Western and Central Pacific Fisheries Commission

Pacific Community
Communauté du Pacifique

Evaluation of candidate management procedures for South Pacific albacore

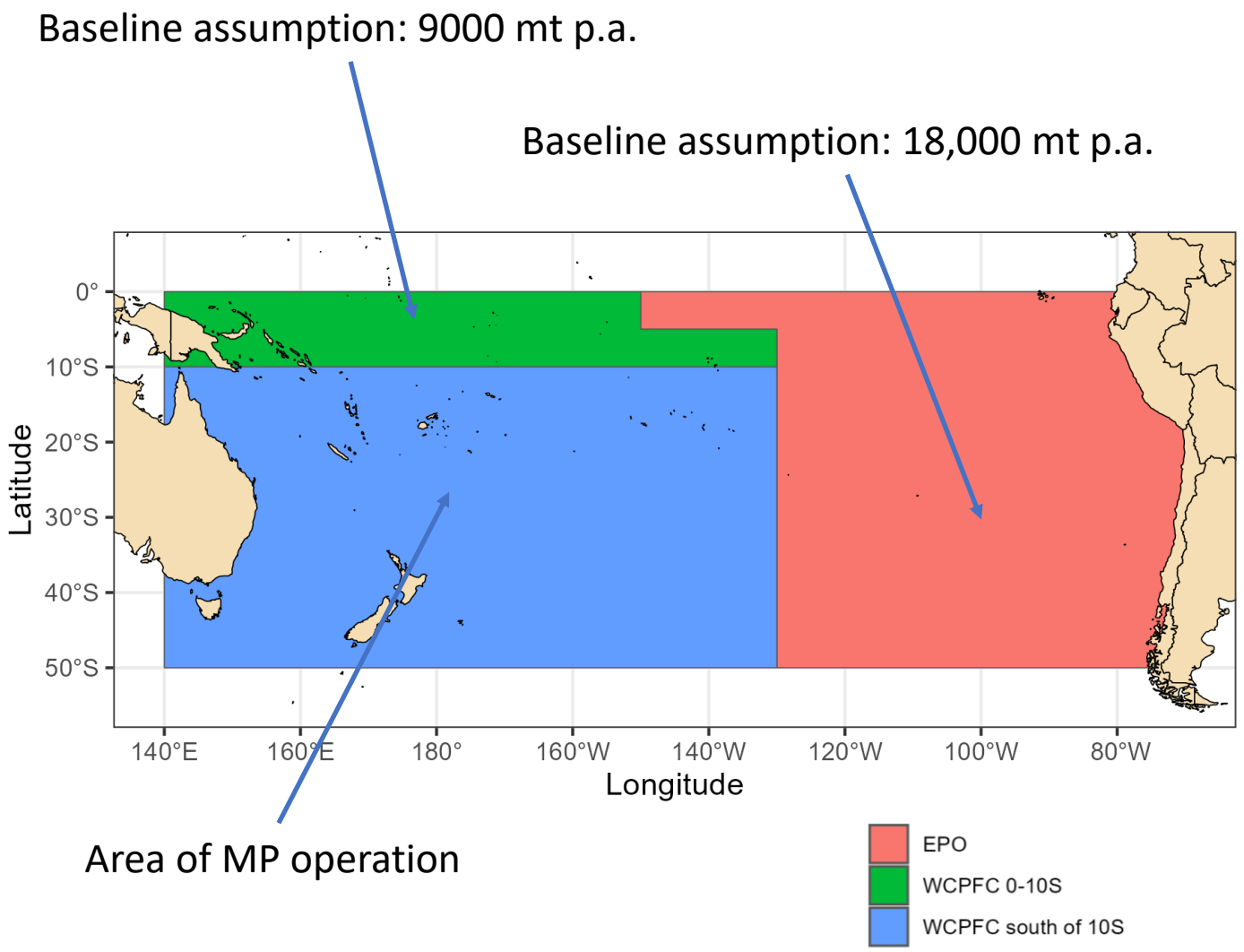
WCPFC-SC21-2025/MI-WP-04

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

Differences with 2024 evaluations

- Following the mixed fishery harvest strategy approach, the SPA MP now only applies to longline and troll fisheries operating in the region south of 10S in the WCPFC-CA.
  - In previous evaluations, the MP applied to longline and troll fisheries operating in the WCPFC-CA, south of the equator.
- Necessary to assume future catch levels of albacore in the equator to 10S region of the WCPFC-CA. The assumption here is that the future catches are fixed at 9000 mt per annum (approximately the average of 2014-2023 catches).
- The future catch levels of albacore in the EPO model region are fixed at 18,000 mt per annum (approximately the average of 2014-2023 catches).
  - In the previous evaluations they were fixed at 22,500 mt per annum.
- Sensitivity tests are conducted around these catch assumptions.
- Currently 4 candidate MPs (previously, 18 candidate MPs).

