



**NORTHERN COMMITTEE
SEVENTEENTH REGULAR SESSION**

**ELECTRONIC MEETING
5 – 7 October 2021**

**ISC21 – Annex 13
Report of the Albacore Working Group Workshop**

WCPFC-NC17-2021/IP-04

ISC¹

¹ International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean

FINAL

ISC/21/ANNEX/13



ANNEX 13

*21st Meeting of the
International Scientific Committee for Tuna
and Tuna-Like Species in the North Pacific Ocean
Held Virtually
July 12-20, 2021*

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

July 2021

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ANNEX 13

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

*International Scientific Committee for Tuna and Tuna-like Species
in the North Pacific Ocean*

18/19 – 19/20 and 24/25 May 2021 (Eastern/Western Pacific)

1. OPENING AND INTRODUCTION**1.1 Welcome and introduction**

An intersessional workshop (WS) of the Albacore Working Group (ALBWG or WG) of the International Science Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) was convened as a webinar for 18 – 19 and 24 May 2021 (Eastern Pacific time) and 19 – 20 and 25 May 2021 (Western Pacific time). 12 participants attended the WS (**Attachment 1**). The objectives of this workshop were to: (1) Review feedback on the NPALB MSE from workshops with managers and stakeholders; (2) Propose and review responses to feedback; and (3) Election of ALBWG Chair.

The ALBWG vice-Chair reported that Dr. Hidetada Kiyofuji has moved to a new position at the Japan Fisheries Agency, and can no longer serve as Chair of the ALBWG. The ALBWG vice-Chair will therefore act as the interim ALBWG Chair for this workshop and until a new Chair is elected.

1.2 Meeting protocol

The ALBWG vice-Chair noted that the efforts of the WG at this meeting would be collegial and follow the scientific method with an emphasis on empirical testing, open debate, documentation and reproducibility, reporting uncertainty, peer review, and constructive feedback to authors and presenters.

1.3 Review and adoption of agenda

The draft agenda was circulated prior to the meeting, reviewed, and adopted at the WS (**Attachment 2**).

1.4 Assignment of rapporteurs

Rapporteur duties were assigned to Y. Aoki and S. Hawkshaw.

1.5 Distribution of files and availability

A list of the presentations at this WS are provided (**Attachment 3**). Files of the feedback from MSE workshops and draft responses were distributed to WG members prior to the WS. The WG examined the feedback and further developed the responses, which are provided in this report (**Attachment 4**) and the MSE report.

2 NORTH PACIFIC ALBACORE MSE

2.1 Current Status of the MSE Process

S. Teo gave a short presentation on the progress and current status of the NPALB MSE process.

A short history of the NPALB MSE process was provided, starting with the 1st MSE Workshop with managers and stakeholders in Yokohama, Japan in 2015. The initial MSE results were presented in the 4th MSE Workshop with managers and stakeholders in Yokohama, Japan in 2015. The managers and stakeholders recommended several improvements to the MSE. These improvements were completed, and preliminary MSE results were presented to managers and stakeholders in a series of online workshops in March and April, 2021. Three separate workshops for Japan (March 17-19), the EPO (US and Canada; March 22-25), and Chinese-Taipei (April 7-8) were held for managers and stakeholders to ease difficulties with language and time zones. The preliminary MSE results were also presented at the IATTC SAC meeting via video recording in May 2021, as well as several other upcoming meetings in 2021. The managers and stakeholders are now expected to spend some time absorbing and discussing the MSE results, and may propose management measures in the future, based on the MSE results. It was noted that the ISC Chair stated in the foreword of the MSE report that “Future iterations of this MSE are not planned by the ISC because the current results need to be fully assimilated by managers and stakeholders”.

Discussion

The WG thanked the presenter for the update on the current status of the MSE process. In addition, **the WG agreed that it is currently important for the managers and stakeholders to spend some time to absorb the current results of the NPALB MSE, and that future iterations of the MSE should not be planned until that happens.**

2.2 Review Feedback from MSE Workshops with Managers and Stakeholders

Feedback from the three MSE workshops for managers and stakeholders were reviewed by the WG, together with the responses (see Section 2.3).

