

Bigeye tuna management procedure design and implementation considerations WCPFC-SC22-2026/MI-WP-03

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

SC21 - catch proportions by gear

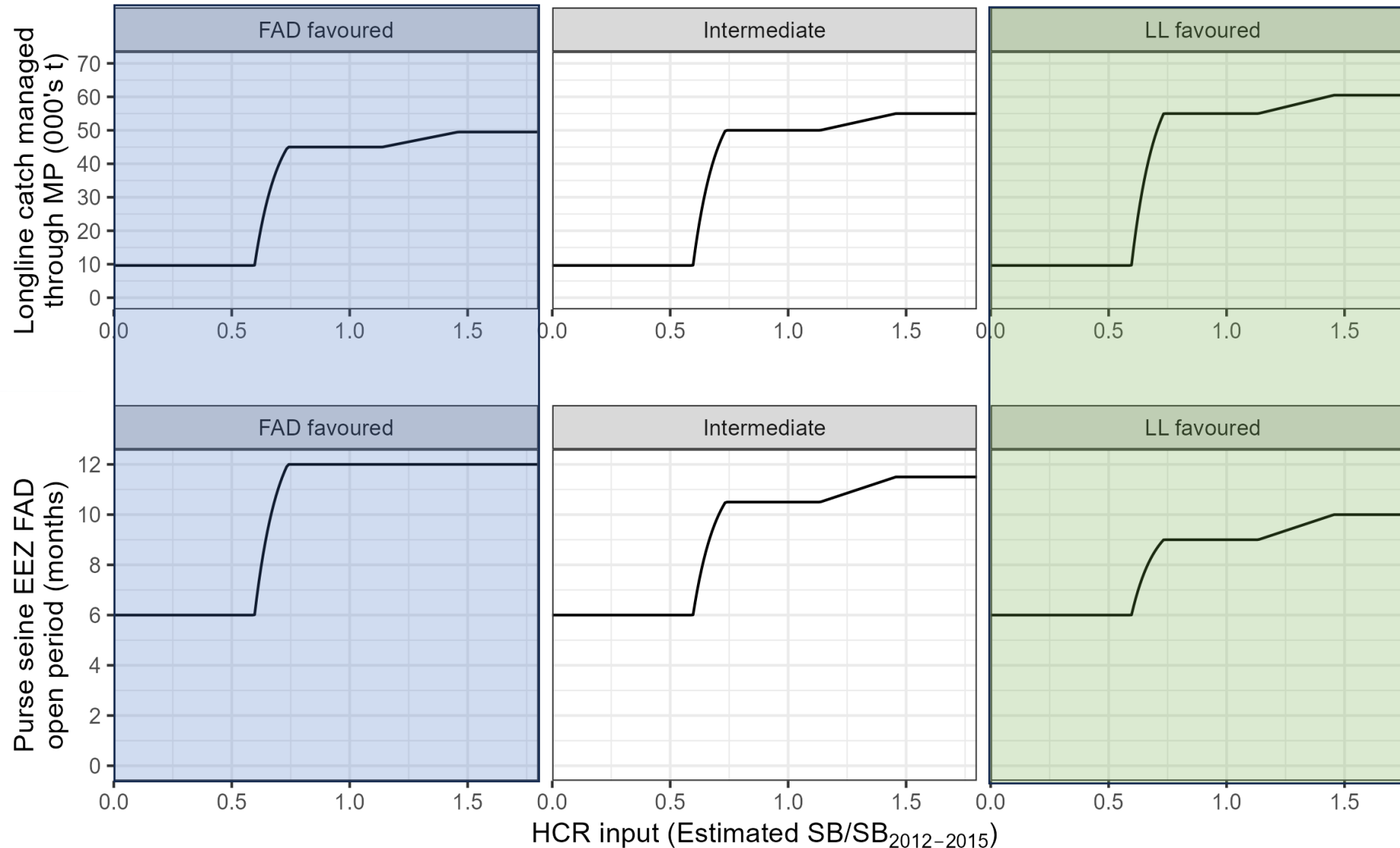
Stock	Tropical longline	Southern longline	Northern longline	Pole and line	Purse seine	Troll	Other
Skipjack	0	0	0	0.09	0.83	0	0.08
South Pacific albacore	0.12	0.81	0	0	0	0.07	0
Bigeye	0.27	0.05	0.06	0.01	0.45	0	0.15
Yellowfin	0.08	0.02	0.01	0.03	0.55	0	0.31

- 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.
- Main bigeye catches by tropical longline (20°N to 10°S) and FAD associated purse seine fishery.
- WCPFC proposed bigeye MP comprises HCRs for longline fishery and FAD associated purse seine fishery.

