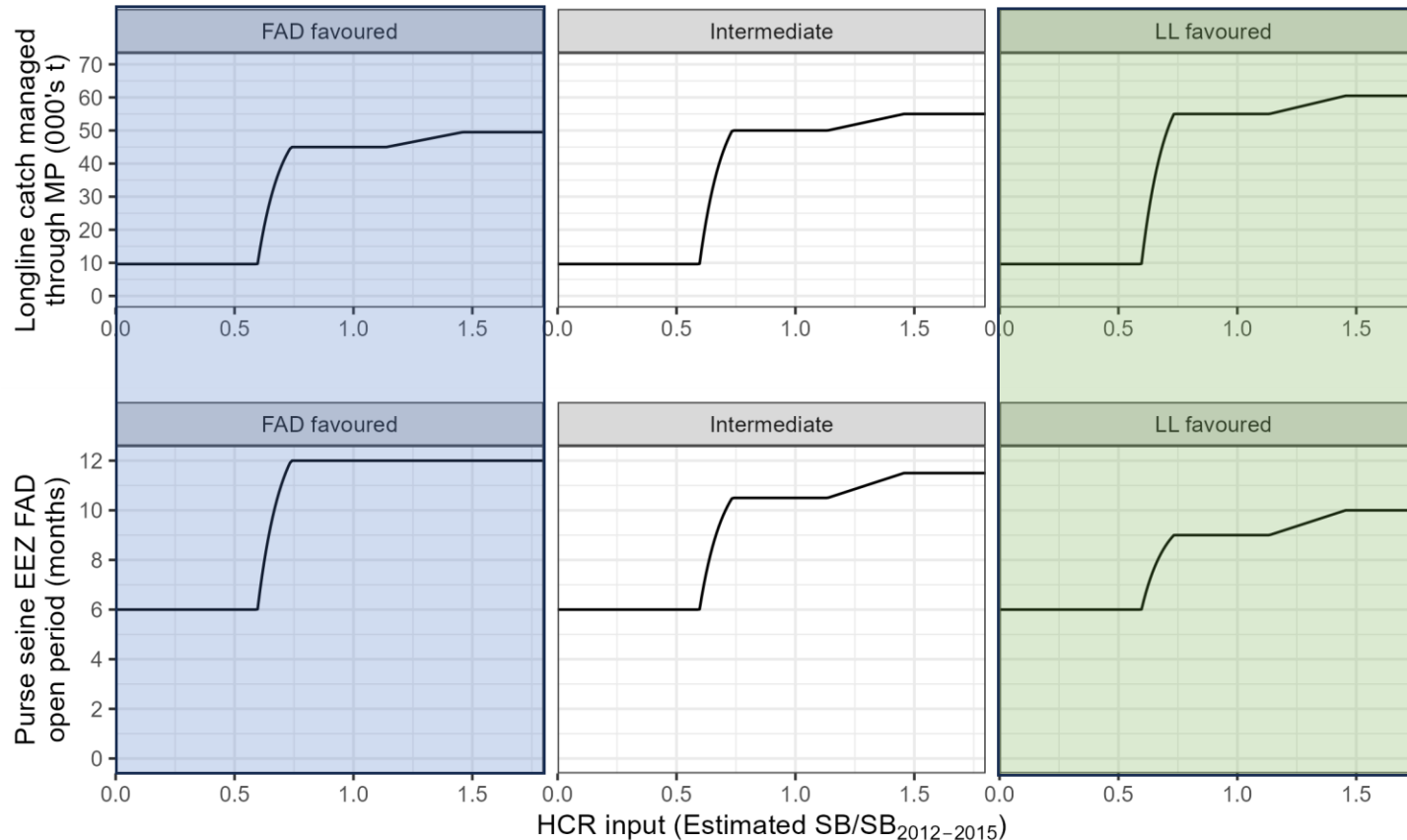


Bigeye tuna management procedure evaluations WCPFC-SC22-2026/MI-WP-04

SCIENTIFIC COMMITTEE
TWENTY-SECOND REGULAR SESSION
Apia, Samoa
11–19 August 2026

Bigeye MP overview

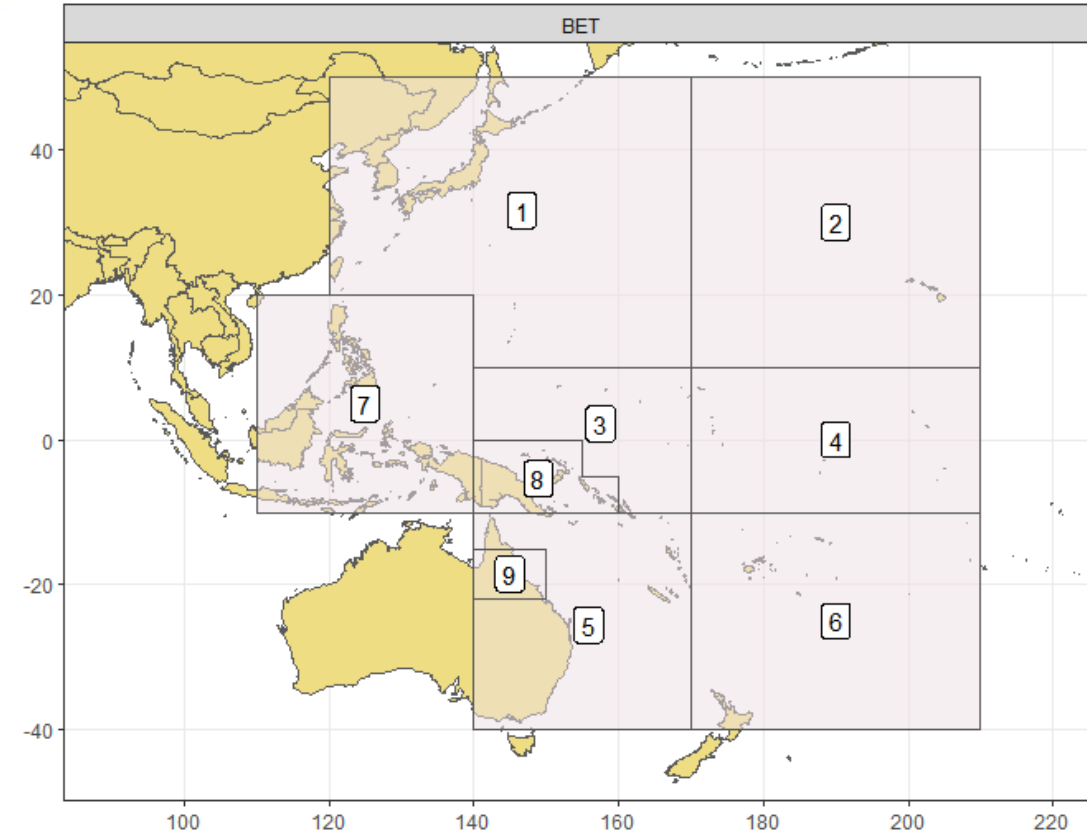


- Not limited to choice of three HCR pairs – there is a continuum

- Bigeye MP comprises a 'continuum of HCR pairs':
 - One for FAD closure period
 - One for catch/effort of longlines managed through the MP
- Each HCR pair is designed to achieve the same long-term stock status (TRP), but with different FAD closure period and longline catch/effort.
 - Different fishery outcomes under different pairs.
- The pair selected in each management period would be result of WCPFC negotiations.
- Any FAD closure period would be the result of WCPFC negotiations – not determined by MP.

Three MP longline spatial scenarios (BMW01)

Scenario	Longline fisheries managed through the bigeye MP
TLL including Hawaiian longline fleet	TLL (20°N to 10°S), including the portion of the Hawaiian longline fleet operating south of 20°N.
TLL excluding Hawaiian longline fleet	TLL (20°N to 10°S), excluding the portion of the Hawaiian longline fleet operating south of 20°N.
WCPO wide	All longline fisheries in the WCPO, including Hawaiian longline fleet.



- BMW01 agreed that the overlap area should be distinguished from the core BET MP design and treated as an implementation adjustment rather than as a direct MP output.
- BW01 agreed that the fisheries managed through the MP will be dependent on the spatial range decision.
- HCR design and evaluations make no assumptions on implementation and allocation – separate Implementing CMM.

