**SCIENTIFIC COMMITTEE**
**NINETEENTH REGULAR SESSION**
16–24 August 2023

## Update to further inform discussions on South Pacific albacore objectives and the TRP

**WCPFC-SC19-2023/MI-WP-03**
**20th June 2023**

**SPC-OFP**

## Executive Summary

WCPFC19-2022-15 presented a table of possible outcomes for South Pacific albacore under a range of different longline and troll catch levels, determined by catch scalars relative to the 2017-2019 average. Two scenarios were presented: catches from longline and troll fisheries within the WCPFC Convention Area (WCPFC-CA) only are set by the catch scalar and the catches in the EPO held constant at recent levels (2017-19, 15,600mt; Table 1); catches from longline and troll fisheries in both the WCPFC-CA and EPO are set by the catch scalar (Table 2).

In this report Tables 1 and 2 have been updated following a small change in the method used for analysis. The method for running the projections that generate the results remains the same as used in WCPFC19-2022-15. For each catch scalar, each of the 72 models in the 2021 stock assessment grid is projected 100 times, referred to as iterations, where each iteration has different stock recruitment variability to represent uncertainty in future recruitment. A small proportion of these projections fail to complete, leading to a missing iteration.

When calculating summaries for the original tables presented in WCPFC19-2022-15, these missing iterations were excluded from the calculation of results. In the updated tables presented herein, the missing iterations are assumed to be the result of the stock crashing from being fished too hard. The stock biomass in the projected period for these iterations is now set to 0 and are included in the calculation of results. This approach is thought to be more appropriate. The result is that the projections are now slightly more pessimistic. For example, the risk of falling below the LRP is slightly higher for the higher catch scalars.

Extra rows have been included in each table following input from CCMs.

Two extra rows have been included based upon discussions of the WCPFC South Pacific albacore IWG. The first shows the results of a projection that achieves a long-term $SB/SB_{F=0}$ equal to the 2017-2019 average. The second shows the results of a projection that achieves a long-term vulnerable biomass (available to the longline fisheries) equal to the 2017-2019 average.

Three extra rows have been included based upon requests of the PNA. These show the results of projections that achieve long-term $SB/SB_{F=0}$ equal to the 2015-2018 average, and to that in 2013 and 2019.

An extra row has been included, following a request from Tokelau, to present the results of a South Pacific albacore stock level equal to a level of adult biomass that is twice the level that would give MSY. We used the results of the 2021 stock assessment for South Pacific albacore to calculate this adult biomass level in terms of depletion:

$2 \times SB_{MSY}/SB_{F=0} = {\sim}32\%SB_{F=0}$

Information provided within Tables 1 and 2 reflect the outcomes requested at prior meetings, and columns have been re-ordered to refocus on depletion levels. The tables also include an additional

column of long-term average $SB/SB_{F=0}$ relative to the average $SB/SB_{F=0}$ in the years 2017 to 2019, consistent with the request at SC18. Below we concentrate on the results for scenarios evaluated since SC18, where fishing is controlled within the WCPFC-CA only (i.e. Table 1).

To achieve a target level of 2 x $SB_{MSY}$, the level of catch within WCPFC-CA longline and troll fisheries would need to be increased by 14% relative to 2017-2019 average levels if catches in the EPO were held constant at recent levels (Table 1). This leads to declines in stock biomass to the depletion level of $32\%SB_{F=0}$, resulting in a notably more depleted stock than seen recently. In turn, long term vulnerable biomass (the CPUE proxy) is notably lower than that seen on average over 2017-2019, and the original target level of 2013 levels + 8% (36% and 53% lower, respectively, in Table 1). Given that the level of catch necessary to achieve this depletion level is greater than recent average levels, and the declines in CPUE estimated, this target would require considerably more effort to achieve.

Achieving a target consistent with depletion levels seen in 2019 ($SB/SB_{F=0}$ 2019; $39\%SB_{F=0}$) also requires an increase in catch - by 3% - relative to the average over 2017-2019, leading to 20% and 21% decreases in stock and vulnerable biomass respectively compared to recent levels.

Under scenarios which require status quo or higher catch scalars (i.e. scalar values equal to or greater than 1), an increased number of projection runs 'fail'. This increases the risk of falling below the LRP and result in risk levels greater than the 20% maximum risk considered by the Commission for harvest strategy analyses.

To maintain recent depletion levels ($SB/SB_{F=0}$ 2017-19; $49\%SB_{F=0}$) WCPFC-CA catch must be reduced by 14% from baseline levels (to approximately 62,500 mt if that region alone is controlled by management; Table 1). Average vulnerable biomass falls very slightly compared to recent levels (in an equilibrium state) and there is a 17% risk of falling below the LRP. Achieving a vulnerable biomass consistent with the average seen over the recent period (VB 2017-19) requires a slightly greater catch reduction of 16% (approximately 60,500 mt in the WCPFC-CA), leads to a small increase in biomass, and a 16% risk of falling below the LRP.

To achieve a target consistent with the average seen between 2015 and 2018 ($SB/SB_{F=0}$ 2015-18; $58\%SB_{F=0}$) WCPFC-CA catch must be reduced by 29% (to approximately 51,300 mt). This results in a 14% increase in vulnerable biomass relative to recent levels, and a 9% LRP risk.