Proposed bigeye MP

- Data collection
 - Assumed to continue as current.
- Estimation method
 - Stock status estimated as $SB/SB_{2012-2015}$
- Following discussions at WCPFC22 and BMW01, the proposed bigeye MP comprises a '*continuum of pairs of HCRs*':
 - One that sets the fishing opportunities of the longline fishery.
 - And one for the FAD associated purse seine fishery - FAD closure period.
- Each pair of HCRs aims to achieve the same outcomes in terms of long-term bigeye stock status, but under an alternative FAD closure scenario.
- Some pairs of HCRs would allow for more or less longline fishing depending on the associated FAD closure period.
 - i.e. the longer the FAD closure period, the higher the longline catch of bigeye to achieve the same long-term outcome.

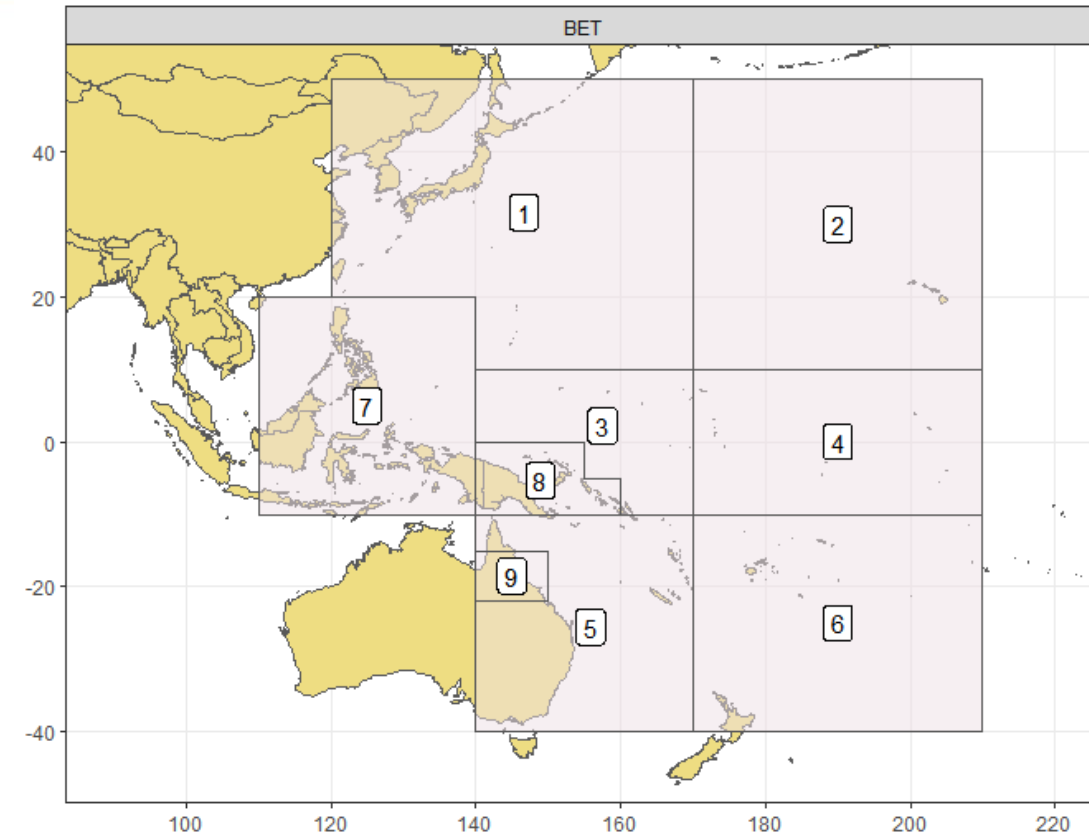
Continuum of HCRs - example



- Each pair of LL and FAD HCRs designed to achieve same long-term stock status.
- Different fishery outcomes with different pairs.
- The pair selected in each management period would be result of WCPFC negotiations.
 - Not limited to a choice of three pairs – there is a continuum.
- Any FAD closure period would be the result of WCPFC negotiations – not determined by MP.
- HCRs designed around a 'nuclear grid'.