Candidate bigeye TRPs

- BMW01 agreed four TRPs:
 - 0.94x 2012-2015 average SB/SB_{F=0} (lower TRP) at thresholds of 50%, 60%, 70%
 - 1.06x 2012-2015 average SB/SB_{F=0} (upper TRP) at threshold of 50%
 - Noting that 50% threshold equivalent to a 'point target', i.e. achieving that level on average
- Build MPs to achieve TRPs in the long-term, i.e. TRPs are long-term objectives
- Achieving the same TRP under different bigeye MP spatial scenarios requires different MP.
- Workload defined by BMW01, prioritised for SC22:
 1. Evaluate the three candidate spatial ranges for one TRP level (e.g. 0.94 x 2012-2015 average spawning biomass depletion, 50% probability)
 2. Evaluate the four candidate TRP levels for one spatial range (e.g. the 20°N-10°S tropical longline, excluding the Hawaii longline fishery)
- MI-WP-04 presents five MPs (TRPs at 50%, 60%, 70% above lower TRP and 50%, 70% above upper TRP) for each of the three spatial scenarios.

Scenario	Lower TRP	60% above lower TRP	70% above lower TRP	Upper TRP	70% above upper TRP
TLL (excl. HW)	MP 4	MP 5	MP 6	MP 7	MP 9
TLL (incl. HW)	MP 13	MP 14	MP 15	MP 16	MP 18
WCPO wide	MP 22	MP 23	MP 24	MP 25	MP 27

Simulating the continuum of HCR pairs

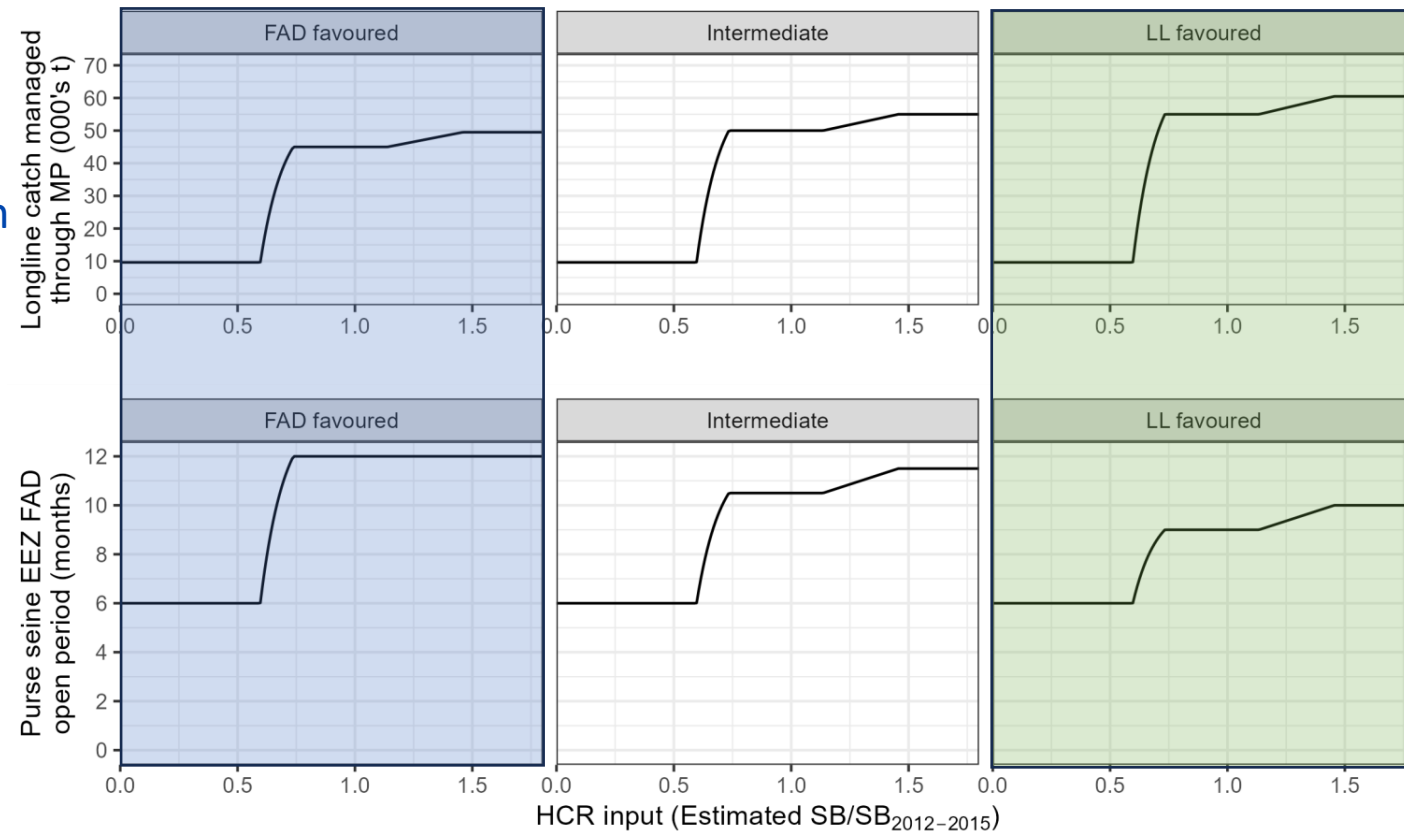
- In practice, the pair of HCRs used to set the longline catch/effort limit and the FAD closure period would be negotiated by Commission in each management period.
- How to model this in the evaluations? How do we know which HCR pairs to use in evaluations?
- WCPFC22 specified that the work should *“Evaluate a range of HCRs controlling the tropical longline and tropical purse seine fleets, at different levels of FAD closure length (from 0 to 3 months) and tropical longline catch and/or effort, that form the basis of a continuum of MPs all tuned to achieve the same TRP”*.
- In evaluations three pairs of HCRs are designed for each MP, based on three different FAD closure periods.
- Each pair of HCRs attempts to achieve the TRP while distributing management responsibility differently between longline and purse seine fisheries.

