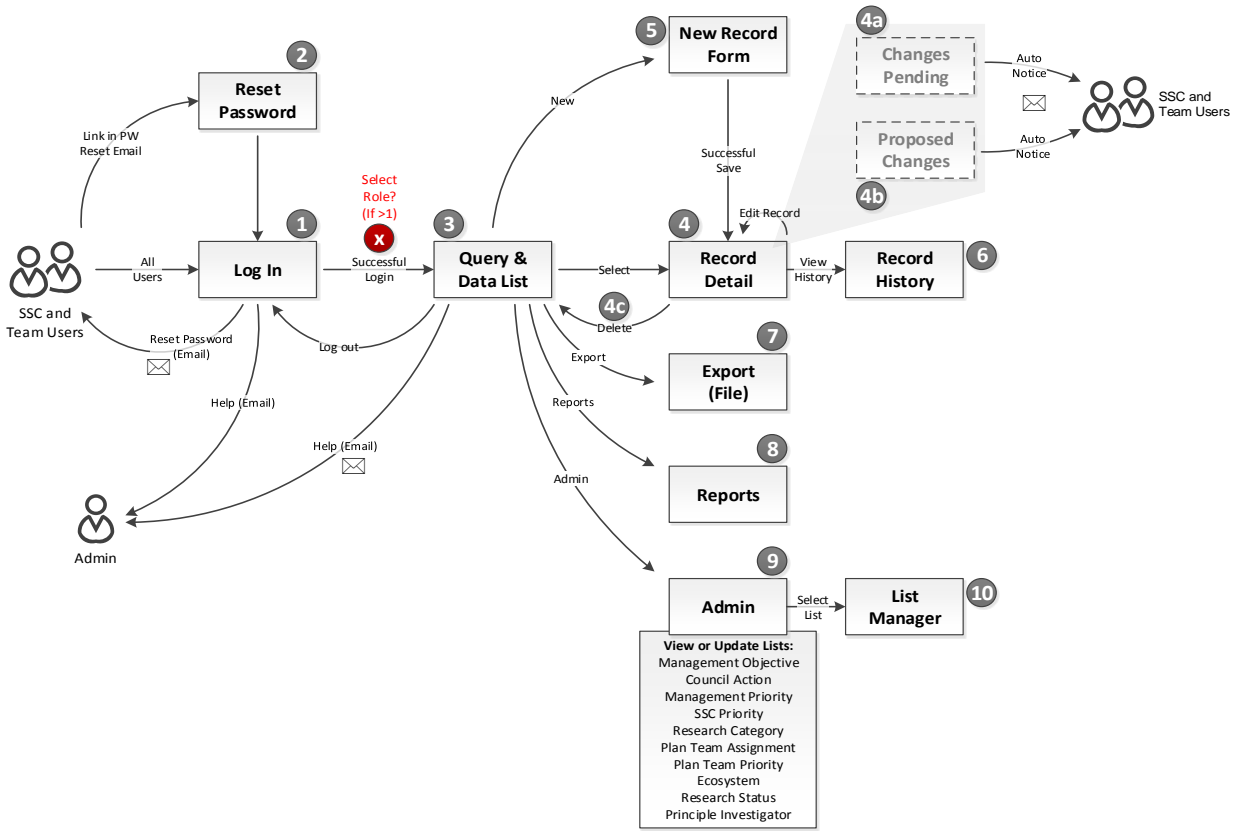


Figure 1. Schematic of the research priorities application database and its use.

### D-5 Pacific Cod Assessment Models

Grant Thompson (NMFS-AFSC) provided two presentations to the SSC: (1) an overview on the data and base models from the 2013 Pacific cod stock assessment models, and (2) the March 2014 report of the Joint Team Subcommittee on Pacific Cod Models. There were five documents that gave the background for the historical development of Pacific cod models; these are available as appendices to the report. The presentations focused on the data available, model nomenclature, descriptions of the 2011 base model, and models that evolved from it. Public testimony was provided by George Hutchings (President of the Americans for Equal Access).

Unlike most groundfish assessment models, Pacific cod assessments are fitted to trends in survey numbers, not biomass. Composition information consists of length frequencies, and there is some aging information, but with only one year available for the AI stock. In general, the survey CPUE information for the BS, AI, and the GOA do not provide a lot of contrasting information that would resolve model confounding between global scaling and productivity. In other words, the data could equally come from a small productive stock, or a very large, less productive stock. Nearly all of the alternative model structures deal with this lack of information problem via informative priors for global scaling parameters such as catchability coefficients, or fixing  $Q$  and estimating time-varying parameters for selectivity. The analyst noted that, at least in the EBS case, it is very difficult to fit the survey CPUE data without allowing  $Q$  to vary over time.

