SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON TRAWL CATCH SHARES REVIEW DRAFT REPORT AND INTERSECTOR ALLOCATION

The Scientific and Statistical Committee's (SSC's) Groundfish and Economics Subcommittees met on May 24 and 25, 2017 to review the West Coast Groundfish Trawl Catch Share Program Five-Year Review - Draft (Agenda Item F.2.a, Catch Share Analysts Report, June 2017). The SSC subcommittees produced a report (appended to this report) that contains technical comments on the Draft document and the analyses that support it. Dr. Cameron Speir (SSC Economics Subcommittee Chair) presented a summary of the subcommittee report to the full SSC.

The analysts' report (Agenda Item F.2.a, Catch Shares Analysts Report, June 2017) includes a comprehensive summary of economic, community, environmental, and program management outcomes in the groundfish trawl catch share fishery before and after the implementation of the catch share program in 2011.

The program review team is to be commended for its work on the analysts' report. The team has compiled a comprehensive and rigorous set of analyses in a short period of time. The analyses would not have been possible without the data collection efforts that began prior to implementation of the catch share program. The Economic Data Collection program and Pacific Coast Groundfish Social Survey were indispensable in documenting changes in the fishery, and staff involved in these efforts should also be commended.

The subcommittees found no major problems with the analysts' report or the included analyses. The report from the SSC's Groundfish and Economics Subcommittees' review of the analysts' report contains comments and suggestions. These comments either require minor changes or suggest editorial changes to improve the exposition of the report or identify areas for potential future research.

While the information and analyses in the analysts' report are useful for summarizing the state of the fishery and documenting changes that occurred after implementation of the catch share program, the analyses in general do not assign causality for observed changes nor can causality be inferred. This is a limitation of the analysis and is noted in the analysts' report.

The subcommittee chairs will work with the analysts to prioritize the suggested revisions. The SSC does not anticipate this causing a delay in the review process.

PFMC
06/09/17

REPORT OF THE SSC GROUNDFISH AND ECONOMICS SUBCOMMITTEES ON THE WEST COAST GROUNDFISH TRAWL CATCH SHARE PROGRAM FIVE-YEAR – DRAFT

The SSC's Groundfish and Economics Subcommittees met on May 24 and 25, 2017 to review the West Coast Groundfish Trawl Catch Share Program Five-Year Review Draft document to be presented at the June 2017 Council meeting. This report summarizes the discussion with emphasis on recommendations by the Subcommittees to the analysts.

Jim Seger (Pacific Fishery Management Council [PFMC] staff) gave a brief overview of the timeline and process for reviewing the Trawl Catch Shares Review document(s). At the June PFMC meeting, the Council is scheduled to approve the draft document for public review. Given Council approval, probably subject to responding to comments from advisory bodies, a finalized draft will be ready for general distribution and public comment in the late summer. In November 2017, the Council will consider approving the draft as final. During summer, the Community Advisory Board (CAB) will work on a range of alternatives for the Council to follow-up on.

Dr. Seger reminded the group that there is also a 5-year review of the inter-sector allocations in parallel to the 5-year review of the trawl catch shares program.

The program review team is to be commended for its work so far. The team has compiled a remarkably comprehensive set of information on the status of the fishery in a very short amount of time.

It is very difficult to identify whether many of the changes that have occurred after implementation of the catch share system were caused by the catch share program. Nearly all the analyses do not assign causality for any observed changes, but rather document the state of the fishery before and after catch share program implementation. This limitation of the analysis should be understood by stakeholders that use the program review results and clearly stated in the final document.

This analysis would not be possible without the data collection efforts that began prior to implementation of the catch share program. The Economic Data Collection (EDC) program and Pacific Coast Groundfish Social Survey (PGFSS) are indispensable in documenting changes in the fishery that have occurred.

The subcommittee has the following recommendations regarding the overall organization of the report.

- A section that documents all sources of data used in the report is required. This section can be succinct (several paragraphs per data source), but should describe each source (EDC, PCGFSS, fish tickets, logbooks, WCOP and any other data used in the analysis).
- The final report should include a discussion of the confidentiality rules associated with the data. This could be included in the data section.
- The full document will likely be used primarily for reference, so it is essential it be well organized and provide a means to quickly locate specific information. A detailed table of contents, list of tables, and list of figures is required in the final document.