HCR pair	EEZ FAD closure (months)	High seas FAD closure (months)
FAD favoured	0.0	0.0
Intermediate	1.5	2.5
Longline favoured	3.0	5.0

3/5 EEZ/HS ratio is assumed

Evaluating the MPs

- Run three evaluations for each MP:
 - 'FAD favoured' pair only
 - 'Longline favoured' pair only
 - Randomly selecting between three pairs in each management period.
- BMW01 did not agree on meta-rules or constraints so non applied in the evaluations – least stable option.
 - Maybe no need as MP allocation and implementation arrangements would involve negotiated outcomes.
- Gives three sets of results for each MP – care taken with interpreting results.
- Each evaluation should achieve same long-term stock status (TRP) but different fishery outcomes.



MSE settings

- OMs conditioned up to 2021.
- MP first run in 2027, result applied from 2028.
- Two year data lag.
- Three year management period.
- 2022-2024 project using real catch and effort data (noting uncertainties around domestic VIP data).
- 2025+ fisheries not managed through MP, catch and effort set consistent with nuclear grid projections
 - Fisheries under SKJ MP at baseline levels: pole and line at 2001-2004 effort levels; purse seine at 2012 effort levels; domestic fisheries at 2016-2018 effort levels.
 - Southern longline at effort consistent with SPA MP.
 - Northern longline (non-US) at 2015-2024 catch levels.
 - HW longline catch at 6554 mt p.a., split between north/south of 20°N using 2012-2015 proportion (60/40).
- 2025-2027
 - Tropical longline catch set to 2015-2024 average levels; FAD closure 1.5 months EEZ, 2.5 months HS.
- 2028+ bigeye MP sets
 - Catch of longline fisheries managed through the MP.
 - FAD closure period (distribution of 2012 purse seine effort).

BMW01 agreed performance indicators

1. Stock status (SB/SB_{F0}) in WCPFC-CA;
2. Proximity to the TRP, with threshold TRPs reported as probability of being above the TRP;
3. Probability SB/SB_{F0} is above the Limit Reference Point (WCPFC requires the probability to be greater than 0.8);
4. Expected bigeye catch for fisheries managed through the bigeye MP (longline and purse seine);
5. Expected vulnerable biomass (VB) for longline fisheries managed through the bigeye MP (proxy for catch rates).
 - Presented as relative to the average vulnerable biomass in 2019-2021.
 - Expected relative vulnerable biomass for the FAD-associated purse seine fisheries is also presented
6. Catch variability for fisheries managed through the bigeye MP, separated for longline and purse seine;
7. Effort variability for fisheries managed through the bigeye MP, separated for longline and purse seine;
8. F relative to FMSY (to be calculated);
9. MSY (to be calculated).