MSE assumptions



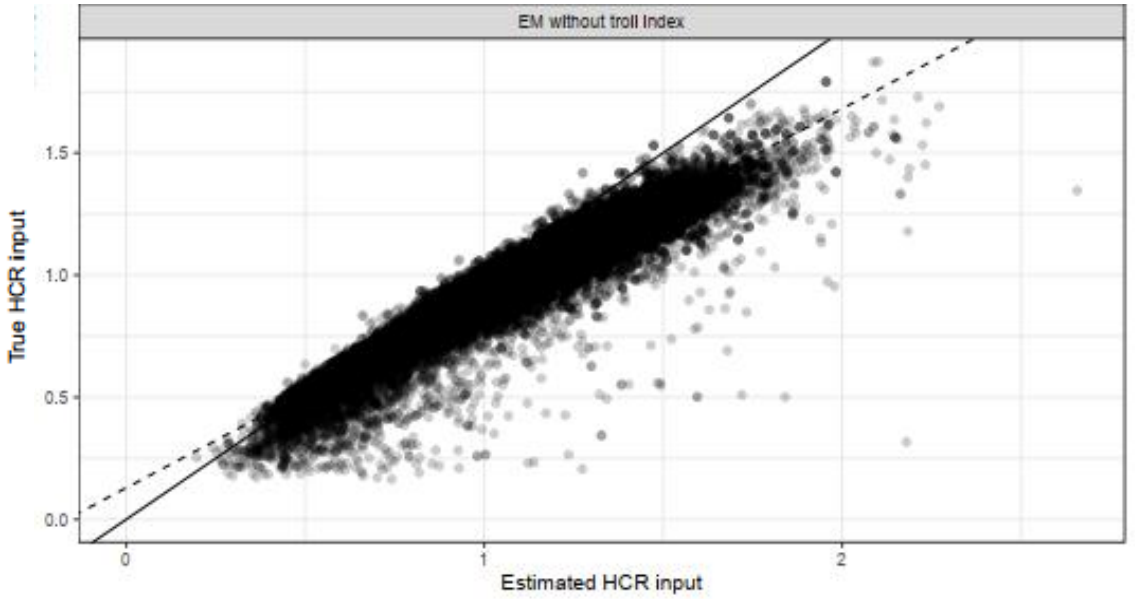
- Simulations run from 2023 to 2053.
- Transient catch or effort (2023-2025 period) set to 2017-2022 levels.
- MP is first run in 2025 and output applied in 2026.
- Three year management period
  - MP output applied for following three years
- MP does not apply to EPO or WCPFC-CA 0-10S
- Data lag of two years

Operating model grid

- SC20 adopted the OM grid reference set.
- Grid factors include:
  - Recruitment variability
  - Steepness
  - Natural mortality
  - Effort creep
- Future work to develop OM grid to be conducted under the monitoring strategy, noting that a pragmatic approach is needed.