Section 3.1 Economic Performance

Section 3.1 is the longest section of the draft report and summarizes economic aspects of the groundfish catch share fishery. The first major subsection, 3.1.1 Changes in Net Economic Benefits, summarizes net revenue fishery-wide and reports that net revenue to all participants in the fishery more than doubled from the pre-catch share base period (2009-2010) to the period following catch shares (2011-2015). Subsection 3.1.1 goes on to summarize several aspects that are thought to affect the level and change in net benefits in the fishery including: consolidation, efficiency and productivity, product value, and quota market performance. The second major subsection, 3.1.2 Individual Economic Outcomes, summarizes the distribution of individual financial outcomes for participants in the fishery. In addition to profitability and detailed tabulations of cost by category and fleet, this subsection reports on participation, timing and location of landings, diversification, gear-switching, and carryover provisions. The third major subsection, 3.1.3, Other Economic Goals and Objectives, reports on utilization of annual catch limits, income and employment impacts, conflicts between fishery sectors in the southern sablefish quota area, and safety outcomes.

General Comments on section 3.1

For figures and tables where there is large variation across entities (e.g. vessels or plants) and the data are a census, percentiles, rather than standard deviations, may be a better way to show the variation among individuals. An example of this is figure 3-12, but there are many similar cases.

Specific comments on Section 3.1.1 Changes in Net Economic Benefits

Table 3-1: There should be a note that the overall net benefits table (Table 3-1) does not subtract buyback fees as a cost since these a transfer to the public, not a true cost.

3.1.1(b)(1) Consolidation

There is no direct comparison of consolidation that occurred in the post-buyback period up to the catch share and then after. This comparison could provide some basis for assessing the effect of the catch share program, particularly if observed consolidation rates were compared to predicted consolidation in the Final Environmental Impact Statement (FEIS). While the FEIS does not separate whiting/non-whiting vessels in the same manner as the analysis in the draft document, it would be useful to have a comparison in the report to see if the rate of consolidation has changed relative to the rate prior to the catch share program being implemented.

Table 3-6 shows the number of processing companies. This is lower than the number of plants. This should be clarified here and there should be a cross reference if there is information in the report on the number of plants or buyers.

The draft analysis uses the number of vessel accounts that have nearly reached annual Quota Pounds (QP) limits (Tables 3-7, 3-8) and the number/percentage of entities holding Quota Share (QS) greater than 90 percent of the control limit (Table 3-9) as indicators of the degree to which consolidation limits are constraining on individual operations. The draft document simply notes that “a small percentage of vessel accounts have reached annual QP use limits since the implementation of catch shares” and “few entities are close to the QS control limits on individual

species." While the fact that not many vessels have come close to aggregation limits is suggestive that the limits are not very constraining, it is not conclusive. We do not know, and there is nothing in the draft analysis to indicate, how many firms might have exceeded QP or QS aggregation limits, and by how much, if these constraints were not there. This is an important caveat that should be noted and may be an area where further research is needed.

- The analysts should explore and report whether there is additional information (e.g., from surveys) that might suggest that vessel QP limits are more limiting than suggested.
- Lian, Singh and Wenninger (2009) developed pre-catch share estimates of optimal operations size (i.e., how economies of scale affect vessel size and output) that could be used to investigate whether vessel QP limits are constraining.
- It may be useful review existing studies that evaluated how much consolidation of QP or QS equivalents occurred in fisheries that did not impose similar aggregation limits.

3.1.1(b)(2) Efficiency and Productivity

The draft document includes the Lowe Multifactor Productivity Index (Lowe Index) as one indicator of vessel-level productivity (the relationship between the quantity of fish produced and the amount of inputs used to harvest fish). The Lowe index can be adjusted to incorporate changing biomass levels and the biomass-adjusted version is included in the draft document (Table 3-11, non-whiting vessels; Table 3-13, shoreside whiting vessels). However, the use of the biomass-adjusted Lowe Index is problematic because it assumes that commercial catch per unit of effort (CPUE) should increase proportionately with biomass (i.e. constant catchability). This assumption is unlikely (especially so for whiting), and is contrary to assumptions made in stock assessments. The biomass-adjusted version of the Lowe index should therefore be removed from the final report and only the unadjusted version presented.

On page 3-21 the following sentence should be deleted as it is not accurate: "Projected biomass estimates in stock assessment reports are, by nature, decreasing, meaning that total non-whiting biomass is underestimated in years for which projections are used. The overall productivity change could be inflated if the biomass is lower than assumed."

