

Agenda Item 5

WP06

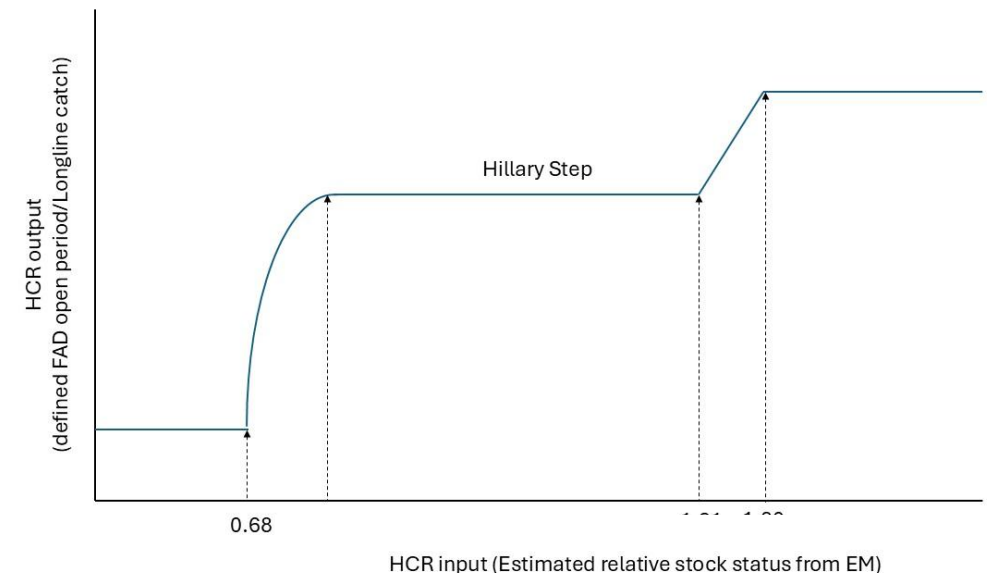
Shape of the harvest control rules

WCPFC BMW2
Honolulu, Hawaii (Hybrid)

SPC-OFP
1-2 October 2026

HCR shape

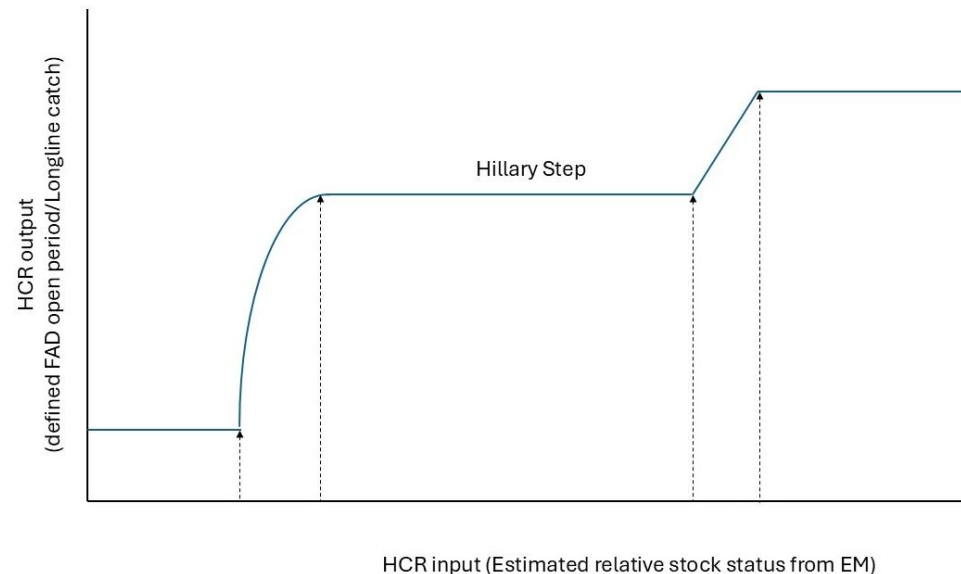
- Main focus has been on the height of the Hillary steps.
 - Specifies combinations of FAD open period and longline catch that will achieve agreed TRP in the long-term.
 - Determined by nuclear grid.
- If estimated stock status is on the Hillary step, HCR output is set at the height of the Hillary steps of negotiated HCR pair.
- But what happens if estimated stock status is not on the step?
- Need to consider other aspects of HCR design, e.g. the curve and bottom step.
- Need to be able to construct consistent HCR pairs across the 'arc of possibilities'.
- The shapes of these HCR pairs need to be agreed in advance.



