Western and Central Pacific Fisheries Commission

Pacific Community
Communauté du Pacifique

Evaluation of candidate management procedures for bigeye tuna

WCPFC-SC21-2025/MI-WP-07

SCIENTIFIC COMMITTEE
TWENTY-FIRST REGULAR SESSION
Nuku'alofa, Tonga
13–21 August 2025

Recent catch proportions by gear

Stock	Tropical longline	Southern longline	Northern longline	Pole and line	Purse seine	Troll	Other
Skipjack	0	0	0	0.09	0.83	0	0.08
South Pacific albacore	0.12	0.81	0	0	0	0.07	0
Bigeye	0.27	0.05	0.06	0.01	0.45	0	0.15
Yellowfin	0.08	0.02	0.01	0.03	0.55	0	0.31

- Mean proportion of catch by weight (2020-2022) in WCPFC-CA (SPA south of equator).
- Other is domestic fisheries of Vietnam, Indonesia and Philippines.
- Skipjack and South Pacific albacore - dominated by one fishery, no interaction.
- Bigeye and yellow – mixed fishery interactions.

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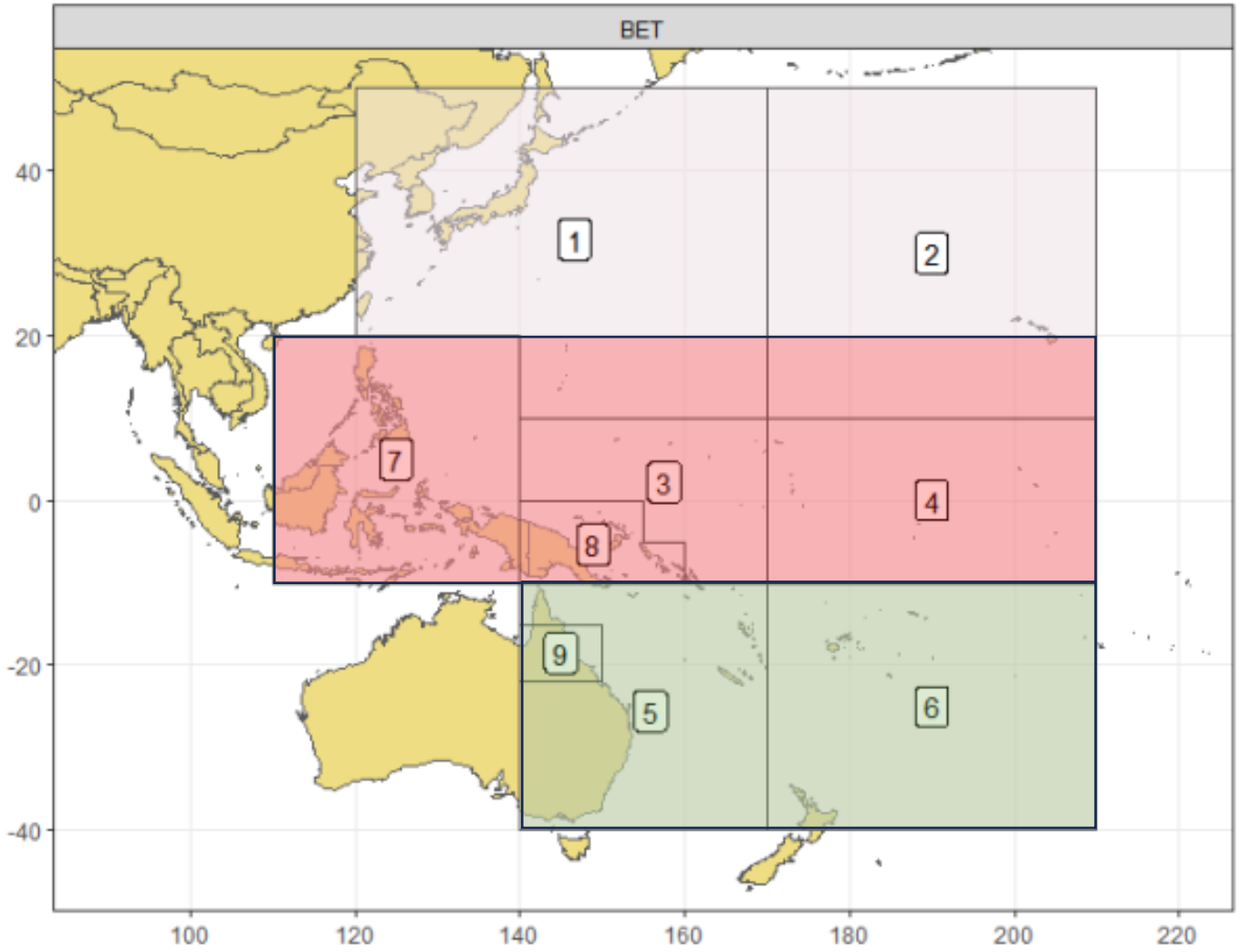
- Skipjack and South Pacific albacore - dominated by one fishery, no interaction.
- Bigeye and yellow – mixed fishery interactions.
- Mixed fishery approach specifies single-stock MPs for skipjack, South Pacific albacore and bigeye.
- Under mixed fishery approach the tropical longline is managed through the bigeye MP
- Archipelagic waters excluded from WCPFC MPs.