Estimation method

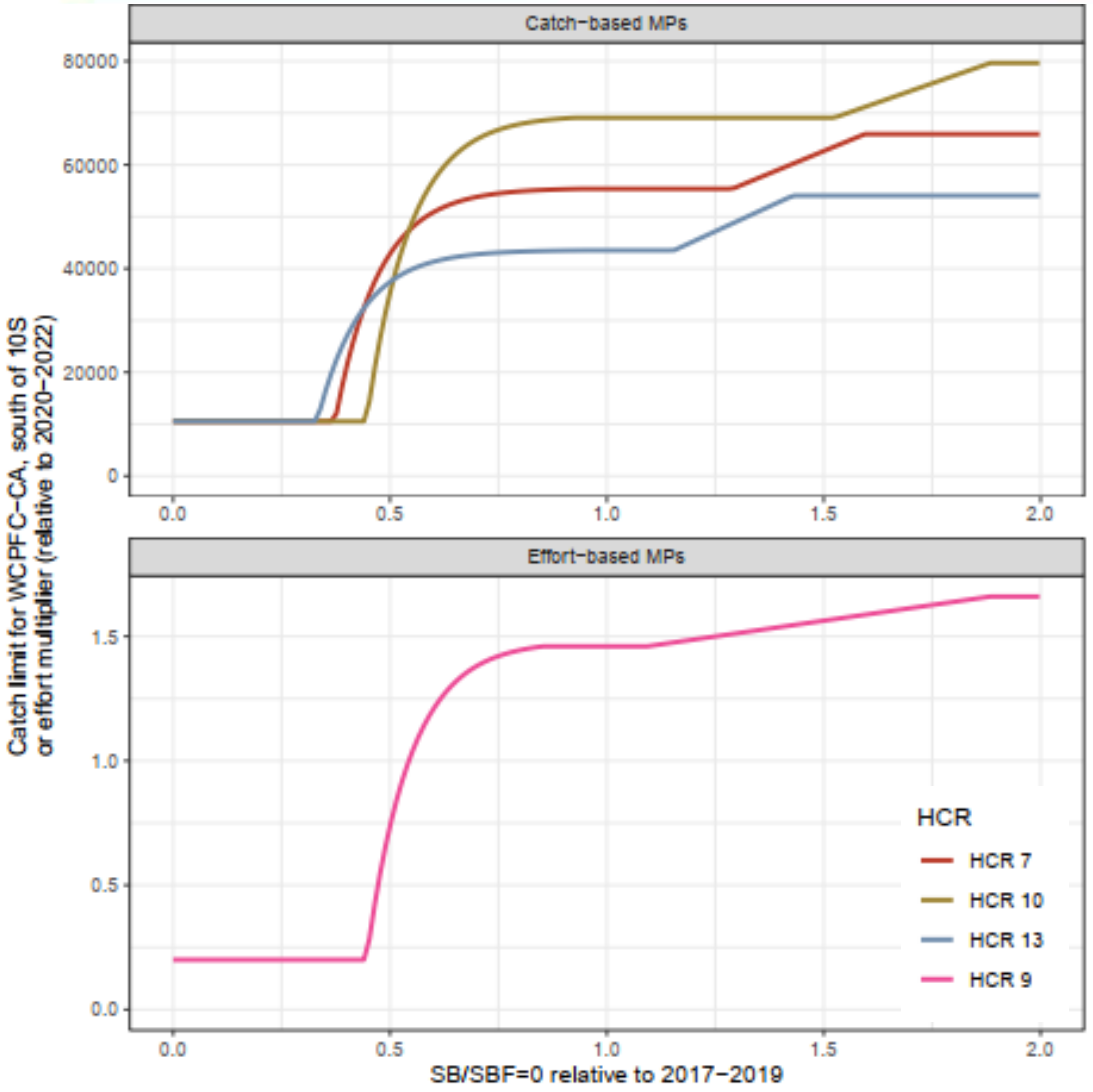
- Age-structured production model (ASPM), implemented in Multifan-CL (SC20, SMD02).
- Two longline index fisheries in the WCPFC-CA and EPO model regions.
- Updated since SC20: removed reliance on WCPFC-CA troll fishery index to help 'future proof' the MP.
- HCR input is a relative measure of abundance (SMD02). Calculated as estimated $SB/SB_{F=0}$ relative to 2017-2019



MP assumptions

- All fisheries in the WCPFC-CA, south of 10S, are managed either through the setting of catch or effort limits, depending on the candidate MP
  - i.e. all are managed through catch limits, or all are managed through effort limits.
- HCR outputs a scalar that is applied to the baseline catch or effort.
- Baseline is average catch or effort 2020-2022 within the WCPFC-CA, south of 10S
  - i.e. an output scalar of 1 sets the catch or effort limit for the next management period to the average of 2020-2022 catches or effort.
- Allocation of that limit, 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.
- All fisheries managed by the MP are affected equally
  - E.g. if the MP specifies a 10% increase in catch, all fisheries managed by the MP have their catch limits increased by 10% relative to the baseline for the next management period.

HCRs



- Same shape as HCR in skipjack interim MP.
- Input is relative $SB/SB_{F=0}$ from EM.
- Designed to achieve long-term objectives
  - WCPFC20 agreed iTRP: 0.96 x 2017-2019 $SB/SB_{F=0}$.
  - A TRP range of 0.42 to 0.56 was also proposed.
- Initial suite of 4 candidate MPs
  - Currently only one constraint option per HCR.
  - Sensitivity test performed on constraint.