The draft document tabulates the efficiency (calculated as net revenue as a percentage of total revenue) of each sector of the fishery (Table 3-14). The results show a substantial increase in efficiency for non-whiting catcher vessels and a decrease in efficiency for non-whiting processors after catch shares implementation. The draft document does not comment on reasons for this change, but there may be reasons other than changes in operational efficiency. The draft document should discuss whether this is driven by increases in ex-vessel prices and thus a transfer to rents from processor to harvest sectors.

The distribution of efficiency changes should be analyzed.

- It is unclear from information presented in the draft document whether efficiency changes have been driven by large changes in a few vessels or more broadly distributed changes.
- It would also be useful to explore whether less efficient vessels have exited over time during the catch share program and if that has increased overall efficiency.

3.1.1(b)(4) Quota Market Performance

The draft document uses cash sales of QP that include only single species transactions as the indicator of QP price. However, cash sales may not be a good representation of the value of QP because they represent only a small number of transfers and a minority of transfers of some species (Table 3-21, 3-22). There was extensive discussion of this and two points should be added to the discussion:

- QP prices from single-species cash sales likely indicate what some additional QP put on the market would sell for (marginal value), but not the average value of all transfers including multi-species transfers.
- Several species have QP prices above ex-vessel price despite the fact that there is unused QP, which suggests the prices are part option value. That is, participants may hold QP or are willing to buy QP at a premium as insurance to avoid an overage they cannot cover and the resultant forced shut down.

Table 3-22 is useful for understanding the percentage of quota transferred in cash sales for some species. However, the table should break out single-species/multi-species cash sales and add more species, since only single-species cash sales provide usable species-level QP prices.

Specific comments on Section 3.1.2 Individual Economic Outcomes

The analysis in this section focuses on individual financial outcomes. Therefore, variation in the data is best represented by reporting percentiles, rather than medians and standard deviations. This will give a better sense of whether the distribution of individual outcomes is skewed by a few outlying individuals. EDC data represent a census of all vessels (and processors) operating in the fishery and variation in this data is due to heterogeneity of respondents. This is in contrast to some biological data and models where measures of variation include sampling variability.

The classification of a vessel as whiting or non-whiting can (and does) change from year-to-year depending on individual vessels' choice of target species. How frequently this occurs and its effect on the outcome of the analysis should be further investigated.

3.1.2(a) Individual Viability and Profitability

Figure 3-13 shows the percentage of catcher vessels with negative net revenue (both total and variable cost) in each year of the EDC data. This is a good indicator of the distribution of net revenue across vessels. There would be benefit in tracking the cumulative net revenue per vessel over time as well. A table or figure that showed the percentage of vessels with negative cumulative net revenue (from 2009 through a given year) would be useful for several reasons:

- A vessel's classification as whiting/non-whiting can (and sometimes frequently does) change from year to year.
- Total Cost Net Revenue incorporates "lumpy" fixed costs and can fluctuate from year-to-year depending on when an investment is made.
- The presence of vessels with persistent negative net revenue values would indicate either a problem in the data or an issue for future research.

The information in Tables 3-25 through 3-32 was presented to the subcommittees as plots. These were easier to interpret than the tables. These figures should be included in the written report.

Tables 3-25, 3-29, and 3-31, which summarize costs by year and category for shoreside catcher vessels, contain a pre-catch shares and catch shares period average for each cost category. For cost-recovery and observer fees, these averages are misleading because these costs have been systematically changing over time. For example, observer costs were subsidized at a declining rate from 2011 through 2015.

The ratios of the standard deviation to the mean presented in Tables 3-26, 3-28, 3-30, 3-32 are often very large. This indicates that there high degree of variation among vessels; therefore mean/SD values could be strongly influenced by outliers. For example, in 2012 Total Cost Net Revenue (TCNR) went down substantially, while Variable Costs Net Revenue (VCNR) only declined slightly.

Plots and tables that use empirical percentiles are strongly preferred to present the values and distribution for the data in this section.

There appears to be a large decline in mean TCNR in 2012 that appears to occur across the shoreside whiting, at-sea whiting catcher vessels, and non-whiting trawlers (Tables 3-26, 3-28, 3-30). 2012 saw a large decrease in whiting total allowable catch (TAC). Also, the EDC data presented in the draft document represent activity level analyses, so large fixed costs can affect more than one fishery. This could be the result of the same vessel(s) making a large investment in fixed costs. Again, using the median minimizes the effect of outliers in the presentation of results. Further investigation into what happened in the fishery in 2012 may be warranted and the outcomes may not be due to the catch share program.