2.3 Propose and Review ALBWG Responses to Feedback

D. Tommasi gave a presentation on the feedback from the three MSE workshops for managers and stakeholders, as well as draft responses to the feedback. The WG examined the feedback and further developed the responses, which are provided in this report (**Attachment 4**) and the MSE report.

Three workshops were held in March – April, 2021 to inform managers and stakeholders of the preliminary MSE results for NPALB. Feedback from these workshops are presented here. The feedback were organized into several sections, reflecting themes in the feedback. Candidate responses to the feedback were also drafted for the ALBWG to review. Some of the responses resulted in proposed changes to the MSE report, and in these cases, the proposed changes were shown to the ALBWG for review.

Discussion

The WG thanked the presenter for organizing the feedback and drafting the candidate responses. **The WG recommended that the feedback and responses for all three workshops be combined and provided as an Appendix in the MSE report and an attachment in this ALBWG workshop report.** In addition, **the WG also recommended that the non-technical summary**

developed for the MSE workshops for managers and stakeholders be provided as an Appendix in the MSE report. Discussion of the feedback and responses were organized as 2 sections: 1) feedback from workshops for the EPO and Chinese-Taipei; and 2) feedback from the workshop for Japan.

Feedback from workshops for the EPO and Chinese-Taipei

A major portion of the feedback related to translating the MSE results into the real world (i.e., translating simulated effort control into the real world; and how expected differences in performance may not reflect actual differences in the real world). The WG noted the limitations of the MSE simulations relative to the real world, and agreed with the suggested responses and changes to MSE report. The WG also suggested that, where appropriate, the ‘Key Limitations’ section of the MSE report be expanded to include a summary of these responses.

The WG noted that Table 12 in the preliminary MSE report had used an incorrect reference historical period (1981-2010) and agreed with the presenter that Table 12 should be amended with the correct historical period (2006-2015). The WG agreed with the explanations for the different ‘historical periods’ used in the MSE, which was because of different management objectives specified by the managers and stakeholders. The WG agreed with the suggested responses and changes to the MSE report.

The WG noted that there were several suggestions in the feedback to clarify and improve the figures in the MSE report. The WG reviewed these new figures and agreed that these new figures were an improvement over the figures in the preliminary MSE report. In particular, the WG recommended that the lower right panels in Figs 9 and 10 be amended to show the ‘current’ SSB/SSB0 and 1-SPRs as estimated by the simulated stock assessments and used to manage the simulated stock at the time of the assessment. In addition, the plotted circles in Figs. 9 and 10 could be color coded by year to help the reader track the year of the simulated assessment. The WG agreed to using the label ‘Odds of SSB > LRP’ instead of ‘Odds of SSB not breaching the LRP’. The WG also agreed to using the label ‘Odds of no management change’ instead of ‘Odds of no management action’. The WG noted that the MSE report will include an explanation that a ‘management change’ refers to a change from the TAC or TAE associated with the TRP.

The WG noted that the managers and stakeholders requested the values in the Appendices of the MSE report be made available to help them make comparisons. The WG noted that this request has already been completed and the data is currently available on the NPALB MSE site hosted by IATTC on Basecamp.

Feedback from workshops for Japan

The WG noted that the feedback from the MSE workshop for Japan was generally consistent with the workshops for the EPO and Chinese-Taipei. Therefore, the WG recommended to combine the feedback from all three workshops.

Some of the feedback required clarifications from the scientists who attended the MSE workshop in Japan. After clarification, feedback #4 and #5 from the MSE workshop in Japan was withdrawn because the comments appeared to be a result of a misunderstanding. The WG agreed with the draft responses from the presenter and suggested some minor edits.

3 ALBWG WORKPLAN FOR 2021 - 2022

The WG tasked D. Tommasi with providing the final draft of the MSE report to the WG by 27 May, 2021 (EPO time), and the WG was expected to provide any feedback to the WG vice-Chair by 03 June, 2021 (EPO time). The WG vice-Chair was tasked to provide the MSE report to the ISC Plenary and follow-up with the ISC Chair with regards to any minor editorial suggestions.