HCR	Constraint	Objective
Catch-based MPs		
HCR 7	+10% -5%	iTRP
HCR 10	+10% -5%	Lower TRP range
HCR 13	+10% -5%	Upper TRP range
Effort-based MPs		
HCR 9	+-5%	Lower TRP range

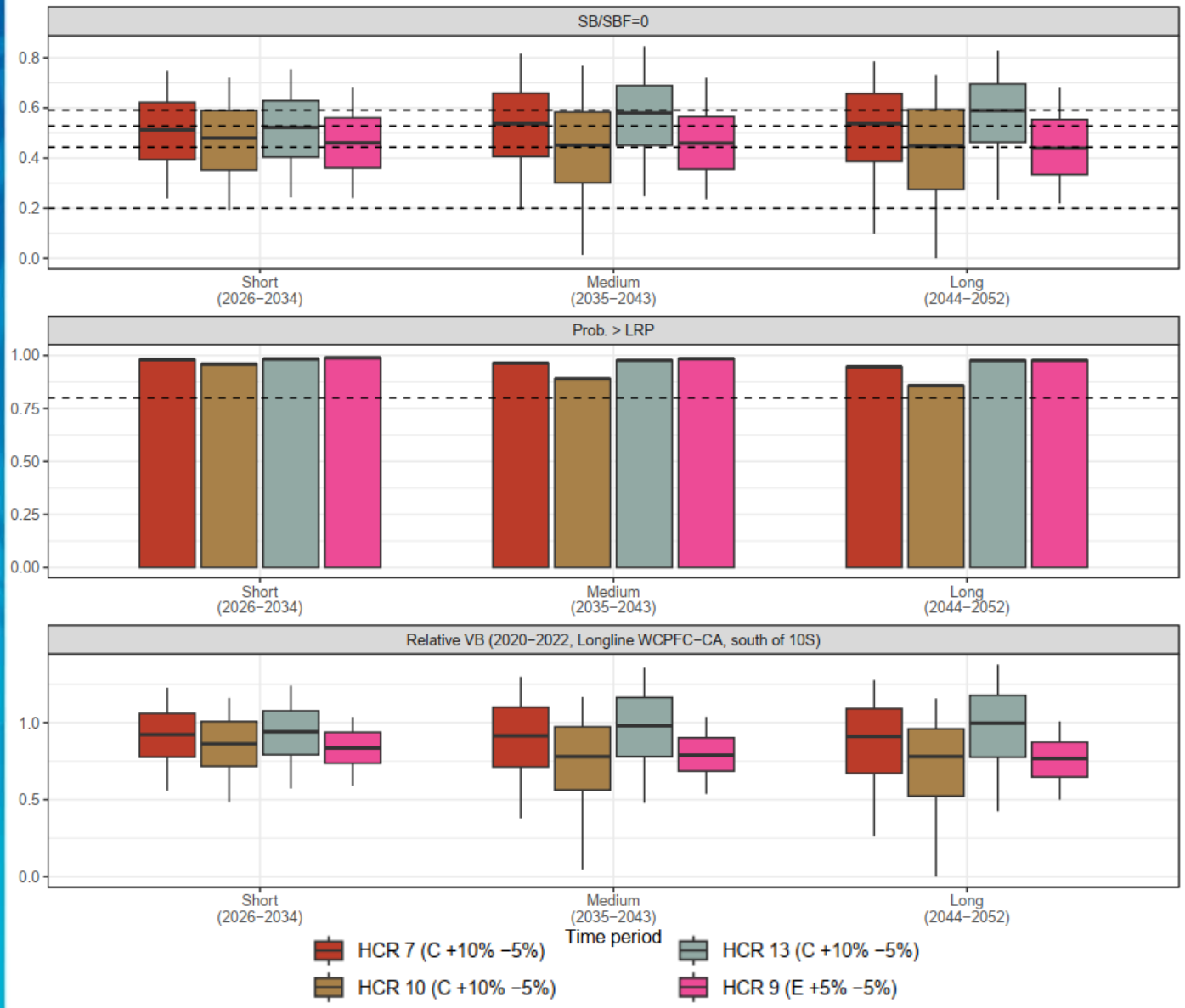
Six performance indicators

Indicator	Notes
$SB/SB_{F=0}$ in the WCPFC-CA	Can be compared to the iTRP
Probability of being above LRP	WCFPFC requires at least 0.8
Total catch in the WCPFC-CA, south of 10S	Noting that catch in WCPFC-CA, equator to 10S, is fixed in the evaluations
Vulnerable biomass (WCPFC-CA longlines)	Relative to VB in 2020-2022
Catch variability in WCPFC-CA, south of 10S	Calculated as absolute annual difference
Effort variability of longlines in WCPFC-CA, south of 10S	Calculated as absolute annual difference