The AI data present a very challenging problem, in which the annual survey CPUEs show a near monotonic decline, but the average size of fish caught in the fishery increases over the same time period. It has been difficult to reconcile this divergence using similar age-structured models that are used for EBS and the GOA stocks.

In the GOA, recent commercial catches have been much higher than in the 1980s, and the pot fishery is a much more dominant gear type in this region. Trends in survey CPUE are also relatively uninformative and in years where there are contrasting changes in abundance (e.g., 2010), estimates of uncertainty are extremely large. Another unique feature in the GOA survey data is that 2-year old cod appear to be less available to the survey gear than age-1 and age-3 cod. This poses potential problems when using parametric selectivity curves that have monotonic increasing functions. One solution has been to split the data set up into sub-27cm and over-27cm groups. **The SSC recommends exploring a time-varying, non-parametric function (i.e., a random walk) that directly estimates age-specific selectivity coefficients in lieu of splitting the data into two independent sources.**

A subcommittee consisting of members from the Groundfish Joint Plan Team last met on March 12, 2014 via phone conference to discuss Pacific cod models. The objective of this meeting was to reduce the number of possible model configurations to a maximum of six models for each area, while the authors are free to include additional discretionary models as they see fit. The process for developing and refining appropriate models for Pacific cod still needs to mature and **the SSC recommends that the assessment authors continue to work with the subcommittee to refine this process. For 2014, the SSC recommends as an alternative model the use of the time-varying, non-parametric selectivity function described above. Additionally, profiling over the natural mortality rate should be conducted to gain a better understanding of the relationship between global scaling (Q and its associated priors) and natural mortality rate.** The mode of the M-profile should not be used as a basis for setting the natural mortality rate in the model as it is conditional on other structural assumptions in the model. **Lastly, the SSC recommends that as an overarching goal for these three areas, a common model structure be explored and based on the biology of Pacific cod and not devolve over time to address area-specific outliers or retrospective biases.**

In light of the presentation, the SSC clarified its intent regarding the use of the base model (“base” being used here to identify the model accepted by the SSC in the previous year) for “several” years. While the SSC cannot be prescriptive about the exact length of time this would be, the idea is to continue the use of the model until there is general agreement by the stock assessment authors, the Plan Team, and the SSC on discontinuing its use.

The SSC discussed the use of model averaging to ameliorate some of the problems of choosing among competing models with substantially different estimates. Essentially, the SSC agrees with the analyst that this approach should not be used until progress is made regarding issues about the selection of the competing models and averaging over models with nonlinearities in population and fishery processes.

The SSC also discussed the nomenclature used to specify models in a historical context (when introduced and the model designator). While the SSC understands that this was useful for the historical presentation, it also notes that the nomenclature is confusing and probably not useful for the assessment in a given year. Furthermore, the use of “base model” to denote any model that is proposed seems overly inclusive and perhaps should be restricted to the chosen model in a previous assessment year.

## **Miscellaneous Items**

### **Data Confidentiality Consideration**

NPFMC Executive Director Chris Oliver met with the SSC to discuss the Data Access and Confidentiality section of the Council’s letter in response to U.S. Congressman Doc Hastings’ draft of the MSA revision. The letter concluded, “Overall, the NPFMC believes that the current data collection and confidentiality provisions in the MSA are working quite well.” Mr. Oliver conveyed that this was written in response to a proposed revision that would have increased restrictions; it was not intended to convey that specific improvements in data access were not needed.

The SSC identified two points where data access and confidentiality provisions are viewed as inadequate, especially by social scientists charged with assessing the benefits, costs, and distributional effects of Council initiatives. First, the SSC December 2013 meeting report reflected concerns (again raised in the GOA rationalization discussion paper in April 2014), about interpretations of entity confidentiality encompassing cooperatives as single entities. If this interpretation persists, reporting performance of entire fisheries under Council management would be impossible on the basis of confidentiality constraints. The MSA is ambiguous on this matter, but it appears that this ambiguity has been functionally interpreted by NOAA as restrictively as possible. The informational responsibilities and obligations incumbent upon those who profit from public trust resources could be addressed during a revision of MSA.

Second, the use of third-party contractors to collect, compile, manage, and disseminate statistical data to Council and Agency staff is a concern. The value of establishing barriers to access of data, collected under legal mandates, impose costs, both in terms of efficient use of staff and expenditures of limited financial resources. It is our understanding that there has been no instance of confidential data released by Council or agency analysts in NPFMC experience, calling into question whether these additional data costs and access complexities are justified. Ultimately, the Council must assess whether the benefits of contracting a third-party to provide blind-data management, justify the costs (e.g., staff time and associated resources, delays resulting from communication failures between analysts and third-party data managers, error detection and resolution, contracting expenditure and overhead).