The WG vice-Chair was tasked to follow up with the ISC Chair on the presentation of the NPALB MSE results to the ISC Plenary, as well as with WCPFC Staff on the presentations for the WCPFC SC and WCPFC NC. D. Tommasi agreed to present the NPALB MSE results to the ISC Plenary, WCPFC SC, and the WCPFC NC, if requested to do so.

The WG developed a work plan for 2021 - 2022 (**Attachment 5**). Besides presentations of the MSE results at various meetings, the **WG plans to have an in person workshop in early 2022 (Jan – May) to discuss potential improvements to the NPALB assessment**. The timing and location of the meeting will be COVID-19 dependent, and Yokohama, Japan was proposed as the tentative location for the meeting.

Based on the research recommendations from the 2020 NPALB stock assessment, the following research tasks were discussed by the WG, and several members of the WG volunteered to perform the research.

1. Further investigation of the F01 fishery because there appears to be a mixture of two fisheries (one on juveniles and one adults) in this fishery.
Scientists from Japan agreed to examine the F01 Japan longline fishery in more detail and report back to the WG on their findings at the assessment improvement meeting in 2022.
2. Evaluate adult indices from the Japanese longline fisheries in southern areas (Areas 2 and 4), especially with respect to incorporating size data into the standardization process using a spatiotemporal process and/or data from alternative seasons.
Scientists from Japan agreed to evaluate the adult indices from the Japanese longline fisheries in southern areas (Areas 2 and 4), and report back to the WG on their findings at the assessment improvement meeting in 2022.
3. Evaluate potential juvenile indices from the Japanese longline fisheries in northern areas (Areas 1, 3 and 5), the Japanese pole-and-line and/or EPO surface fisheries.
Scientists from Japan agreed to evaluate the juvenile indices from the Japanese longline fisheries in northern areas (Areas 1, 3, and 5), and the Japanese pole-and-line fishery. Scientists from the US agreed to evaluate the juvenile indices from the EPO surface fisheries. Both groups agreed to report back to the WG on their findings at the assessment improvement meeting in 2022.
4. Collect sex-specific age-length samples using a coordinated biological sampling plan to improve current growth curves, and examine regional and temporal differences in length-at-age.
The WG agreed to discuss this topic at the assessment improvement meeting in 2022.
5. Collect sex ratio data by fishery using a coordinated biological sampling plan.
The WG agreed to discuss this topic at the assessment improvement meeting in 2022.
6. Evaluate and document historical high seas drift gillnet catch by member countries.
The WG agreed to discuss this topic at the assessment improvement meeting in 2022.

In addition to the six abovementioned research recommendations, **the WG also recommended that the modelers in the WG examine the 2020 assessment model and projection software in**

detail, and report to the WG on possible improvements at the assessment improvement meeting in 2022.

4 ELECTION OF ALBWG CHAIR

Sarah Hawkshaw was elected as the Chair of the ALBWG.

5 ANY OTHER MATTERS

No other matters were discussed. The WG thanked D. Tommasi for the tremendous work done on the NPALB MSE.

6 CLEARING OF THE MEETING REPORT

The WG vice-Chair prepared a draft of the report, which was reviewed by the WG prior to adjournment of the workshop. After the workshop, the WG vice-Chair evaluated and incorporated suggested revisions, made final decisions on content and style and distributed a second draft via email for approval by WG members.

7 ADJOURNMENT

The ALBWG meeting was adjourned at 6:50 pm on 24 May 2021 (West Coast North America time), 10:50 am on 25 May 2021 (Japan time), 9:50 am on 25 May 2021 (Chinese-Taipei time). The WG vice-Chair thanked the scientists participating in the workshop for their attendance and contributions on the NPALB MSE process.