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

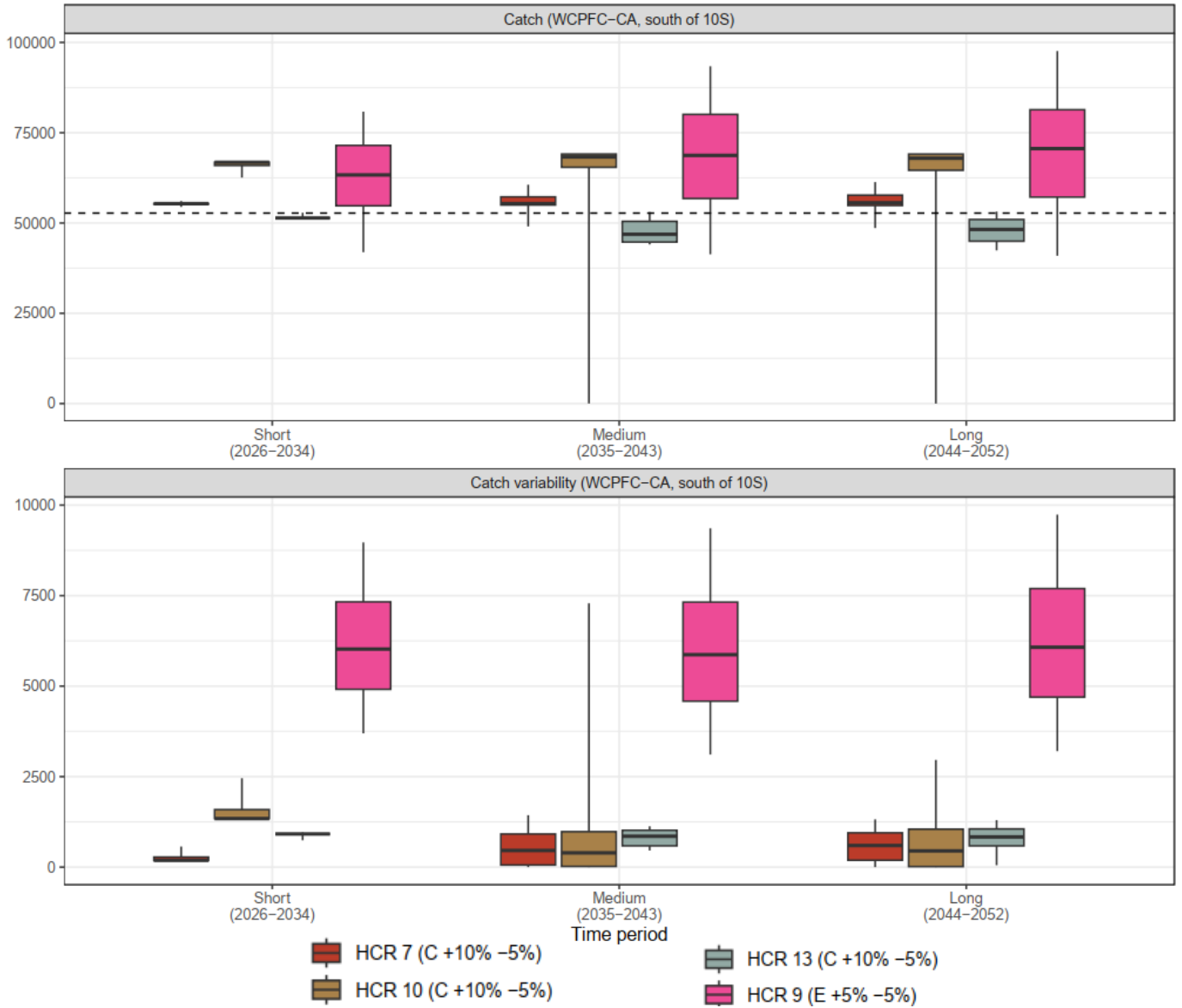
- Short (2026-2034)
- Medium (2035-2043)
- Long (2044-2052)