3.1.2(a)(2) Quota Leasing Activity and Distribution of Net Revenue

The tables presented in this section are very useful for getting reference information and specific values. However, the final document should also include the figures included in the presentation to the subcommittees because they are easier to interpret than tables.

Figure 3-19 presents net quota spending as a proportion of revenue, by revenue quartiles. It is unclear what question this figure addresses.

Additional minor comments on 3.1.2

Table 3-35: note here you have decimals in percentages, but not in earlier similar tables – please be consistent.

<u>Specific comments on Section 3.13 Utilization</u>

3.1.3(a)(1) Utilization of Non-whiting Species Allocations

Figure 3-38 shows landings and discards relative to Annual Catch Limits (ACLs) for eight species groups. These figures are informative, but a longer time series should be provided to illustrate that underutilization has occurred over a long period of time prior to catch shares.

Text after Figure 3-38 on page 3-139 seems out of place.

- Some or all of the paragraph beginning "There can be trade-offs" and next paragraph should be deleted. Some of this discussion in this section is unsupported by any analysis.
- This section might be best presented in the form of: "this is what we know and what we don't know about why there is underutilization"
- It may be useful to include analysis of reasons for underutilization and data necessary to answer this question in future research and data needs identification.

The discussion around Figure 3-39 seems speculative. It would be useful to have additional analysis on market limitations (to verify and support Figure 3-39). For example, it would be useful to interview seafood buyers for retail and restaurant sector. Comments by the public at the subcommittees' meeting referenced a poll of buyers by MSC that indicated certainty and consistency of supply was a paramount concern.

3.1.3(b) Income and Employment Impacts through Associated Sectors of the Industry

The text should emphasize that the results in this section are model outputs, not data. Input output models are deterministic, but there is model error. If possible, it would be nice to have some idea of uncertainty or error of economic impact results, especially as they are presented as impacts "over time" in Figure 3-51.

3.1.3(c) Interdependencies with Other Fisheries

The guidance from National Marine Fisheries Service (NMFS) headquarters to address interdependences with other fisheries is not clear about what types of interdependencies should be evaluated. The analysts addressed interdependencies that they or stakeholders had identified as problematic. There may be others that were not identified but are important.

While the analysis addresses conflicts between the individual fishing quota (IFQ) and non-IFQ (open access or fixed gear permit) fisheries for sablefish south of 36° N Latitude, it is not clear if the analysis here completely responds to comments submitted to the Council by stakeholders. These comments suggest that the catch share program is enabling fishing by vessels in the catch share fishery to use fixed gear in areas south of 34° 27' where the limited access trawl fishery had never been prosecuted in the past. Further analysis on this issue should be explored because it is unclear what conclusions should be drawn from the existing analysis of sablefish landings in the Morro Bay area (e.g. Figures 3-52 and 3-53).

3.1.3(d) Safety

There is uncertainty as to whether the definition of incidents in the Coast Guard data includes break-downs (Figure 3-54). It is likely that some of the break-downs are included in the incident data. Having observers on board all vessels mean could lead to higher reporting of incidents to the Coast Guard. This could lead to some bias in comparisons of the number or frequency of incidents before and after catch share implementation.

The relationship between proportion of trips starting between midnight and 2 a.m. and cost of observers could be spurious (Figures 3-59) because some of the relationship may be affected by vessel size. Specifically, the relative cost of observers is higher for smaller vessels so they are

more likely to time trips this way. The analysts agreed that at least some of this relationship may be affected by vessel size, but claimed that there is consistent increase in observer cost over time due to reducing subsidies over years, so that most of what is driving the midnight to 2 a.m. start time is likely due to cost.

Additional minor comments on 3.1.3

All other roundfish in Figure 3-38 includes rockfish, but rockfish are not usually considered roundfish. This label should be changed to all other non-flatfish groundfish.

Pg. 3-171 mentions the "warm blob", but it should actually be referred to as "the Blob".

It is difficult to distinguish between pre-catch share and catch share period in Figure 3-56. Use of open circles may improve readability.