ATTACHMENT 1

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ATTACHMENT 2

ALBACORE WORKING GROUP (ALBWG)
International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean
WEB MEETING

DATES

18-19 and 24 May 2021 (Eastern Pacific)
19-20 and 25 May 2021 (Western Pacific)

TIME

JAPAN & KOREA: 9:00 – 13:00
CHINESE-TAIPEI: 08:00 – 12:00
NOUMEA: 11:00 – 15:00
WEST COAST NORTH AMERICA: 17:00 – 21:00

MEETING OBJECTIVES: 1) Review feedback on the North Pacific Albacore Management Strategy Evaluation (MSE) during workshops with managers and stakeholders; 2) Propose and review responses to feedback; and 3) Election of ALBWG Chair.

AGENDA

DAY 1 (EPO: Tue, May 18; WPO: Wed, May 19)

1. Opening and Welcome
 - 1.1 Introductions
 - 1.2 Meeting Protocol
 - 1.3 Review and Adoption of Agenda
 - 1.4 Assignment of Rapporteurs
2. North Pacific Albacore MSE
 - 2.1 Current Status of the MSE Process
 - 2.2 Review Feedback from MSE Workshops with Managers and Stakeholders
 - 2.3 Propose and Review ALBWG Responses to Feedback

DAY 2 (If needed; EPO: Wed, May 19; WPO: Thu, May 20)

2. North Pacific Albacore MSE (cont.)

DAY 3 (EPO: Mon, May 24; WPO: Tue, May 25)

3. Review ALBWG Workplan for 2021 – 2022
4. Election of ALBWG Chair
5. Any Other Matters
6. Clearing of Meeting Report
7. Adjournment

ATTACHMENT 3

List of Presentations

Number	Title and Authors	Availability
Presentation 1	Progress and Current Status of the NPALB MSE Process S. Teo	Contact the author
Presentation 2	Feedback from MSE Workshops with Managers and Stakeholders D. Tommasi	Contact the author

ATTACHMENT 4

Feedback from MSE workshop attendees to the ALBWG, and corresponding responses from the ALBWG. Feedback is sorted into general themes.**Translating simulated effort control into real world measures.**

1. Workshop attendees noted that the simulated effort control was modelled as exploitation rate (H) instead of real world effort (e.g., number of vessels, fishing days). If effort control is to be used, there would be a need to translate simulated effort control into real world measures. Therefore, communication may be required between managers and the WG about the observed relationships (or lack thereof) between exploitation rate and effort. The attendees were also not clear about the appropriate measures of effort for management.

Response. Although the report presents a potential approach that could be used to translate exploitation rate (H) into a real world effort measure for the surface fleets, the MSE was not designed to assess efficacy of specific effort control measures. It only assessed the impact of changes in fishing pressure (F) and associated H, as set by the HCR, given some implementation error, on the NPALB stock and fleets.

More work is required outside of the MSE framework to relate F and the associated H to real world effort measures. Ultimately, it is up to managers to discuss and decide what type of effort controls (e.g. restrictions on # fishing days or vessels) are better suited for specific fleets and the ALBWG can work with managers to further refine relationships between real world effort and H.

Expected differences in performance may not reflect actual differences in the real world

2. Workshop attendees noted that the expected differences in catches between HCRs with different TRPs may not actually manifest in the real world because the fishing fleets may not fish to the TRP level. Besides the HCRs, the actual fishing effort is also dependent on the productivity and availability of fish (both NPALB and other stocks), as well as market forces and fleet dynamics. It is important that the WG highlight to the managers that the expected differences are likely ‘potential’ differences.

Response: The text in section 5 p. 41 of the MSE report was amended as suggested to highlight that differences in performance are “potential”.

3. Workshop attendees also noted that the expected differences in performance between TAC and TAE/TAC control may be due to how the controls were modeled and may not reflect the real world. For example, fleets under TAC control were assumed to fish to the TAC (with some implementation error) but it is not clear if these fleets actually would in the real world. Other un-modeled factors (e.g., fleet dynamics, market forces) may play a bigger role than HCRs. It is important that the WG highlight this to the managers. However, it was also noted that there was no data on how the different fleets would behave under TAC or TAE/TAC control.