Results



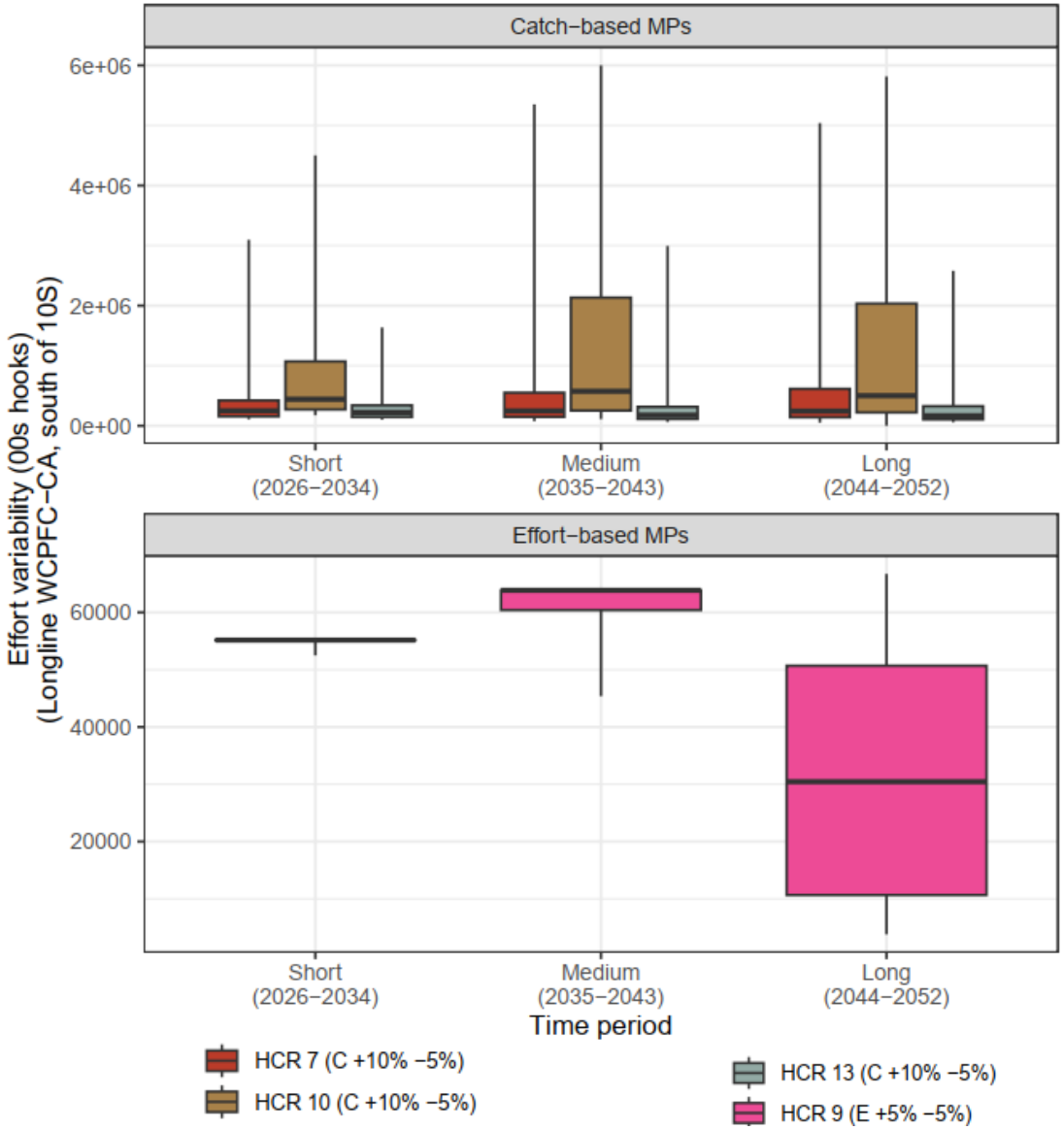
- MPs achieve different long-term $SB/SB_{F=0}$ objectives
- All MPs have prob. > LRP above 0.8
- Achieving the higher TRP range results in highest VB (catch rates)

Results



- Dashed line is the average catch in WCPFC-CA, south of 10S, 2020-2022.
- Trade-off between catch rate (VB) and catch.
- Catch-based MPs have lower uncertainty in catches, and lower catch variability.