Finally, a target of depletion levels equivalent to that estimated in 2013 ($SB/SB_{F=0}$ 2013; $60\%SB_{F=0}$) requires further catch reductions (by 34%, approximately 47,800 mt) and leads on average to an 18% increase in vulnerable biomass relative to recent levels and a 6% risk of falling below the LRP.

Table 1: Outcomes under alternative future combined longline and troll fishery catch levels (scalars) applied within the WCPFC Convention Area only. Outcomes are in terms of median (weighted) stock depletion level within the WCPFC-CA, risk relative to the LRP (WCPFC-CA specific), longline vulnerable biomass relative to alternative historical periods, and risk relative to the FMSY (South Pacific wide).

| Scenario | Depletion | | | Vulnerable biomass | | Approximate catch (mt) | | | F/FMSY |
|---|---|---|---|---|---|---|---|---|---|
| | Long-term avg. $SB/SB_{F=0}$ (WCPFC-CA) | $SB/SB_{F=0}$ rel. 2017-2019 | Risk < LRP | VB rel. 2013 +8% | VB rel. 2017-2019 | Catch scalar | WCPFC-CA | Remainder EPO | Risk F > FMSY |
| 2 x $SB_{MSY}$ | 0.32 | -37% | 38% | -53% | -36% | 1.14 | 82,300 | 15,600 | 26% |
| $SB/SB_{F=0}$ 2019 | 0.39 | -20% | 28% | -43% | -21% | 1.03 | 74,000 | 15,600 | 18% |
| | 0.41 | -17% | 26% | -41% | -18% | 1.00 | 72,200 | 15,600 | 17% |
| | 0.47 | -4% | 19% | -33% | -7% | 0.90 | 65,000 | 15,600 | 14% |
| $SB/SB_{F=0}$ 2017-19 | 0.49 | 0% | 17% | -30% | -3% | 0.86 | 62,500 | 15,600 | 12% |
| VB 2017-19 | 0.51 | 3% | 16% | -28% | 0% | 0.84 | 60,500 | 15,600 | 12% |
| | 0.53 | 8% | 14% | -25% | 4% | 0.80 | 57,800 | 15,600 | 10% |
| $SB/SB_{F=0}$ 2015-18 | 0.58 | 18% | 9% | -18% | 14% | 0.71 | 51,300 | 15,600 | 7% |
| | 0.58 | 19% | 8% | -18% | 15% | 0.70 | 50,500 | 15,600 | 6% |
| $SB/SB_{F=0}$ 2013 | 0.60 | 23% | 6% | -15% | 18% | 0.66 | 47,800 | 15,600 | 5% |
| | 0.64 | 30% | 4% | -10% | 25% | 0.60 | 43,300 | 15,600 | 3% |
| | 0.69 | 40% | 1% | -3% | 35% | 0.50 | 36,100 | 15,600 | 0% |

Table 2: Outcomes under alternative future combined longline and troll fishery catch levels (scalars) applied across the South Pacific (WCPFC-CA and EPO). Outcomes are in terms of longline vulnerable biomass relative to alternative historical periods, F/FMSY (estimate available for across the South Pacific only), median (weighted) stock depletion level within the WCPFC-CA, and risks relative to the LRP (WCPFC specific) and FMSY (South Pacific wide).

| Scenario | Depletion | | | Vulnerable biomass | | | Approximate catch (mt) | | | F/FMSY |
|---|---|---|---|---|---|---|---|---|---|---|
| | Long-term avg. $SB/SB_{F=0}$ (WCPFC-CA) | $SB/SB_{F=0}$ rel. 2017-2019 | Risk < LRP | VB rel. 2013 +8% | VB rel. 2017-2019 | Catch scalar | WCPFC-CA | Remainder EPO | | Risk F > FMSY |
| 2 x $SB_{MSY}$ | 0.32 | -35% | 37% | -51% | -33% | 1.11 | 79,900 | 17,300 | | 25% |
| $SB/SB_{F=0}$ 2019 | 0.39 | -21% | 29% | -43% | -22% | 1.02 | 74,000 | 16,000 | | 18% |
| | 0.41 | -17% | 26% | -41% | -18% | 1.00 | 72,200 | 15,600 | | 17% |
| | 0.48 | -2% | 18% | -31% | -5% | 0.90 | 65,000 | 14,000 | | 13% |
| $SB/SB_{F=0}$ 2017-19 | 0.49 | 0% | 17% | -30% | -3% | 0.88 | 63,900 | 13,800 | | 12% |
| VB 2017-19 | 0.51 | 3% | 16% | -28% | 0% | 0.86 | 62,200 | 13,400 | | 11% |
| | 0.55 | 11% | 12% | -23% | 7% | 0.80 | 57,800 | 12,500 | | 8% |
| $SB/SB_{F=0}$ 2015-18 | 0.58 | 18% | 8% | -18% | 14% | 0.75 | 53,900 | 11,600 | | 6% |
| $SB/SB_{F=0}$ 2013 | 0.60 | 23% | 6% | -15% | 19% | 0.70 | 50,800 | 11,000 | | 4% |
| | 0.61 | 24% | 6% | -14% | 19% | 0.70 | 50,500 | 10,900 | | 4% |
| | 0.67 | 36% | 1% | -6% | 31% | 0.60 | 43,300 | 9,400 | | 1% |
| | 0.72 | 48% | 0% | 2% | 43% | 0.50 | 36,100 | 7,800 | | 0% |