Section 3.2 Community Performance

Section 3.2 summarizes aspects of the catch share program that are believed to affect fishing communities. This section summarizes the geographic distribution of landings, the location of buyers/first receivers, infrastructure in specific ports, the location of quota owners, community level social indicators (engagement and vulnerability), employment, various aspects of community fishing associations and cooperatives, and the attitudes of fishery participants regarding various aspects of the catch share program and the fishery in general. Section 3.2 also provides information on PGFSS survey respondents statements regarding the ability of new participants to enter the fishery and perceived determinates of exit from the fishery.

<u>General Comments on section 3.2</u>

A preamble should be added that reminds readers that the program is not yet mature and, in particular, that trading of QS only started recently. This impacts several aspects of the program perceptions, such as whether it is harder to get loans. Also, the report should place the groundfish fishery in the broader context of the west coast fisheries because most vessels are not reliant on groundfish revenue.

Section 3.2 should focus more on regional differences in perceptions and, to the extent possible, also report the impacts/changes in perceptions within communities (as well as between communities). The latter may be challenging to assess given small sample sizes by community and it may be necessary to rely on the repeat response information.

Could the data be used to explore the quantitative effects of changes in the location of quota? For example, which vessels/operators (the least efficient?) are leaving?

The highlights need to be supported by the text. Also, be careful of highlighting statements such that they appear to represent consensus among respondents, but for which the detailed responses indicate this is not necessarily the case.

Much of the discussion of the impact of observer coverage that occurs in Sections 3.2.2 and 3.2.3 can be limited or moved. Observer coverage impacts can be better focused in Section 3.4 (Program Management Performance).

Specific comments on Section 3.2.2 Fishing Communities

The time periods in Table 3-87 are not consistent with time periods used in the analysis in section 3.1. The text should give some rationale for the time periods chosen for the analysis.

The text in section 3.2.2(c) Changes in Infrastructure makes conclusive or semi-quantitative statements (e.g. "most"). These should be supported by documenting changes in infrastructure by port where possible (e.g. number of processors).

Table 3-108 (in section 3.2.2(d)(1)), which documents trends in QS owners, should show absolute numbers as well as percentages to aid interpretation.

The discussions of the engagement and vulnerability indices would benefit from some emphasis on the definition of indicators and their link to the fishery. Engagement is defined in 3.3.2(e) (page 3-242) as "a measure of the importance of a given community to commercial fishery resources and activities." The text would benefit from some additional emphasis that this concept is different from the importance of fishing to a community. Also, the social vulnerability indicators are constructed from census data and the link to what is happening in the fishery is not clear and direct. Changes in social vulnerability are not necessarily indicators of changes or events in the fishing industry. The review should explicitly make this caveat.

The highlights for section 3.2.2(g)(3)(c) on page 3-281 state: "respondents reported a high degree of consolidation toward processing companies and other multi-vessel entities." Can this belief by respondents be supported by analysis of existing data? This may be complicated given the nature of the available data, but an attempt should be made to explore this issue. Also, a definition of a "multi-vessel entity" should be provided.

There appears to be a conflict between Figure 3-74 and the discussion in section 3.2.2(h)(3) "Improvements in Compensation, Job Stability, and Standard of Living". However, this may be because Sec 3.2.2(f) refers to changes in jobs while Fig. 3-74 refers to roles given a job in the fishery. There should at least be cross-referencing between these sections and possibly some direct comparison of the results and interpretation.

The highlights for section 3.2.2(g) state "Newport, Oregon, appears to be adapting well to the catch share program, in part because the diversity of its fisheries and its robust infrastructure" and quotes by Newport-based participants are cited in within this section. Did the survey receive comments from communities outside Newport that Newport was adapting successfully? It appears so, and the report should be modified to reflect that.

Specific comments on Section 3.2.3 Entry-Level Participants and New Entrants

3.2.3(b) Are data on the cost of trawl permits available that can be included in the document?

Difficulties in obtaining loans are cited as a barrier to entry by new participants (see highlights for 3.2.3 and discussion in 3.2.3(b)(3) Entry Investment: Loans and Debt). Is there evidence to support this as a general or consensus result? If so, is this a unique aspect of the catch share fishery or an issue facing all commercial fisheries? Comment by the public at the subcommittees' meeting suggests that banks are still willing to make loans, particularly for vessel purchases.

Section 3.2.3(b)(4) states "Complicating affordability issues for crewmembers is the fact that QS transactions generally occur in large increments" (page 3-309). This may reflect the current state of the immature quota market. How likely is it that the number of small transactions increases over time as the quota market matures?