Longline fisheries



Longline fishery	Latitudinal range	MP
Northern	North of 20N	Potentially aligned with NPA management
Tropical	10S to 20N	BET
Southern	South of 10S	SPA

MSE model fishery set up

- To run MSE need to make assumptions about future catch and effort of fisheries not managed through the BET MP.
- Future catch / effort consistent with TTM bigeye projections under SKJ MP scenario.

Fishery	MP	MSE framework future assumption
Tropical longline	Bigeye	Catch set by bigeye MP
Northern longline	Potentially aligned with NPA management	2019-2021 average catch +12%
Southern longline	South Pacific albacore	2019-2021 average catch +12%
Purse seine	Skipjack	2012 effort, assume FAD closure period described in CMM 2023-01
Pole and line	Skipjack	2019-2021 average effort
Other	Skipjack	2016-2018 average catch

MSE framework assumptions

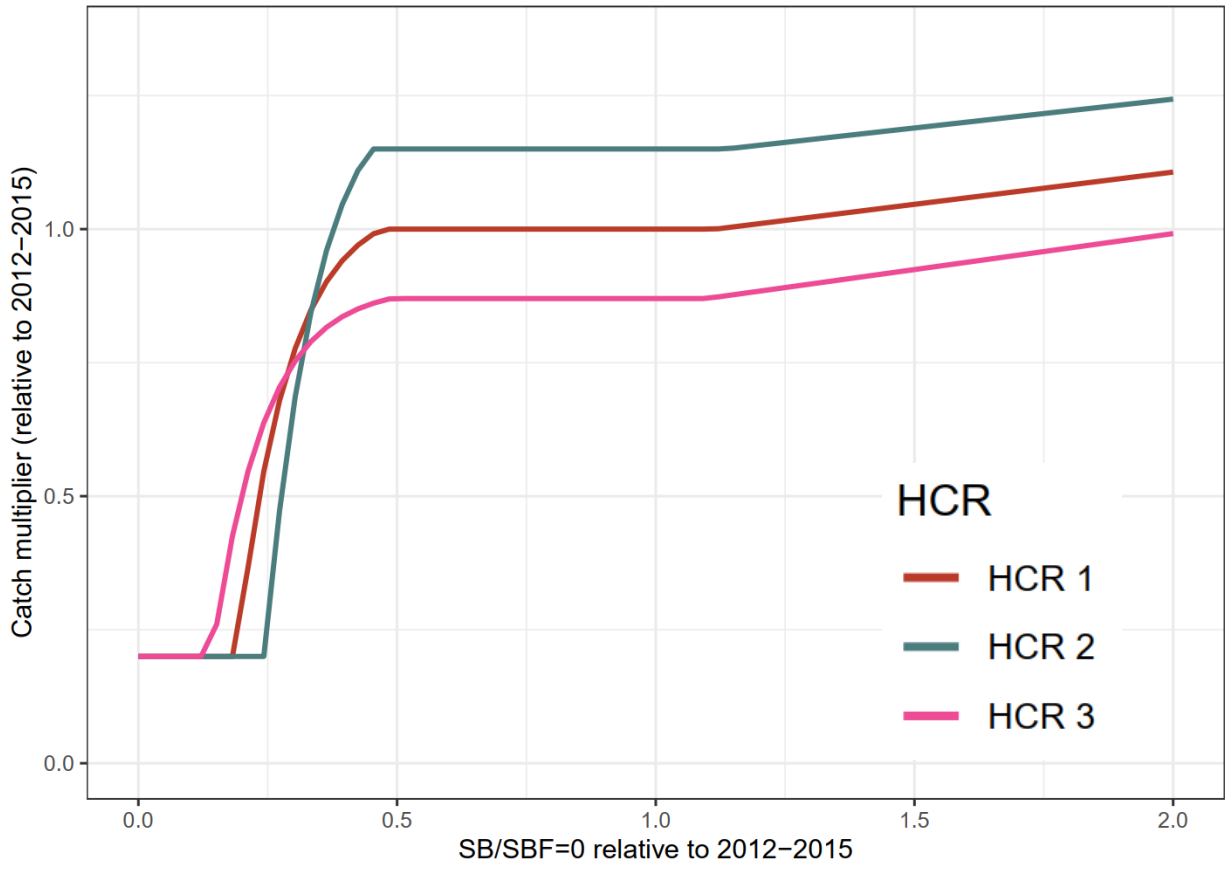
- Operating models described in MI-WP-05
- Evaluations start in 2022
- MP first evaluated in 2026 to set catch limits for TLL in 2027
- Transient period (2022-2026), TLL set to 2019-2021 average +12%