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.



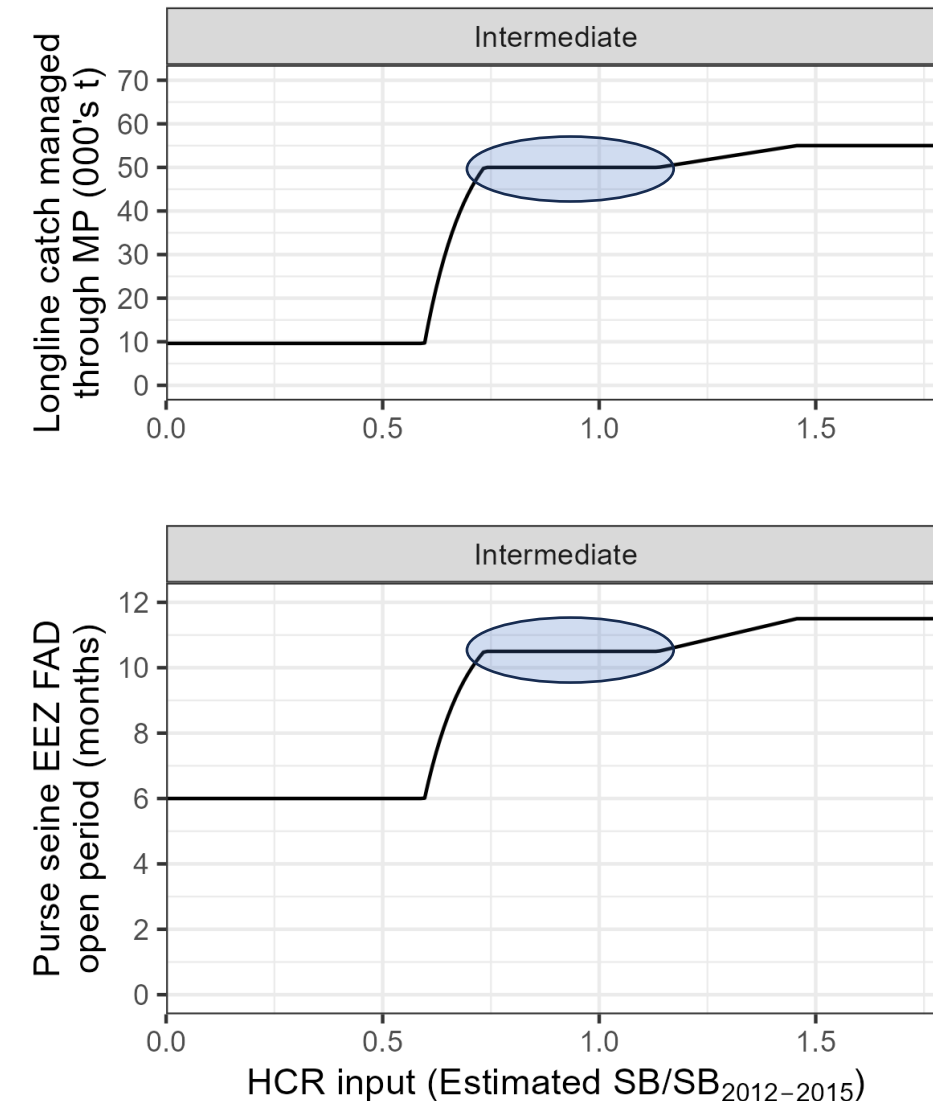
- BMW01 agreed that the overlap area should be distinguished from the core BET MP design and treated as an implementation adjustment rather than as a direct MP output.
- BW01 agreed that the fisheries managed through the MP will be dependent on the spatial range decision.
- HCR design and evaluations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

Candidate bigeye TRPs

- WCPFC – three candidate TRPs, possibly specified as ‘thresholds’, i.e. with a probability of being above the TRP:
 - 1x, 0.94x, 1.06x average $SB/SB_{F=0}$ in 2012-2015.
 - Referred to in the report as TRP, lower TRP and upper TRP.
- BMW01 agreed four TRPs:
 - 0.94x 2012-2015 average $SB/SB_{F=0}$ at thresholds of 50%, 60%, 70%
 - 1.06x 2012-2015 average $SB/SB_{F=0}$ at threshold of 50%
 - Noting that 50% threshold equivalent to a ‘point target’, i.e. achieving that level on average
- The TRPs are long-term objectives.
- Pairs of HCRs for the same MP should achieve the same TRP but with different FAD closures and LL fishing effort/catch.
- Achieving the same TRP under different bigeye MP spatial scenarios will require different MP (different continuum of HCRs).
- Three spatial scenarios and four TRPs = minimum of 12 MPs
 - Each MP is made up of a continuum of pairs of HCRs