Response. The text in section 5 p. 41 was amended to highlight that there are un-modeled factors, such as market forces, that may play a bigger role than in HCRs in determining fleet behavior.

4. WG attendees suggested that the WG can highlight that due to limited knowledge on some aspects of albacore biology and ecology, such as migration patterns, and lack of necessary data (as stated above), the model would not truly (or entirely) reflect the “real world”. Therefore, some discrepancies between the “real world” and the “virtual world” are unavoidable (or expected). However, models provide valuable “general ideas” about possible prospects about the stock behaviors and responses.

Response. Some of this information is already present in section 6 under key limitations, but the text in section 5 p. 41 was also amended to reflect the above. Furthermore, section 6 was expanded to highlight that, due to a lack of data on how the different fleets would respond to a TAC or TAE/TAC control being implemented, it was assumed that the TAC or TAE/TAC set by the HCR would always be met, given some implementation error. However, other un-modeled factors, such as market forces, may be more important than the HCR in determining fleet behavior.

5. Workshop attendees noted that the relationship between fishing mortality and the effort by the EPO surface fishery in number of days was not a clear relationship. In addition, CPUE from those fisheries is not included in the stock assessment due to not representing the population. Therefore, effort control would not be applicable in real world management.

Response. Based on an analysis outside of the MSE framework (see p. 39, Section 4.2.6), there is a significant but noisy relationship between the EPO surface fishery effort and exploitation rate of the fishery. In the report, the ALBWG notes that this is an example of a potential approach that can be used to translate ‘real world’ effort metrics into exploitation rate, and that managers can refine it further in collaboration with the WG.

The MSE was not designed to assess efficacy of specific effort control measures. It only assesses the impact of changes in fishing pressure as set by the HCR, given some implementation error informed by the analysis described above, on the NPALB stock and fleets.

It is up to the managers to discuss and decide whether effort or catch controls are better suited to which fishery and how those would be implemented.

The use of CPUE in the assessment is not related to whether there is a relationship between fishing effort and F. The EPO CPUE not being used in the assessment is due to the CPUE in the EPO being related to both the population and variable migration rates to the EPO, which is currently not well estimated due to lack of data.

6. Workshop attendees noted that when the results for mixed control are converted into real world effort control measures, the rate of reduction in those effort control measures appear to differ depending on the type of fishery for the same reduction in exploitation rate (e.g., 10% reduction for EPO surface fishery vs 30% reduction for Japan pole-and-line fishery). This may create a sense of unfairness, so care must be taken.

Response. The ALBWG stresses that the MSE was not designed to assess efficacy of specific effort control measures. It only assesses the impact of changes in fishing pressure as set by the HCR, given some implementation error informed by the analysis described above, on the NPALB stock and fleets.

However, the report provides examples, based on an analysis outside of the MSE framework (see p. 39, Section 4.2.6), of how effort of the EPO surface fishery and the Japanese pole-and-line fishery can be related to albacore exploitation rate (H) as H was taken as the measure of effort in the MSE. The EPO relationship is more noisy and the required change in the ‘real world’ effort metric for a set change in H is less than for the Japanese pole-and-line (compare Fig. 13 and 16 in the report). However, while ‘real world’ effort is measured as fishing days for the EPO fishery, it is measured as fishing days weighted by the proportion of albacore in the catch relative to skipjack for the Japanese pole-and-line fishery. Thus, the two effort metrics cannot be directly compared. In the report, the ALBWG notes that these are examples of potential approaches that can be used to translate ‘real world’ effort metrics into exploitation rate, and that managers can refine them further in collaboration with the WG.

Management action and behaviors of different HCR

- Workshop attendees noted that the number of management actions should be identified and shown clearly in the results for each scenario and HCR, but especially when the OM is equivalent to the stock assessment model. It appears that one of the main results of this MSE is that no management actions are necessary for this stock.