Probability of being off the step

MP	Target	Probability of being to the left of the Hillary step	Probability of being on the bottom step
5	Lower TRP	0.085	0.035
8	Upper TRP	0.202	0.019

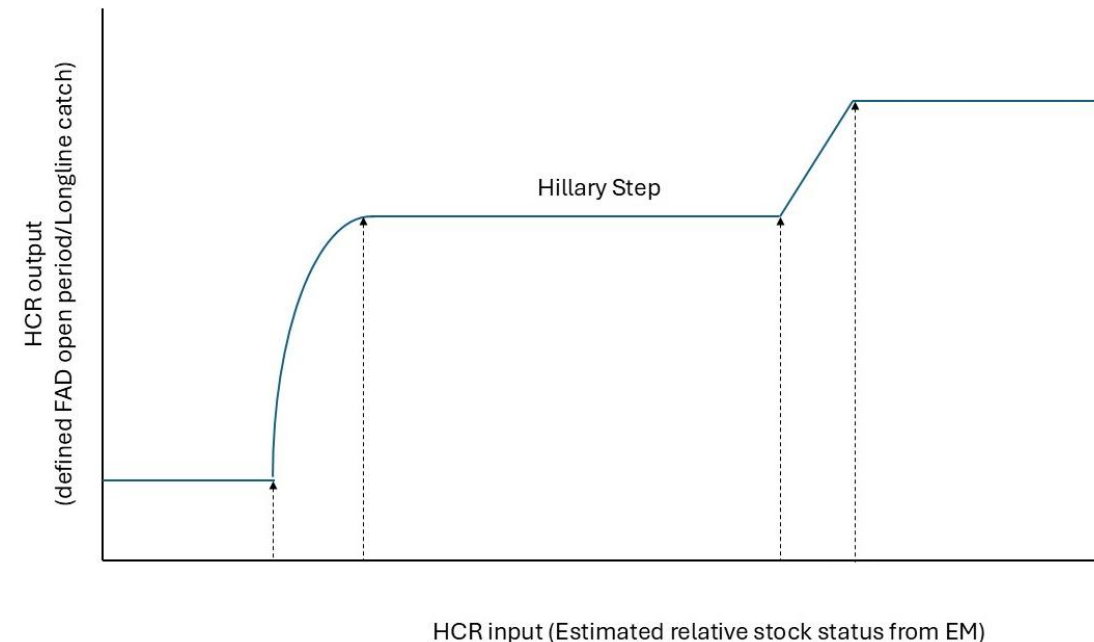
- Example: WCPO excluding SIDS fisheries, 'random' HCR pair scenario.
- Probabilities are not insignificant so there is a need to agree in advance what to do.
- Shape of the HCR to the left of the Hillary step is effectively set by height of bottom step.



Defining the HCR formula

- Under the approach of negotiating HCR pairs from the 'arc of possibilities', need to have a set formula for developing resulting HCR shapes.
- HCRs used in current evaluations (WP05) positions on x-axis (HCR input range) specified by TRP and LRP:
 - Convert depletion (LRP/TRP) to approximate equivalent EM output (est. SB relative to 2012-2015 levels).
 - Unaffected by Hillary step height.
- Hillary step heights from the nuclear grid and arc of possibilities.
- Heights of bottom and top steps need to be determined.

Component	HCR input position (as $SB/SB_{F=0}$, then converted to EM equivalent values)
Hillary Step	Between $TRP-0.05$ and $TRP+0.10$ (TRP is not in the centre)
Bottom Step	Between 0 and the LRP (0.2)
Top Step	Between $TRP+0.30$ and 1
Left-hand curve	Between LRP (0.2) and $TRP-0.05$
Right hand slope	Between $TRP+0.10$ and $TRP+0.30$