Designing HCRs with a 'nuclear grid'

- Ideally, the HCR input is on the 'Hillary step'.
- Heights of the steps (FAD open period, longline catch/effort) should achieve desired TRP in long-term.
- BMW01 agreed that bigeye MP evaluations should proceed using longline catch limits as longline output control.
- Project OMs under different combinations of FAD closure and longline catch managed through MP and record long-term stock status – 'nuclear grid'.
- A 3 month EEZ, 5 month high seas FAD closure ratio assumed, e.g. 0 closure; 1.5 EEZ & 2.5 HS; 3 EEZ & 5 HS... etc.
- 480 OMs in grid.
- 4 stochastic projections up to 2052 for each OM.
- Results of the nuclear grids are conditional on the OMs.



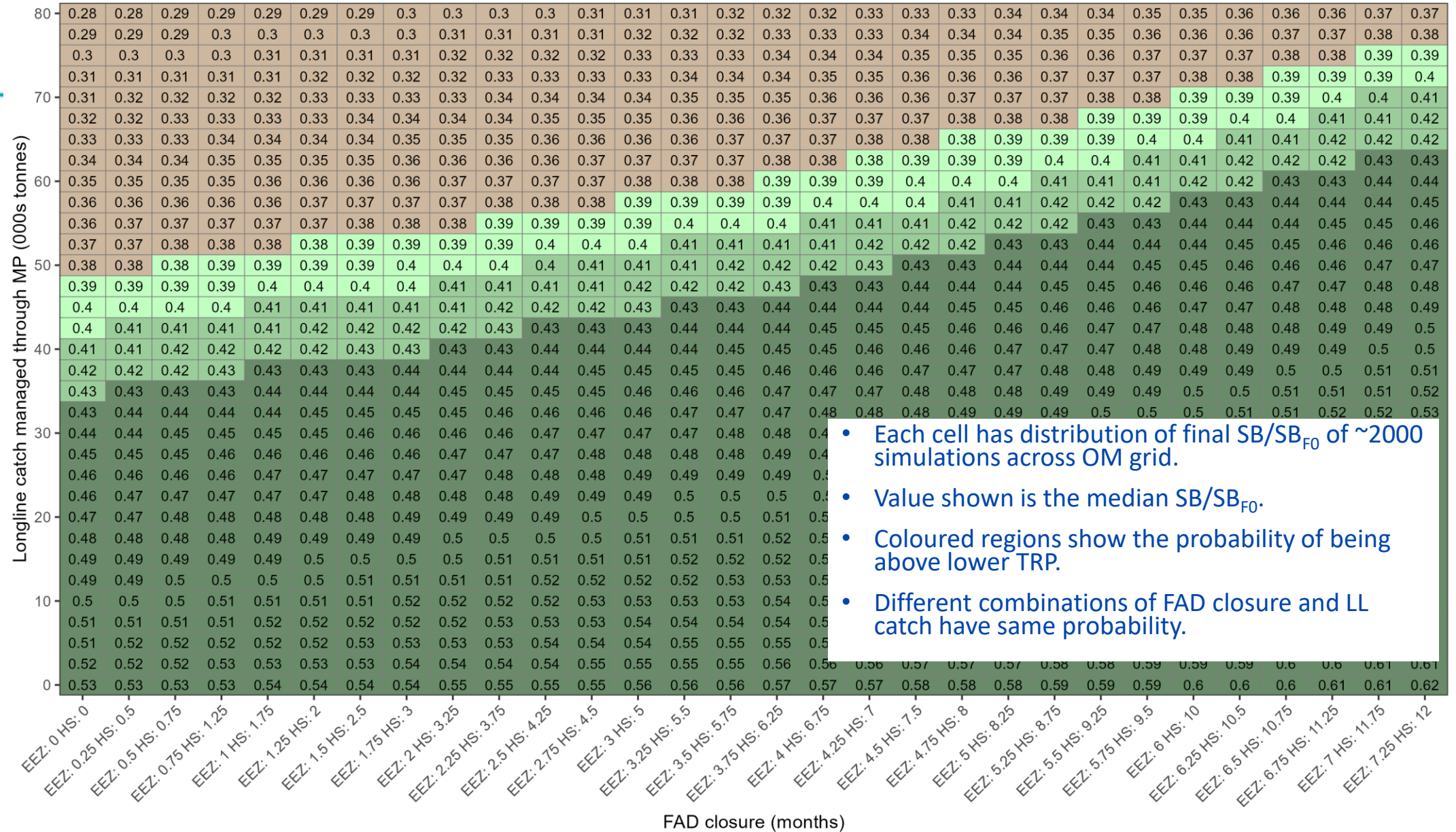
Nuclear grid assumptions

Assumptions for fisheries not managed through bigeye MP – depends on spatial scenario

Skipjack MP managed fishery	Future fishing assumption at SKJ MP baseline