In section 3.2.3(c) Fishing Heritage, the draft document cites issues such as lack of family connections, aging of the fleet, etc. as barriers to new entry. Are these issues unique to fisheries (if so, how and why) or are they also faced by other industries and communities?

Specific comments on Section 3.2.4 Small Vessels and Vessels Leaving the Fishery

Section 3.2.4 makes statements that can and should be verified using existing data. This section should attempt to justify the statements (a) small vessels may be becoming more reliant on other fisheries, such as crab and shrimp, in order to offset diminished revenue in the groundfish fishery; (b) some small trawl vessels have left the fishery, either by leasing out their quota, or by selling; and (c) Astoria/Tillamook have lost the greatest number of both large and small vessels that were active in the trawl fishery during 2009 and 2010, followed by Washington, based on data collected for the economic section of the report.

Section 3.3 Environmental Performance

Section 3.3 summarizes environmental outcomes in the catch share fishery. The draft document states that a main goal of the catch share program is "to reduce the incidental catch of overfished groundfish species to assist in rebuilding these stocks." This section summarized discards and total mortality, catch limits and optimum yield, the status of stock regarding overfishing and rebuilding, bycatch of protected species, and habitat impacts. This section also contains a discussion of "localized depletion" of southern sablefish stocks (Section 3.3.4(b), see subcommittees' comments below).

Specific comments on Section 3.3.2 Discards and Total Mortality

The species composition of the grouping labeled roundfish in Figure 3-80 and 3-81 is not clear. A similar issue arose in the discussion of section 3.1.3. Providing an appendix defining the species included in roundfish would be helpful and reference to it in the figures would be useful.

Specific comments on Section 3.3.3 Catch limits and Optimum Yield

The discussion in section 3.3.3(c) Large Bycatch Events (Lightning Strikes) regarding the implications of large bycatch events for fleet behavior should be moved to the economic section. In particular, section 3.1.3(a) Utilization Information contains a discussion of the effect of

perceived risk on utilization and the quota market. The total amount of removals is what is pertinent to Environmental Performance rather than the implications of large catch event "lightning strikes" which are primarily economic.

Specific comments on Section 3.3.4 Status of Stocks

The language in section 3.3.4 Status of Stocks regarding "overfishing" and "overfished", and "recovered" species is potentially confusing to stakeholders.

- Above the minimum stock size threshold (MSST), a once overfished stock is referred to as 'rebuilding' rather than 'overfished' under national parlance, but is still referred to as 'overfished' in the PFMC since it is still in a rebuilding plan and subject to much lower harvest levels until completely rebuilt. A footnote below Figure 3-97 regarding the definition of 'rebuilding' in the MSA vs. 'overfished' in the PFMC would help readers from our Council understand the terminology being used.
- Also filling in the blanks in Figure 3-97 would clarify the status in the intervening years. Canary and Pacific ocean perch were continuously in an overfished state, and should be indicated as such in the table. Circling the status symbol when an assessment was undertaken would also help readers follow the table.
- The header for Figure 3-97 indicates the stock was overfished at that time according the most recent assessment, whereas the assessment effective at the time in question is reflective of our understanding of its status at that juncture. Thus, the table should be referencing status relative to the assessment effective in each year if it is to reflect our understanding of stock status and resulting stock status under management at the time. The annual Status of the Stocks report forming the basis for the figure may use methods that differ, reflecting a retrospective understanding of stock status per the most recent assessment. Whichever method is used, it should be referenced and explained in the Figure caption. This may also pertain to Figure 3-98 and 3-99.

In Figure 3-99, the title on the slide should not reference "overfished rockfish" since some of the species listed were never overfished. The perception of the trend in abundance appears to reflect results from the most recent assessment rather than the status as understood in each year given the assessment in effect at the time. The caption should clarify whether the Stock Information System results or the most recent assessment were referenced to clarify the source used. Cowcod also needs to be added to the graph using a B_{msy} of 620 mt as the basis for comparison.

Specific comments on section 3.3.4(b) Localized Depletion of Sablefish South of 36°N. Latitude

The term "localized depletion" as used in this section is not clearly defined and may not reflect the nature of the issue being analyzed. The draft document fails to present a strong and relevant definition of localized depletion. Is the issue being analyzed an ecological issue? Or is it a change in fishing behavior that (possibly) negatively impacts the ability of another group of fishers to fish? The second is an economic question.