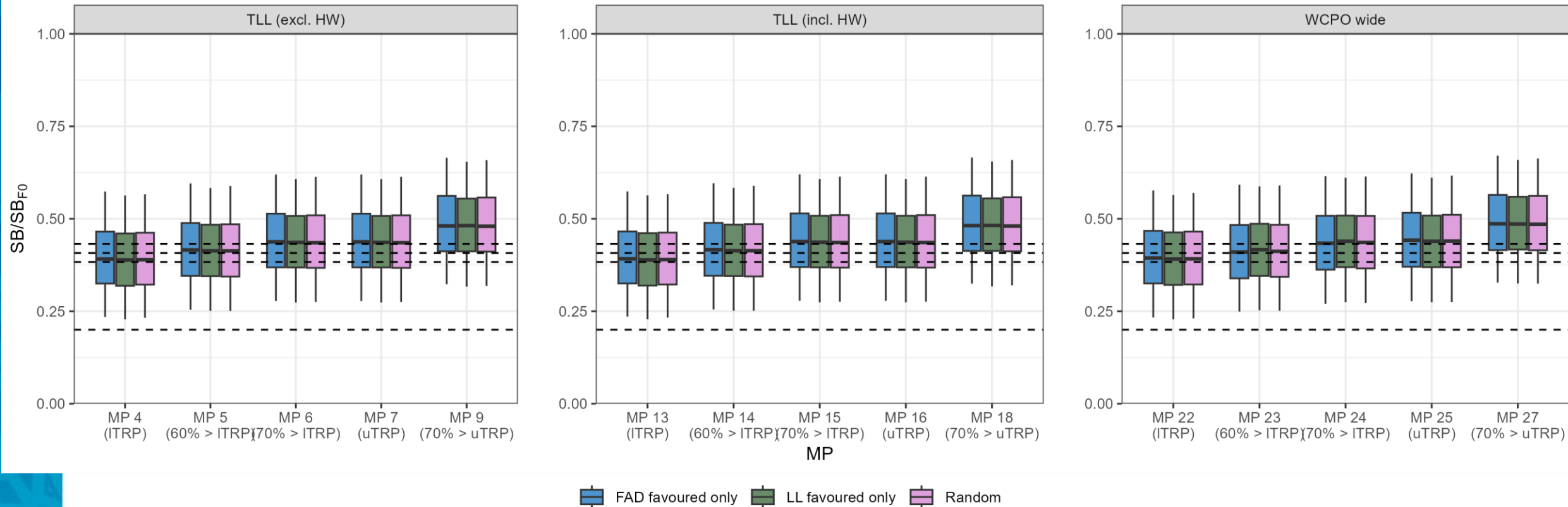
The average values of the performance indicators are calculated over three time periods:

- Short (2028-2036)
- Medium (2037-2045)
- Long (2046-2054)

Results

- Three MP spatial scenarios; five MPs (TRPs); three HCR pair scenarios; seven performance indicators = a lot of results.
- Presented as box and whisker plots to capture uncertainty in each time period, and tables.
 - Variability indicators presented as medians for clarity.
- Care must be taken when comparing results between the three MP spatial scenarios as they manage different groups of longline fisheries.
- Results of the fishery based performance indicators (those based on catch, effort and vulnerable biomass) presented separately for each scenario.
- Less focussed on actual results at this stage, more focus on method and technical details.