Response. The probability of a management change, where management change refers to a reduction in fishing intensity relative to the fishing intensity associated with the target reference point (TRP), is one of the performance indicators for Management Objective #5. Its value for across all scenarios can be seen in Column 14 of Table ES4 for mixed control and of Table ES5 for TAC control, with column heading P(no management change). Output for the same performance metric but solely for Scenario 1, which uses an OM equivalent to the assessment model, can be found in Table A5 (mixed control) and Table A6 (TAC control), under Column 15. This metric would be closely related to the number of management actions. Management action being a change in management from the TAC or TAE associated with the TRP.

Yes, the MSE results show that, given that the stock is in good condition, if catches and effort levels remain at historical levels, which according to Scenario 1, would correspond to a F50 TRP, no management action would likely be required to maintain the stock above the threshold. However, management actions may be required in the future and it might be good to have an HCR in place for if and when that happens.

It is up to the managers to discuss and put in place what they think is an appropriate conservation and management measure (CMM) or resolution for this stock.

- Workshop attendees noted that in the example shown in Fig. 40, there is an obvious and large reduction of TAC just after the management starts. The 50% reduction of TAC in the three years after the assessment is similar to a moratorium, and is not a realistic management action. The WG should reconsider the range of TAC variability. Workshop attendees suggested that the range should be within 10-20%.

Response. In several single runs, the TAC limits do drop by >50% when the SSB is detected to drop below the LRP in Figure 40, which is for all reference scenarios and using TAC control. However, in Column 15 of Table A2, one can see that under TAC control and across scenarios, the average TAC change between assessment periods is about 19%. In Table A1 one can see that the average catch change under mixed control is about 7%. The TAC change by scenario and HCR can be seen in Table A3 Column 16 for mixed control and in Table A4 Column 16 for TAC control.

For the MSE, the managers decided not to put in a limit on the TAC change. However, managers may decide to put those limits in a CMM or resolution, noting that this was not tested in the MSE.

9. It was also noted that after the large reductions of TAC, sharp TAC increases occurred, which is also unrealistic. This could be due to the three year schedule of stock assessments. One possible solution for this is to conduct a stock assessment every year by devising prompt data collecting schemes and changing TAC every year. The magnitude of TAC change also needs to be clarified. Reduction of TAC change should be considered as well.

Response. The large drops in TAC are largely due to drops in recruitment and to SSB subsequently dropping below the LRP, which is then detected by the assessment. The reduction in catches coupled with a recovery in recruitment leads to a sharp increase in SSB and associated TAC. The 3 year gap between assessments does lead to low TACs being maintained for 3 years and may lead to faster recovery, but a 1 year assessment cycle was not considered to be reasonable by the WG. However, the 3 year assessment cycle also leads to high TACs being maintained even when ‘true’ SSB drops. See page 9 in the MSE report under Result #2 for an explanation of how TAC control, under a 3 year assessment cycle, is less responsive to changes in SSB between assessments than mixed control.

The magnitude of TAC change between assessment periods across all reference scenarios is reported in column 15 of Tables A1 and A2 and by scenario in column 16 of Tables A3 and A4.

For the MSE, the managers decided not to put in a limit on the TAC change. However, managers may decide to put those limits in a resolution or CMM, noting that this was not tested in the MSE.

Definitions of ‘historical periods’

10. Different management objectives appear to use different definitions of ‘historical periods’. There is a need to explain the reasoning behind these differences. Where appropriate, there may be a need to get feedback from managers and stakeholders on what is the appropriate ‘historical period’ for certain objectives.

Response. The different historical periods used in the management objectives were defined together with managers and stakeholders during the ALBWG MSE workshops in Yokohama in 2016 and in Vancouver in 2017. This was clarified in the text (p. 20, Section 3.4)

11. Table 12 in the preliminary MSE report uses an incorrect ‘historical period’.

Response. Table 12 in the preliminary MSE report used a reference historical period of 1981-2010 rather than that specified in the legend of 2006-2015. The period specified in the legend should have been used because performance metric 3 uses a historical period of 2006-2015. The table and associated text in section 5.3 p. 44 were amended. As Table 12 and the corresponding text used a historical period of 2006-2015, Fig. 34, which showed the difference in catch ratios between the 1981-2010 average and the 1999-2015 average also had to be modified to show the difference in average catch ratios between 2006-2015 and 1999-2015 instead.