- The degree to which a stock may be subject to localized depletion depends on the distribution and intensity of fishing effort from the fleet and mobility of the species.
- Identifying localized depletion requires comparison of the rate of change in the population size at a global level and the local level. The abundance of the stock is spatially

heterogeneous and depletion will not be consistent over the distribution of the stock even in the absence of fishing. It may prove difficult to determine whether the rates of change in the abundance in a given area are more severe than could be occur at random.

The data utilized to address this question are too limited to draw any conclusions regarding fishery conflicts and localized depletion.

- The current analysis utilizes only six years of data for the CPUE from only four boats in the area of the central coast in California between 34° 27' N and 36° N depicted in Figure 3-102. The amount of data is insufficient to draw any conclusions.
- Any trends in abundance or CPUE should be compared to the rates of change elsewhere.
- The Northwest Fisheries Science center Shelf/Slope Trawl survey data should be analyzed in an analogous fashion for the area of interest and compared to the results for the whole area sampled by the trawl survey or adjacent waters considered to be less heavily fished.
- In addition, statistical tests should be conducted between trends to provide greater rigor in examining whether there is a statistically significant difference in the trends in CPUE observed between the area of interest and the area outside for both the fishery dependent and fishery independent data sources.
- Alternative hypotheses regarding the potential causes should also be noted and analyzed where possible, i.e. shifts in the distribution of the stock from the area of interest as sablefish are a mobile species and water temperature regimes etc. may have effected their distribution resulting in the observed patterns.

Latitude and longitude should be indicated on the maps showing overlap in fishing effort between sectors (Figure 3-103). This figure fits better in the economic section regarding interactions between fishing sectors focusing on gear conflicts resulting from gear switching.

Specific comments on section 3.3.5 Protected Species

Section 3.3.5(a)(1) contains a detailed discussion on bycatch of salmon species, including bycatch counts through 2013 in Table 3-137. Additional, updated information was presented to the full SSC at the April 2017 meeting under agenda item F.3 regarding ESA section 7 consultation on the take of listed salmonids in the groundfish fishery and should be incorporated into the final document (www.pcouncil.org/resources/archives/briefing-books/april-2017-briefing-book/).

This section sometimes refers to pounds or tons of salmon when the reported quantities are numbers of fish, units should be checked and corrected as necessary.

Marine mammal interactions with the fishery include entanglement in fishing pot gear are described in section 3.3.5(b)(1). It is unclear whether Table 3-140 includes entanglement in crab pots (the presentation indicated that these are included), but only entanglements with fish pots should be presented. Season and depth distribution of fishing effort differs between fisheries.

The potential biological removal (PBR) limit for the marine mammals should be included in Table 3-140 for comparison to fatal interactions.

Section 3.3 Program Management Performance

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) Limited Access Privilege Programs (LAPP) provisions and the Groundfish FMP Amendment 20 emphasize the importance of efficient and effective enforcement, monitoring, and management of the catch share program. This section presented indicators of management performance, and qualitative assessments informed by public comment.

Comments on section 3.4.2 Monitoring, Accountability, Catch Accounting, and Enforcement

The draft document does not include an assessment of the cost-effectiveness of maintaining 100 percent observer coverage. This issue may become more important as fewer overfished species implies lower risk from having unobserved trips.

Viability of discarded Pacific halibut on vessels with electronic monitoring is assessed by assuming a fixed mortality rate by gear type. It may be possible to refine viability estimates using observer data. (Section 3.4.2(b)(6) Discards)

Executive Summary

Given the length of the draft document, the Executive Summary is an important component of the 5-year review. It is likely the only portion of the document that many will have the opportunity to read in detail. Therefore, the subcommittees stressed that the Executive Summary must clearly and accurately convey the most important information contained in the draft document.

The Executive Summary contained in the draft document is organized according to the four questions that the SSC suggested to the Council in November as focal points for the report. Readers may find the fact that the Executive Summary is not presented in the same order as the main text confusing and it makes it harder to know where to find specific pieces of information. The subcommittees did not reach and consensus on the best organization of the Executive Summary and the analysts should give careful consideration to this issue. Comprehensive referencing of material and conclusions in the Executive Summary is important in either case.