Pole and line	Fixed at 2001-2004 effort
Domestic VIP	Fixed at 2016-2018 effort
Purse seine	Total effort at 2012 levels – distributed between FAD and free school depending on FAD closure period

Bigeye MP scenario	Southern longline (10°S to 50°S)	Hawaiian longline	Non-US northern longline (N of 20°N)
TLL incl. HW	Effort consistent with achieving SPA TRP under SPA MP.	- North of 20°N – 3932 mt (60% of 6554 mt p.a.) - South of 20°N – catch set by BET MP	Catch at 2015-2024 average (~6700 mt p.a.)
TLL excl. HW	Effort consistent with achieving SPA TRP	Catch at 6554 mt p.a.	Catch at 2015-2024 average (~6700 mt p.a.)
WCPO wide	Catch set by BET MP	Catch set by BET MP	Catch set by BET MP

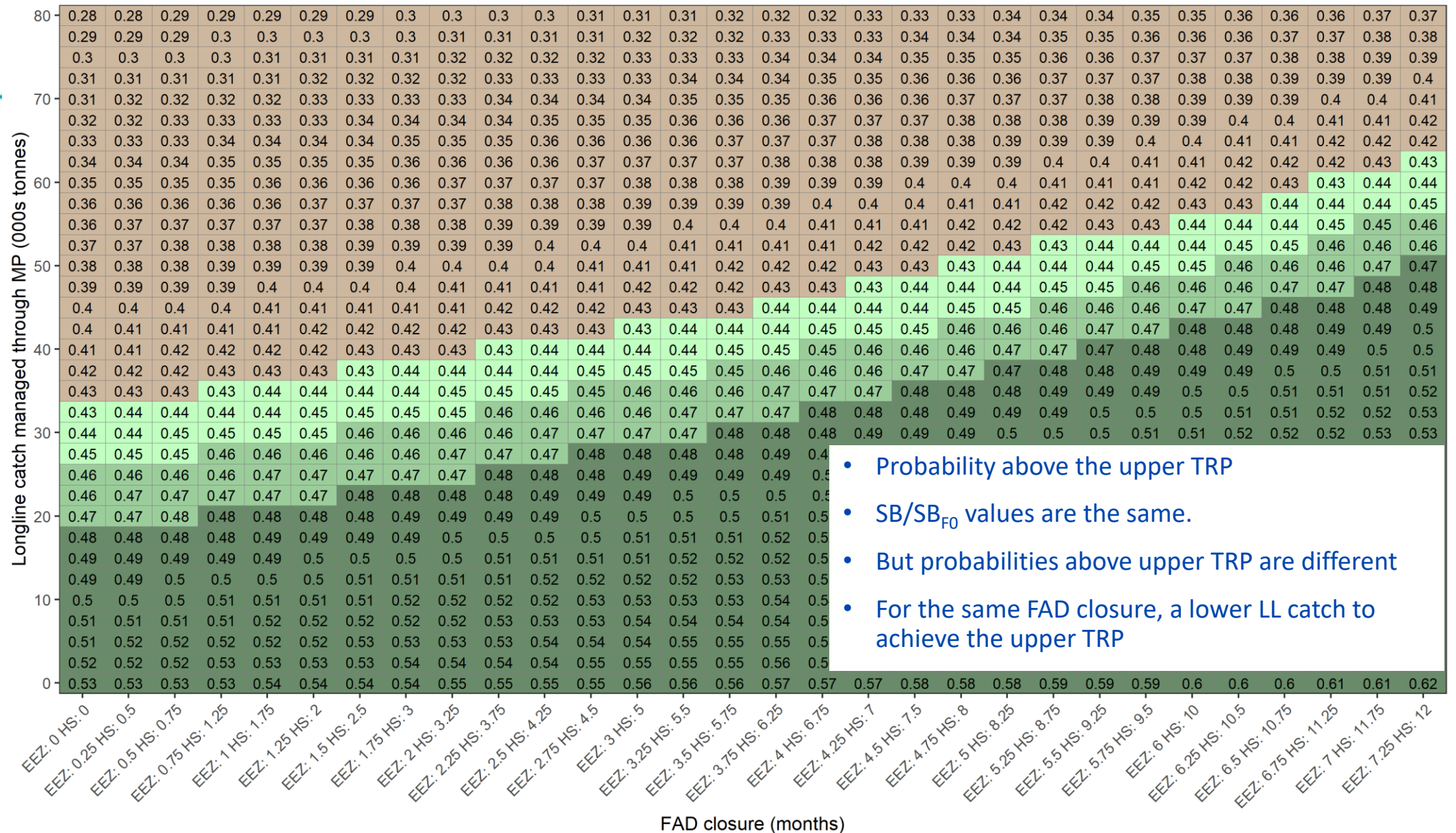
Bigeye MP manages the TLL, including the Hawaiian longline fleet operating south of 20°N.
Probability above the lower Target Reference Point.