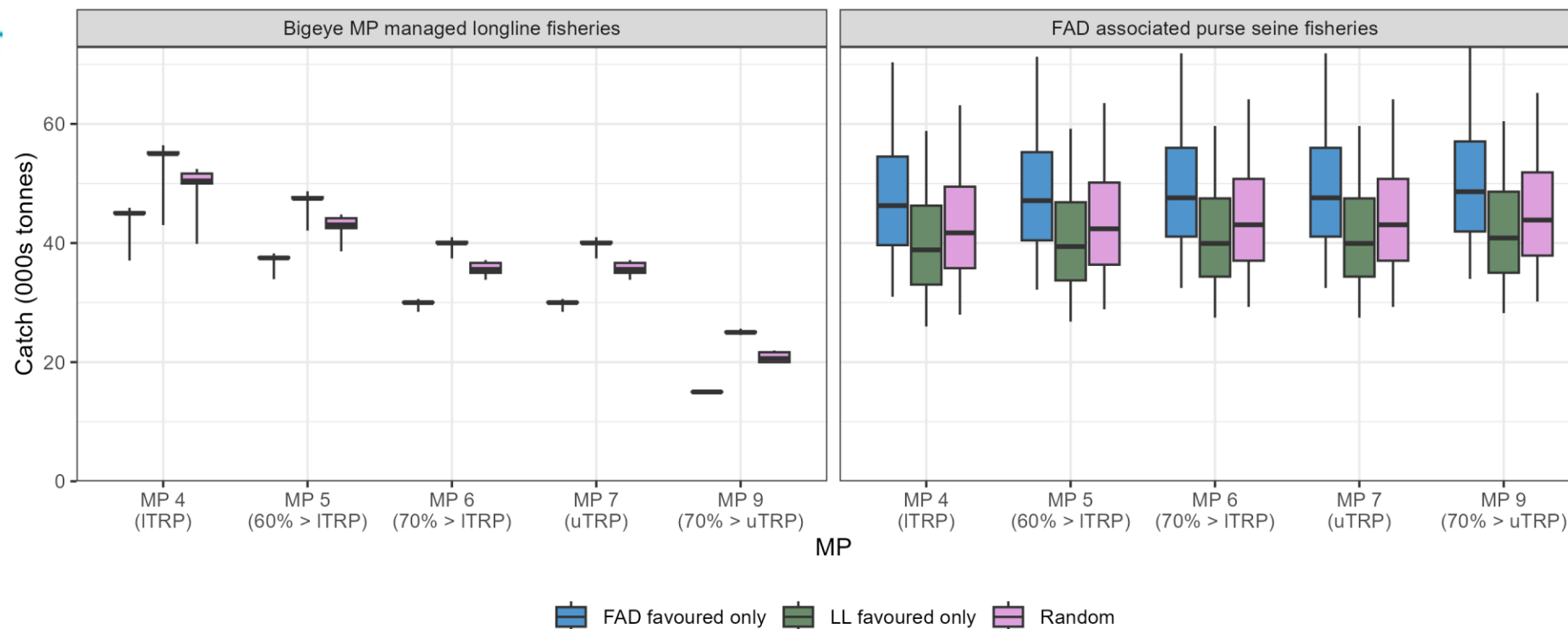
Example results: SB/SB_{F0} (long-term)



- Different MPs for each spatial scenario – but same TRPs.
- Achieve TRP thresholds in the long-term.
- Very low probability of falling below the LRP.
- Little difference between the ‘HCR pair scenarios’, e.g. between FAD favoured only and longline favoured only.
 - Achieving same stock status but distributing management responsibility differently between longline and purse seine fisheries.
- Plots of probabilities of being above LRP and TRPs included in the report.