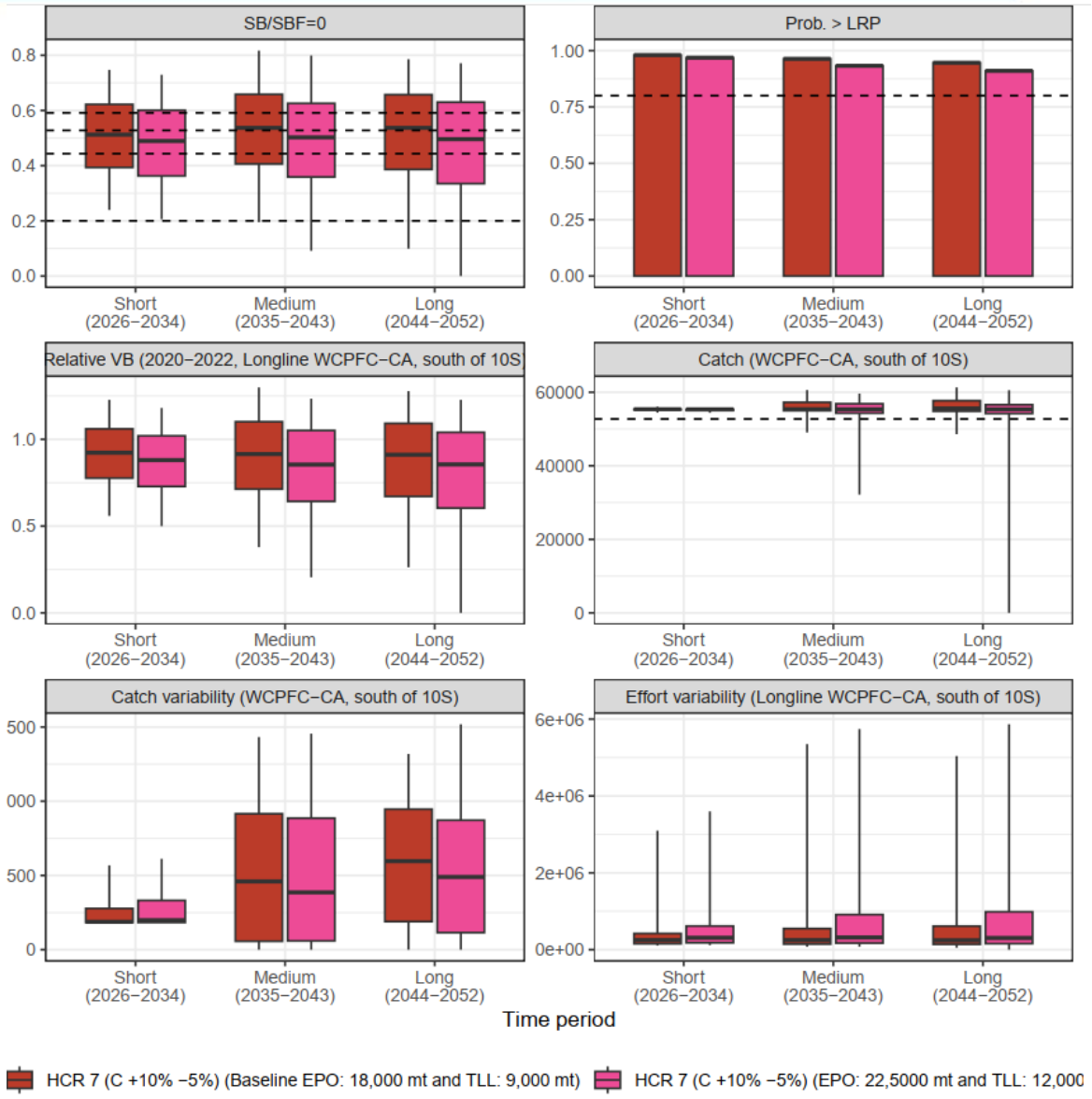
Results



- Catch-based MPs have higher effort variability than effort-based.
- The amount of effort needed to take a catch limit depends on the biomass available to the fishery.
- Biomass levels vary due to natural processes as well as fishing pressure.
- Effort needed to take a catch limit varies over time, resulting in higher effort variability for the catch-based MPs.
- Catch-based MPs assume that catch limit is taken, where possible.
- If the stock is low it can require unrealistically high levels of fishing effort to take the catch limit.
- In reality, maximum effort would be limited, and the realised catches resulting from that effort would be lower than the catch limit set by the MP. This would greatly limit the effort variability.