- Each cell has distribution of final SB/SB_{F0} of ~2000 simulations across OM grid.
- Value shown is the median SB/SB_{F0} .
- Coloured regions show the probability of being above lower TRP.
- Different combinations of FAD closure and LL catch have same probability.

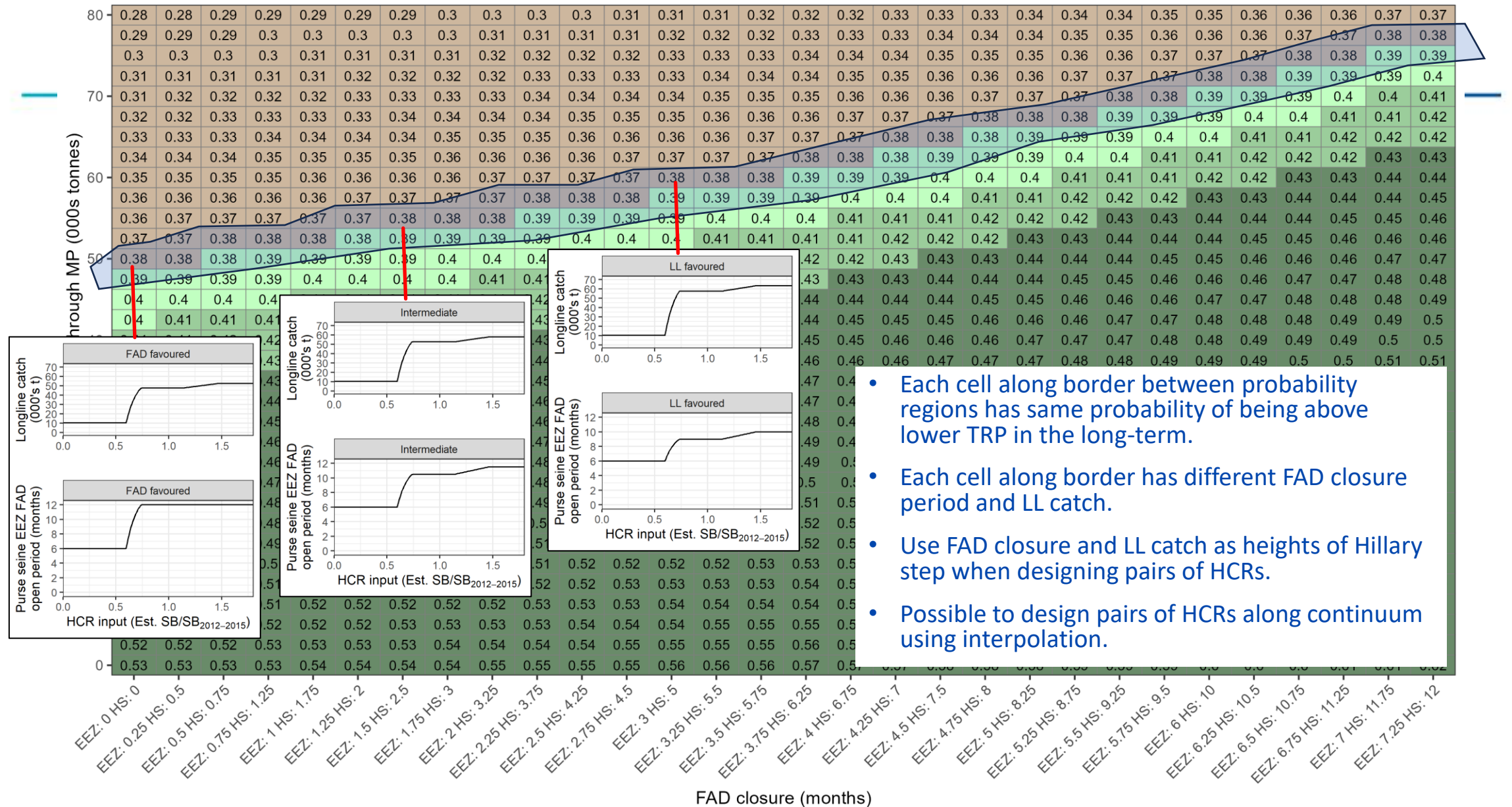
50% threshold 60% threshold 70% threshold Below target