Catch (long-term) – TLL excl. HW

MP manages tropical longline fisheries, excluding Hawaiian longline fleet

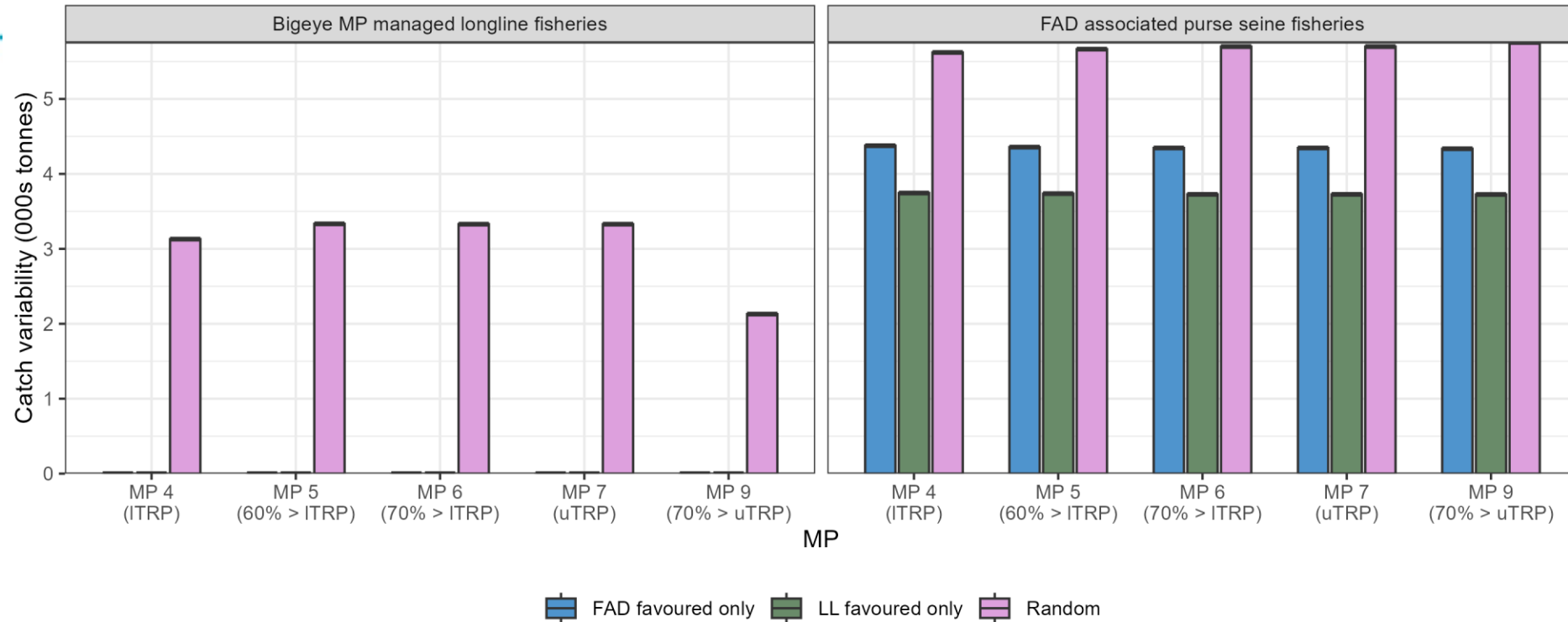


- Longline managed through catch limits, purse seine managed through effort limits.
 - Low uncertainty in longline catch, higher uncertainty in purse seine catch.
- Clear difference between HCR pair scenarios, e.g. FAD favoured only vs LL favoured only.
- For the same HCR pair scenario, FAD associated purse seine effort is the same across TRPs. Slightly more catch when stock status is higher (70% > uTRP vs ITRP).