At the start of the Executive Summary the following two objectives should be accomplished:

- A clearer statement of what benefits were expected from the Trawl Catch Shares program. Some text to clarify the difference between "net benefits to the nation" and the economic performance of the fishing fleet and processors would also be helpful.
- A statement that not all program goals can be achieved at the same time and that the catch share program is set up to balance competing goals.

The presentation given at the subcommittees' meeting was mainly figures and graphs. This was very helpful and the revised Executive Summary should contain figures.

Section "highlights" in the main text, which provide succinct summaries of the main "results", could provide a basis for which items are included in the Executive Summary and which are left out. The Executive Summary could also include bullet-point type lists to convey information, as the analysts think is appropriate.

The Executive Summary should avoid speculation and include only statements regarding results. Each item should be supported by data and analysis contained in the main text. In the case of qualitative survey data, only statements that can be supported as a consensus of respondent views should be presented.

The document would benefit from a timeline of major events to help put some of the changes in the fishery into context. This should include major changes in management (the 2003 vessel buyback, for example), market conditions (Ukraine market for whiting?), and important environmental factors (the "Blob"). The summary slides presented at the subcommittees meeting included a short time-line of some of such events. Inclusion of this figure would provide very helpful context and provide a longer perspective (e.g., the groundfish crisis, the trawl vessel buy-back).

The summary slides presented at the subcommittees meeting included a slide illustrating consolidation from 2009 through 2016 by presenting the number of vessels participating. To understand how catch shares affected consolidation rates, especially relative to other major policy changes such as the vessel buyback, a longer time series is needed. Data exist (e.g. PacFIN fish tickets) to present this information.

- A similar slide showing the decline in the number of buyers by state starting in 1994 (title Net Benefits – Consolidation) was very helpful in showing the long term trends in the West Coast groundfish fisheries.
- A figure showing the number of trawl vessels by state starting in 1994 would be useful.
- A figure showing non-whiting trawl landings and value by state would also provide additional context.

Regarding financial outcomes

- Figures and tables should include median and percentile values (not mean and standard deviation) because they better show the distribution of individual outcomes. Distribution is a main point of emphasis with these results.
- The analysts should consider presenting only VCNR figures in the Executive Summary This reduces clutter (by excluding TCNR) and the VCNR results may be more informative when assessing financial outcomes.

Research and Data Needs

The final report will include a "Research and Data Needs" section. That section is blank in the draft document. The analysts asked the subcommittees for recommendations regarding topics for this section. Some possible topics are listed below, but this should not be considered an exhaustive list.

- A survey that includes quota holders who do not actively participate in the fishery.
- Additional data or cost allocation studies on program administration. It is currently unclear the extent to which cost recovery fees cover program costs.
- Research on utilization rates, aggregation limits, and economies of scale/optimal size. The data and analysis presented in the draft report are insufficient to determine the effect of aggregation limits: simply put, we don't know how participants would behave if these

limits were not in place. One potential option would be to update Lian, Singh and Wenniger 2009. It may be useful to include analysis of reasons for underutilization and data necessary to answer this question in future research and data needs identification.

- Research on whether observed cash prices for quota pounds accurately represent value. Are there other methods for determining value?
- Research on whether observed changes are due to changes in individual behavior or a change in the make-up of the population of participants. The catch share program or other factors may induce exit by participants with certain characteristics. This will alter the mean/median/distribution of indicators, even if the behavior of the remaining vessels hasn't changed. Further, how much exit is due to pre-exiting trends versus the catch share program? This is applies to many of the analyses in the draft document.
- An assessment of the cost-effectiveness of maintaining 100 percent observer coverage. This issue may become more important as fewer overfished species implies lower risk from having unobserved trips.
- Further research on changes in sablefish fisheries south of 36° N Latitude. The draft document attempts to address conflicts between the IFQ and non-IFQ fisheries for sablefish south of 36°, but it is not clear if the analysis here completely responds to comments submitted to the Council by stakeholders. The nature of any interactions between fisheries in this area may be economic or biological (or both), but this is unclear at this time. Further analysis on this issue should be explored because it is unclear what conclusions should be drawn from the existing analysis of sablefish landings in the Morro Bay area (e.g. Figures 3-52 and 3-53).
- Viability of discarded Pacific halibut on vessels with electronic monitoring is assessed by assuming a fixed mortality rate by gear type. It may be possible to refine viability estimates using observer data (Section 3.4.2(b)(6) Discards).

PFMC
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