MPs

- Estimation method – ASPM in SS3 (MI-WP-06)
  - Input is SB/SBF=0 relative to 2012-2015
  - Two year data lag
- Bigeye MP sets catch limit for TLL
- HCR outputs a scalar applied to baseline TLL catch of 2012-2015
- All fisheries managed through the MP are affected equally
- Management period is three years
- HCR shapes chosen to achieve management objectives

Future candidate MPs could output a total effort for the TLL, instead of a total catch limit. Allocation of that total, and how those allocations are managed in practice (e.g. through effort if the allocation is in terms of catch, or catch if the allocation is in terms of effort) is external to the MP.

HCRs



- HCR shapes similar to interim SKJ MP
- Three candidate TRPs for bigeye were specified at WCPFC21: 1x, 0.94x and 1.06x the 2012-2015 $SB/SB_{F=0}$.
- WCPFC21 noted that these candidate TRPs may be specified as thresholds for which associated probabilities of being 'at or above' would need to be specified.
- In these evaluations, specified TRP levels are used as long-term objectives for the candidate MP performance.
- Three HCRs that achieve each TRP.
- Constraint of +- 10% applied.

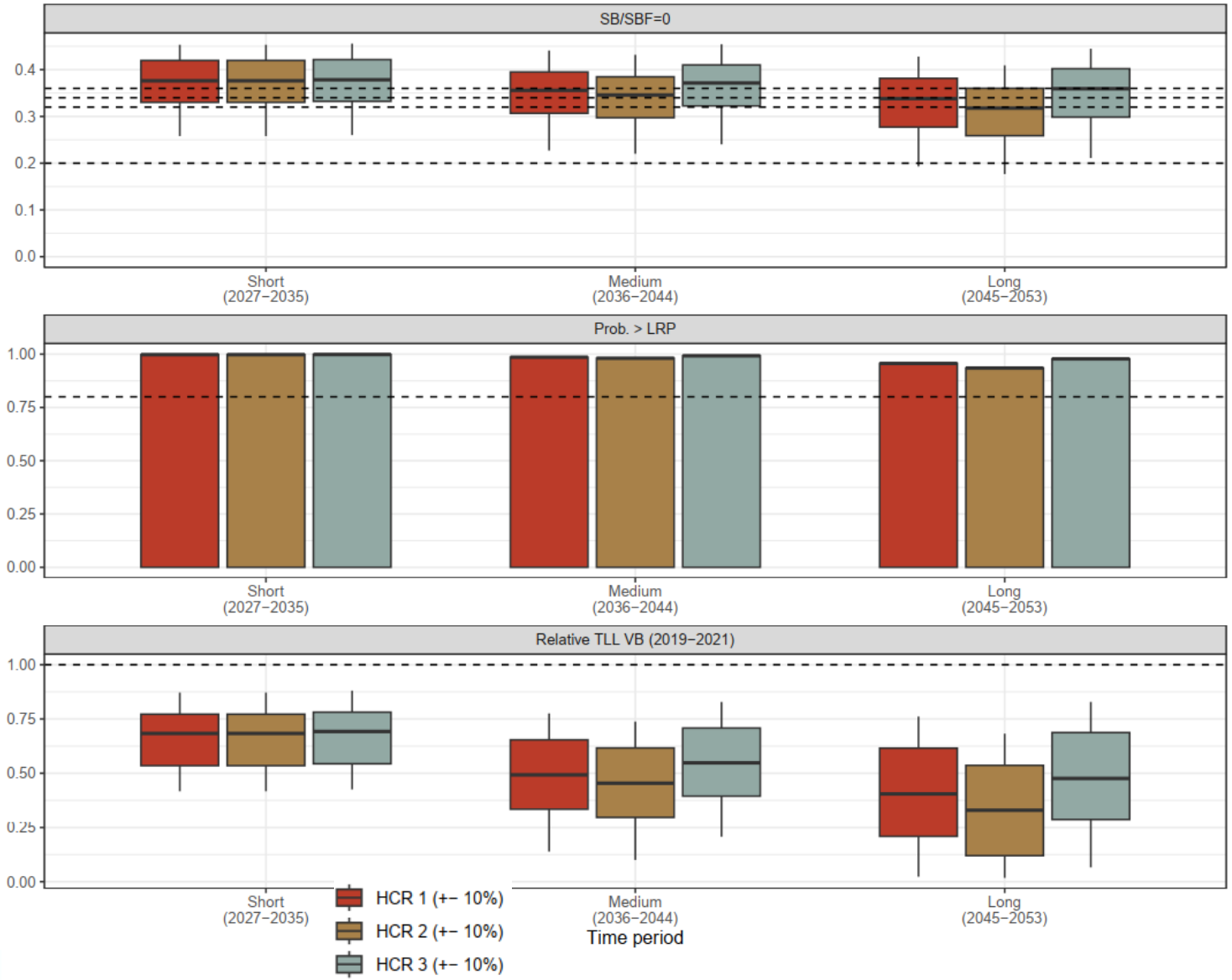
Six performance indicators

Indicator	Notes
$SB/SB_{F=0}$ in the WCPFC-CA	Can be compared to the three TRPs
Probability of being above LRP	WCFPFC requires at least 0.8
Vulnerable biomass (TLL)	Relative to VB in 2019-2021
Total TLL catch	Relative to TLL catch 2019-2021
Total WCPFC-CA catch	Relative to WCPFC-CA catch 2019-2021
Catch variability in TLL catch	Calculated as absolute annual difference

The average values of the PIs are calculated over three time periods:

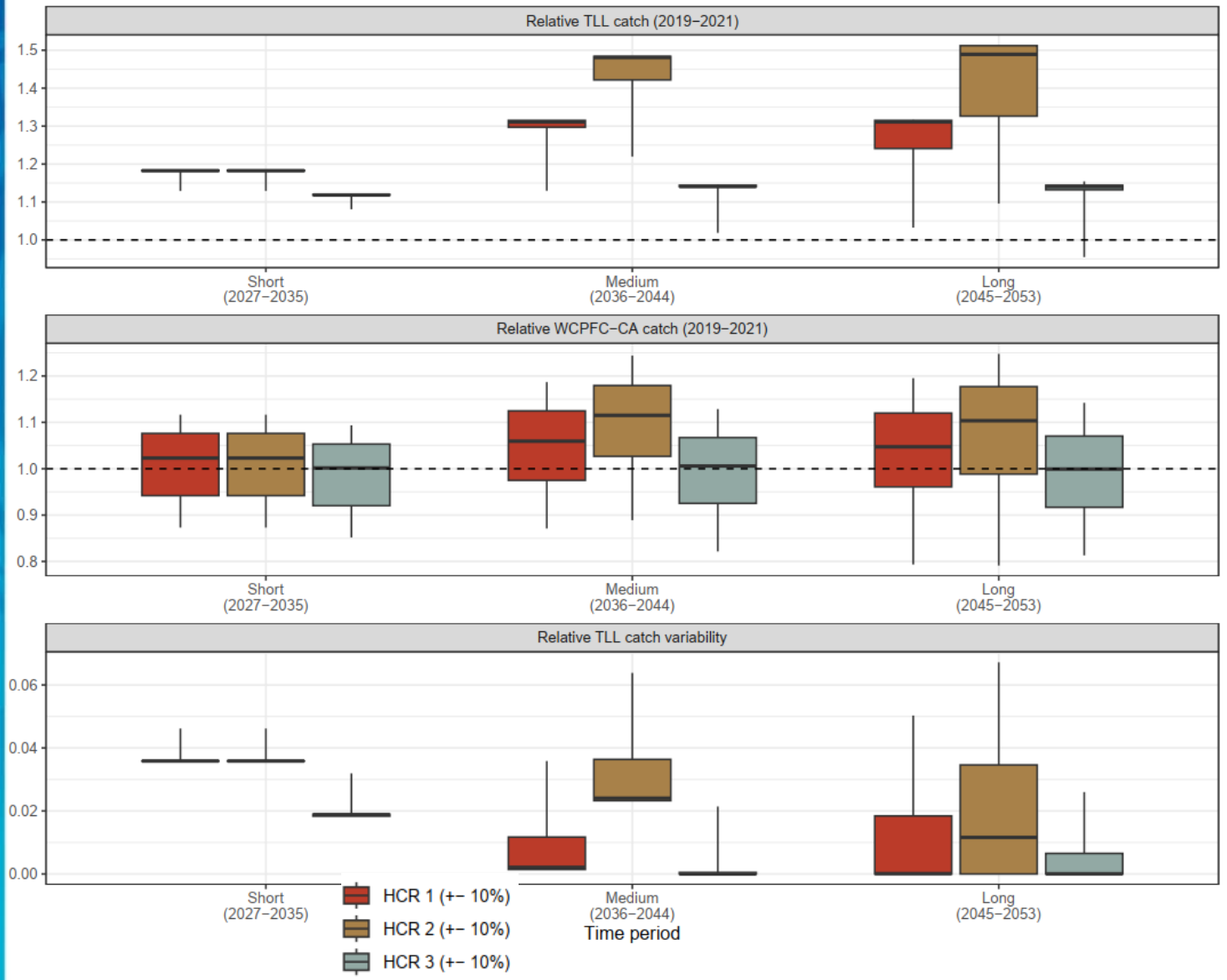
- Short (2026-2034)
- Medium (2035-2043)
- Long (2044-2052)

Results



- Long-term $SB/SB_{F=0}$ achieves the three TRPs.
- All MPs have high probability of being above LRP.
- VB, lower than reference period (consistent with WCPFC21 TRP evaluations)

Results



- TLL catches are above reference period (2019-2021).
- WCPFC-CA less affected (only TLL catches are directly affected by MP).
- Catch variability for TLL catch is low (catch-based MP).

Discussion

- In these evaluations, the shorter FAD closure period described in CMM 2023-01 (one and half month annual FAD closure period in EEZs and high seas, with an additional month in the high seas) is assumed. Future work may include alternative assumptions about the FAD closure period. This may be important, given the impact of FAD fishing on juvenile bigeye.
- Note these are preliminary analyses, demonstrating the utility of the bigeye MSE framework and providing results based upon the request of WCPFC21. However, further guidance will be needed from managers on the assumptions made on key settings within the analyses to progress the work.

Acknowledgements

We gratefully acknowledge funding for this work from the New Zealand Ministry of Foreign Affairs and Trade (MFAT) funded project "Sustainable Pacific Fisheries.

SC21 is invited to

- Note the baseline assumptions made about future catches of bigeye by the northern and southern longline fisheries and domestic fisheries of Vietnam, Indonesia and Philippines, as well as the future fishing effort of the pole and line and purse seine fisheries for these preliminary evaluations.
- Provide feedback on consequences of the long-term objectives, noting the selected target reference points and WCPFC21 discussions on thresholds, and request guidance from WCPFC22 on these issues.
- Provide feedback on the suite of performance indicators used.