Catch variability (long-term) – TLL excl. HW

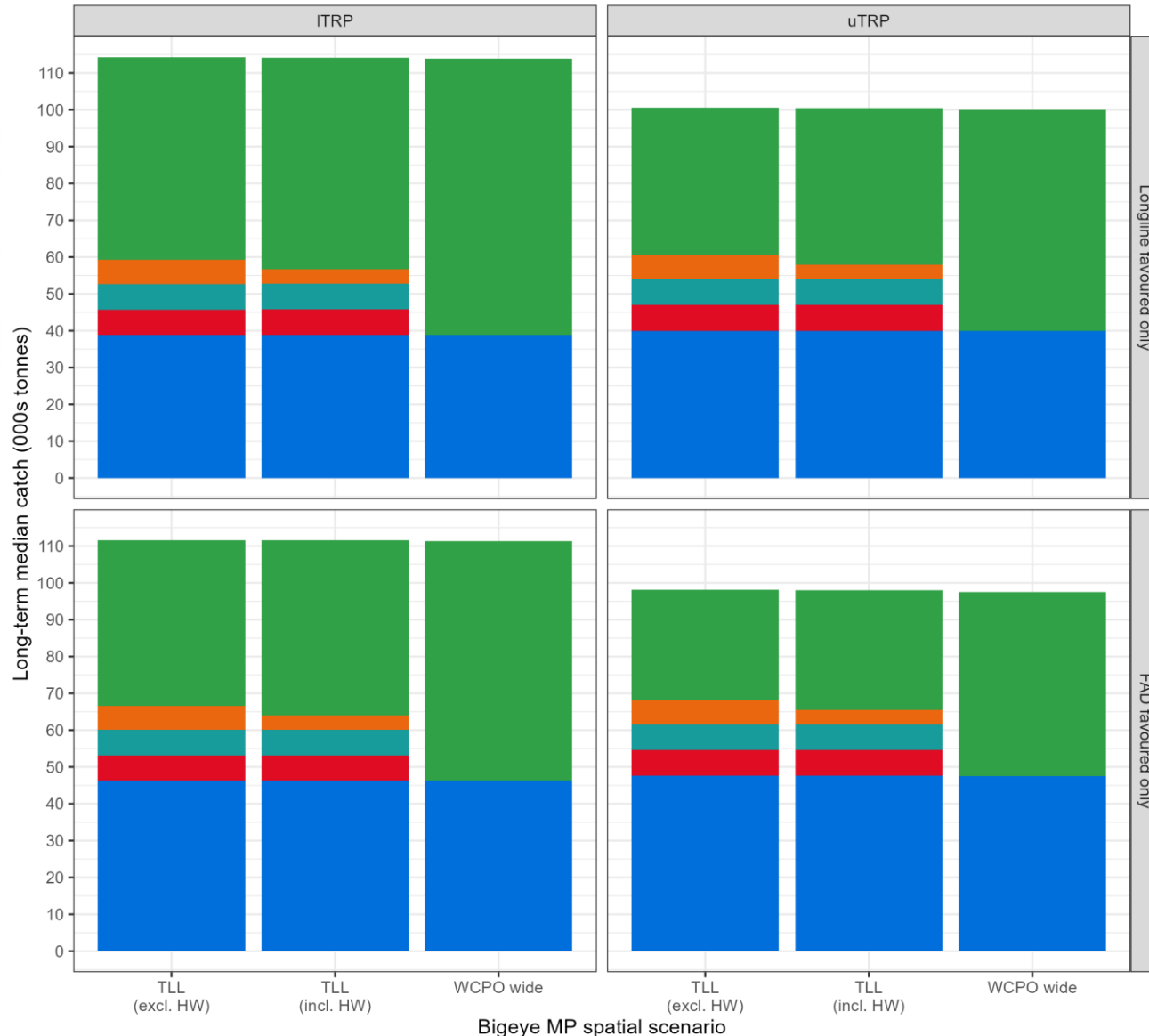
MP manages tropical longline fisheries, excluding Hawaiian longline fleet

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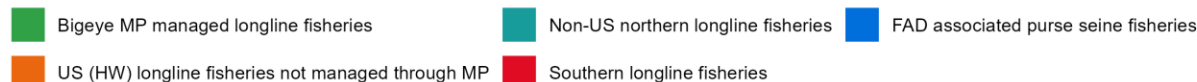


- Median variability is shown – uncertainty in variability is not easy to interpret.
- Longline fisheries are managed through catch limit.
 - When sticking to same HCR pair, e.g. FAD favoured, almost no variability. HCR stays on step.
 - When swapping between HCR pairs (Random), higher variability. Catch limit is fixed in a management period (three years).
- Purse seine fisheries are managed through effort limit = catch variability.
- Opposite story for effort variability (see report).

Comparing between spatial scenarios



- Long-term median catch by fishery segment, for two TRPs (ITRP and uTRP) and 'FAD favoured only' or 'longline favoured only' HCR pair scenarios.
- Total catch of bigeye is approximately the same between HCR pair scenarios.
- Longline fisheries not managed through MP (SLL, NLL and part of HW) at fixed catch/effort.
- Bigeye MP managed longline fishery catch (green portion) would be shared through Implementing CMM.



Further work

- Calculation of the two requested MSY based performance indicators.
- Sensitivity testing of assumptions for fisheries not managed through the bigeye MP conducted for specific MPs, in particular the future levels of fishing effort or bigeye catch by the domestic fisheries in Indonesia, Philippines and Vietnam.
- Noting the limited time between SC22 and BMW02, further work will need to be prioritised, SC22 may wish to provide guidance.

Acknowledgements

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

SC22 is invited to

- Review the technical implementation of the WCPFC22 and BMW01 requests in the development of the bigeye MPs;
- Consider the preliminary results of the evaluations and provide advice to the BMW02 on key outcomes.
- Note that the performance indicators for catch and effort variability are significantly influenced by the technical implementation;
- Note the volume of results arising and provide guidance on how these can be effectively presented to managers;
- Request SC guidance on proposed further work priorities between SC22 and BMW02.