Figures and Tables.

12. It would be useful to illustrate the lower right panels in Figs. 9 & 10 of the preliminary MSE report (F x SSB HCR plots) with lines and year labels joining the dots so that the reader can see how the observed population changes over time with respect to the HCR.

Response. The figures were revised in the MSE report as suggested. Also, the Figures 9 and 10 in the preliminary MSE report showed the SSB relative to dynamic unfished SSB from the simulated assessment, but the fishing intensity (F) from the next assessment period to show the change in F resulting from the management action. However, this caused some confusion for stakeholders. Therefore, the WG decided to amend the figures to show the SSB relative to dynamic unfished SSB and the corresponding F from the same simulated assessment instead.

13. Some attendees would like to see how the stock responds on an annual level, rather than in 3-years intervals for Figs 9 & 10. Especially in the case when the Threshold Reference Point is breached. This can be easily done by adding annual dots to the OM figure.

Response. The figures were revised as suggested.

14. The performance indicators in some figures and tables were labelled as ‘Odds of SSB not breaching the LRP’. It will be simpler and more understandable if they were labelled as ‘Odds of SSB > LRP’.

Response. Labels on figures and tables were amended as suggested

15. Some figures were labelled as ‘no management action taken’ but there were actually still TAC or TAE/TAC controls associated with the TRPs that were in effect. This might be misleading for some. Important to highlight to managers that all the TRPs in the MSE had TAC or TAE/TAC controls associated with them. Suggest clarify that “management action” refers to reducing fishing intensity relative to the fishing intensity according to the TRP, when the stock status is lower than the Threshold or Limit Reference Point. Suggest “appropriate management change”

Response. The label ‘no need for management action’ in Fig. 9 was amended to ‘no management change required’. The label ‘management action triggered’ in Fig. 10 was amended to ‘appropriate management change triggered’. Furthermore, one of the performance indicators for Management Objective 5 was labeled as ‘Odds of no management action’. The label for this performance indicator and those on associated tables and figures were changed to ‘Odds of no management change’. It was highlighted in the text and table captions that management change refers to a reduction in fishing

intensity relative to the fishing intensity associated with the target reference point (TRP), when stock status is lower than the Threshold or Limit Reference Point.

16. Workshop attendees requested that the values in the results tables in the Appendices be made available as Excel or csv files to help them make comparisons.

Response. This has been completed. These tables are now available as csv files on the Basecamp project site.

17. Workshop attendees pointed out that it was important to consider the weightings of the performance indicators in the spider plots because some performance indicators with the same probabilities may differ in importance. Otherwise, the tradeoffs between the different management objectives or performance indicators may not be clear.

Response. The spider plots in the MSE report are un-weighted and meant to be illustrative rather than definitive. This was clarified in the captions for the spider plots in Fig. ES3 and ES4. Given tradeoffs between different performance indicators, the choice of a preferred HCR is dependent on what each manager and stakeholder most value among the different management objectives and their level of risk aversion. The performance indicators in the spider plots are un-weighted as different managers have different risk profiles and have different emphases on certain management objectives. It is not up to the WG to weigh the different management objectives, but to managers and stakeholders. Managers are encouraged to use the results in the appendix tables and Basecamp to plot the results themselves using their own weightings to highlight certain aspects of the results.

ATTACHMENT 5

Workplan

Date	Location/Method	Task/Event
June 3, 2021		Deadline of WG comments on MSE report
July 12 – 20, 2021	Online	ISC Plenary (Report MSE results)
August 11 -19, 2021	Online	WCPFC SC17 (Report MSE results)
October 2021	TBD	WCPFC NC17
Early 2022	Yokohama, Japan	ALBWG workshop (Assessment Improvements)