Bigeye MP manages the TLL, including the Hawaiian longline fleet operating south of 20°N.
Probability above the upper Target Reference Point.



- Probability above the upper TRP
- SB/SB_{F0} values are the same.
- But probabilities above upper TRP are different
- For the same FAD closure, a lower LL catch to achieve the upper TRP

Bigeye MP manages the TLL, including the Hawaiian longline fleet operating south of 20°N.
Probability above the lower Target Reference Point.



- Each cell along border between probability regions has same probability of being above lower TRP in the long-term.
- Each cell along border has different FAD closure period and LL catch.
- Use FAD closure and LL catch as heights of Hillary step when designing pairs of HCRs.
- Possible to design pairs of HCRs along continuum using interpolation.

50% threshold 60% threshold 70% threshold Below target

Implementation

- Each time the MP is run the estimation method estimates stock status.
- The pairs of HCRs used to set the bigeye MP-managed longline catch/effort limit and the FAD closure period would then be negotiated by the Commission.
- In this way the proposed bigeye MP does not prescribe the FAD closure period. Instead, that would be a negotiated outcome each time the MP is run.
- The output of the selected HCR pairs would be implemented through the Implementing CMM.
- The implementation and allocation arrangements for outputs of the bigeye MP remain matters for future discussion.
- BMW01 - several CCMs emphasised the need to ensure consistency with existing management systems and existing TTM arrangements.
- BMW01 agreed that bigeye MP evaluations should proceed using longline catch limits as the longline output control.
- Implementation may differ from the MP output.
 - E.g. some fisheries, including those in PNA waters, may be implemented through effort based arrangements.

Summary

- BET MP comprise pairs of HCRs (one for FAD open period; one for LL managed through MP).
- The pairs exist along a continuum of HCR pairs, where each pair would achieve same long-term stock status (e.g. TRP) but under different FAD closure periods and LL catch/effort limits.
- The HCR pair would be selected through WCPFC negotiations in each management period
 - MP does not determine the FAD closure period, instead that would be a negotiated outcome.
- HCRs can be designed using a 'nuclear grid' that describes long-term stock status under different FAD closure and LL catch/effort combinations.
- Possible to design HCR pairs through interpolation of the nuclear grid.
- Multiple TRPs (some as thresholds), and three MP spatial scenarios - each combination of TRP and spatial scenario has a different continuum of HCR pairs.

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

- Provide technical advice on the approach used for the overall MP design of a continuum of pairs of HCRs: one that sets the fishing opportunities of the longline fishery managed through the bigeye MP, and one for the FAD closure period;
- Consider the approach used to address BMW01 requests for the alternative spatial extents of longline fisheries under MP control;
- Provide technical advice on the proposed assumptions on the future catch or effort of the fisheries not managed through the bigeye MP, consistent with the mixed fishery framework, noting the assumptions may be different depending on the spatial range of the MP.