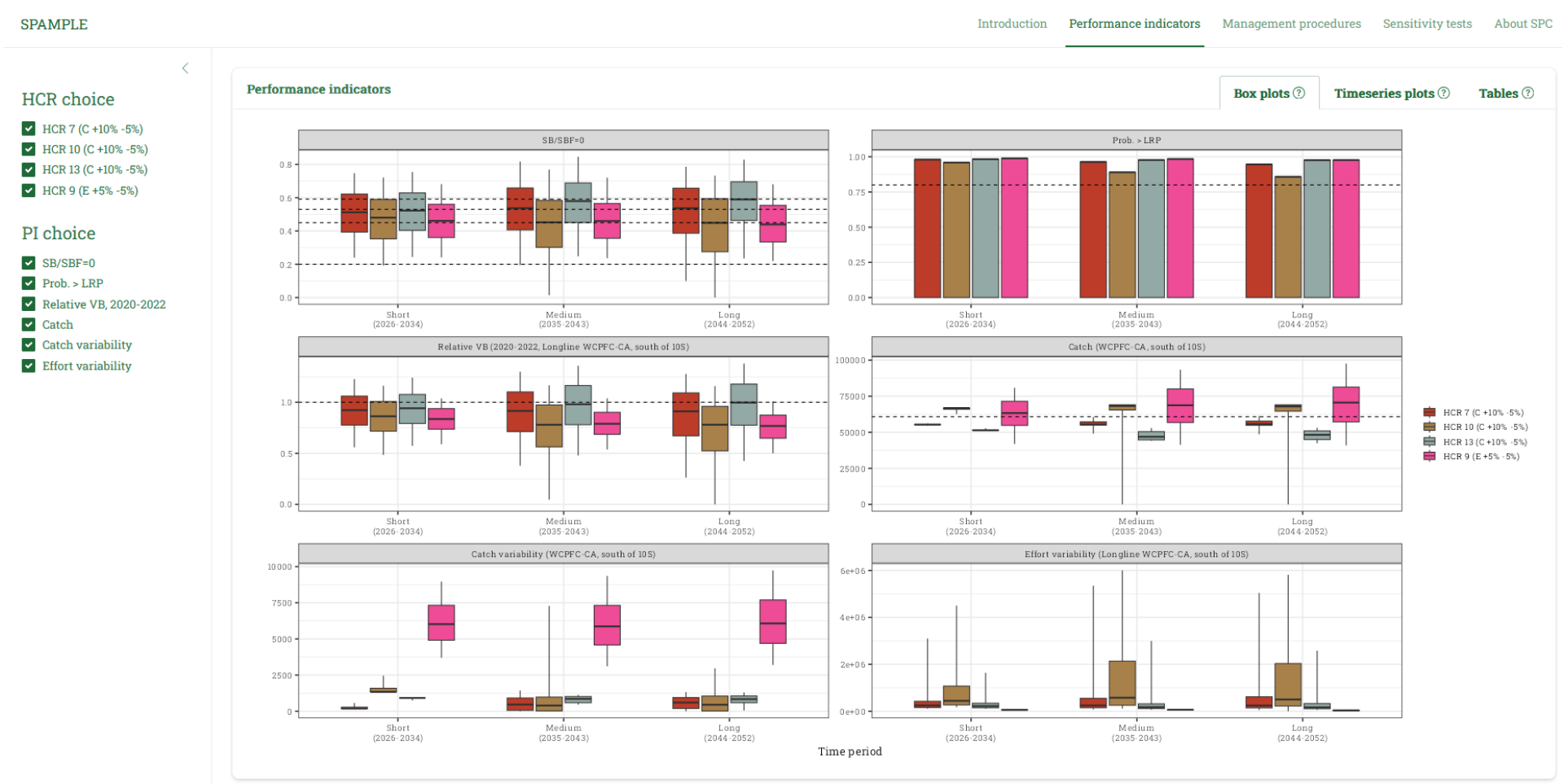
Sensitivity tests

- Sensitivity tests applied to catch-based MP with HCR 7 (baseline: achieves iTRP)
- Alternative assumptions about future catches in the EPO and by TLL (WCPFC-CA, equator to 10S)
  - EPO: 22,500 mt (baseline: 18,000 mt)
  - TLL: 12,000 mt (baseline: 9000 mt)
- MP performance is fairly robust:
  - Lower $SB/SB_{F=0}$ and VB
  - Prob. > LRP still above 0.8
  - Catches in WCPFC-CA unaffected (catch-based MP)
- Alternative constraint +- 10% (baseline: +10%, -5%)
  - Affected catch variability



SPAMPLE

https://ofp-sam.shinyapps.io/spample



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Summary

SC21 is invited to:

- Provide feedback on the MSE framework, including the baseline assumptions made about future catches of albacore in the EPO and equator to 10S region of WCPFC-CA.
- Agree to continue using the described estimation method, including the relative indicator of stock status.
- Provide feedback on the candidate MPs, for example ouput type (catch- or effort-based), long-term objective and constraint option.