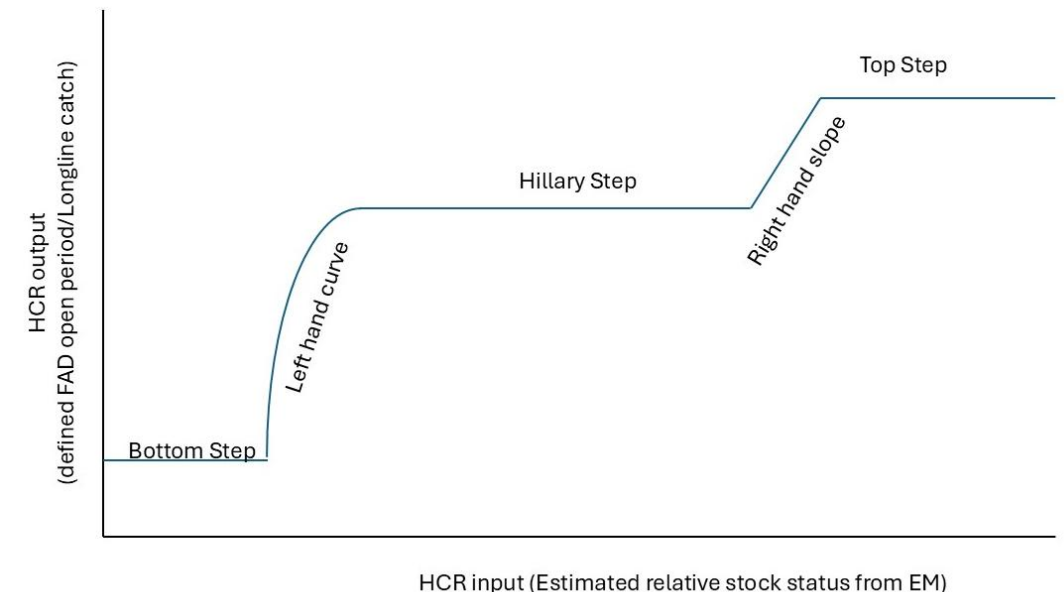


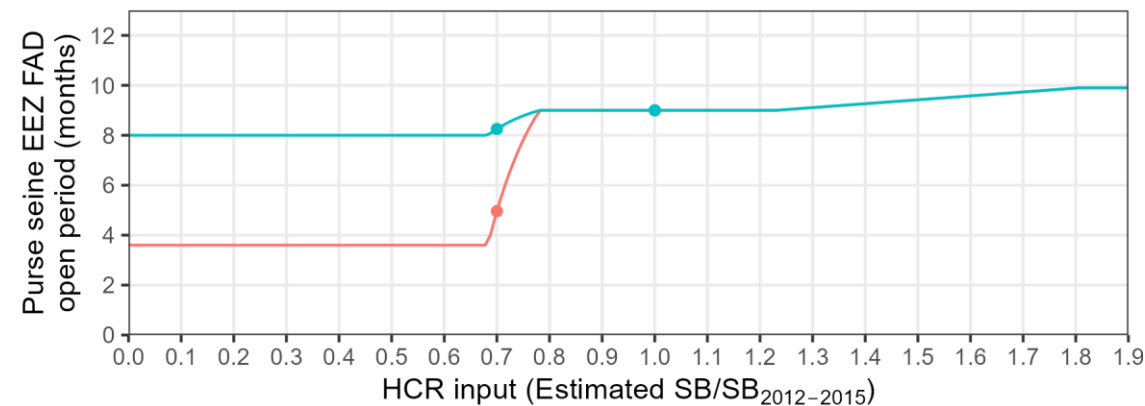
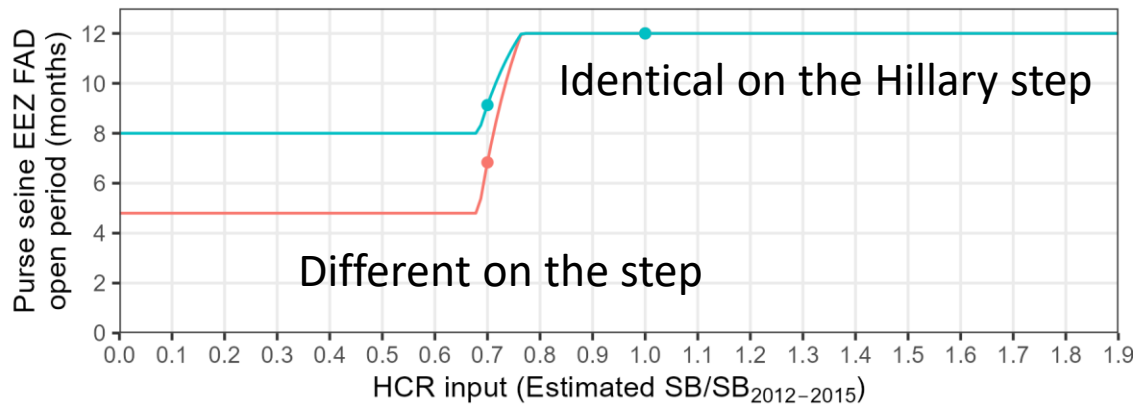
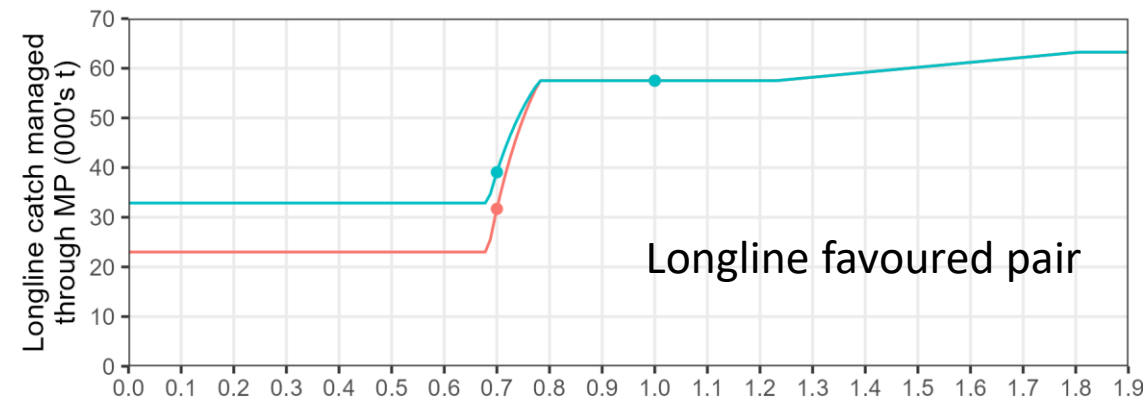
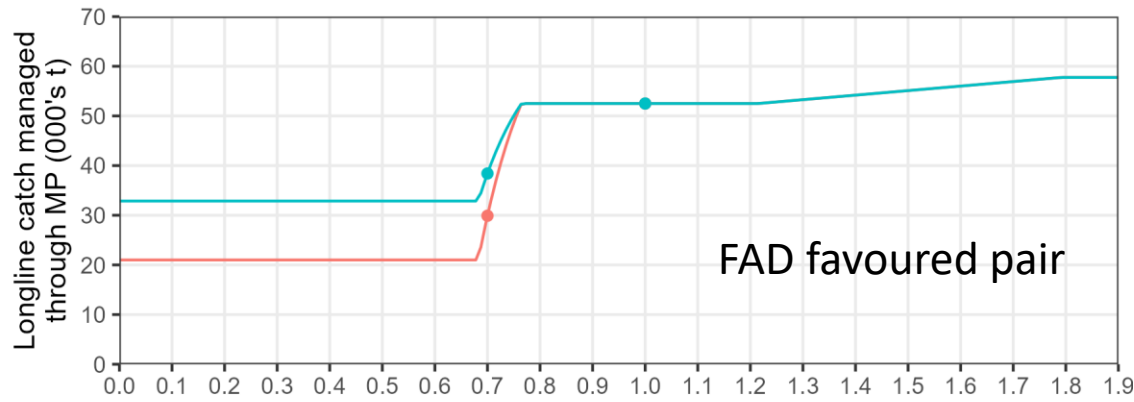
Examining impact of design

- Two example formulations evaluated, defined by height of lower step.

Component	HCR formulation 1	HCR formulation 2
Hillary Step	Designed to achieve TRP in the long-term.	Designed to achieve TRP in the long-term.
Top Step	110% of Hillary step height	110% of Hillary step height
Bottom Step	40% of Hillary step height	Fixed at 8 months open and 0.75 the average longline catch in 2019-2021, depending on the spatial scenario.

- Formulation 1 forms basis of results in WP05.
 - Gives same relative HCR shape for different Hillary steps.
- Formulation 2 evaluated across all spatial scenarios, at the lower and upper TRPs for comparison.
 - Relative shape changes with Hillary step as bottom step is fixed.





—●— HCR design 1 (bottom step 40% of Hillary step)
 —●— HCR design 2 (fixed bottom step)

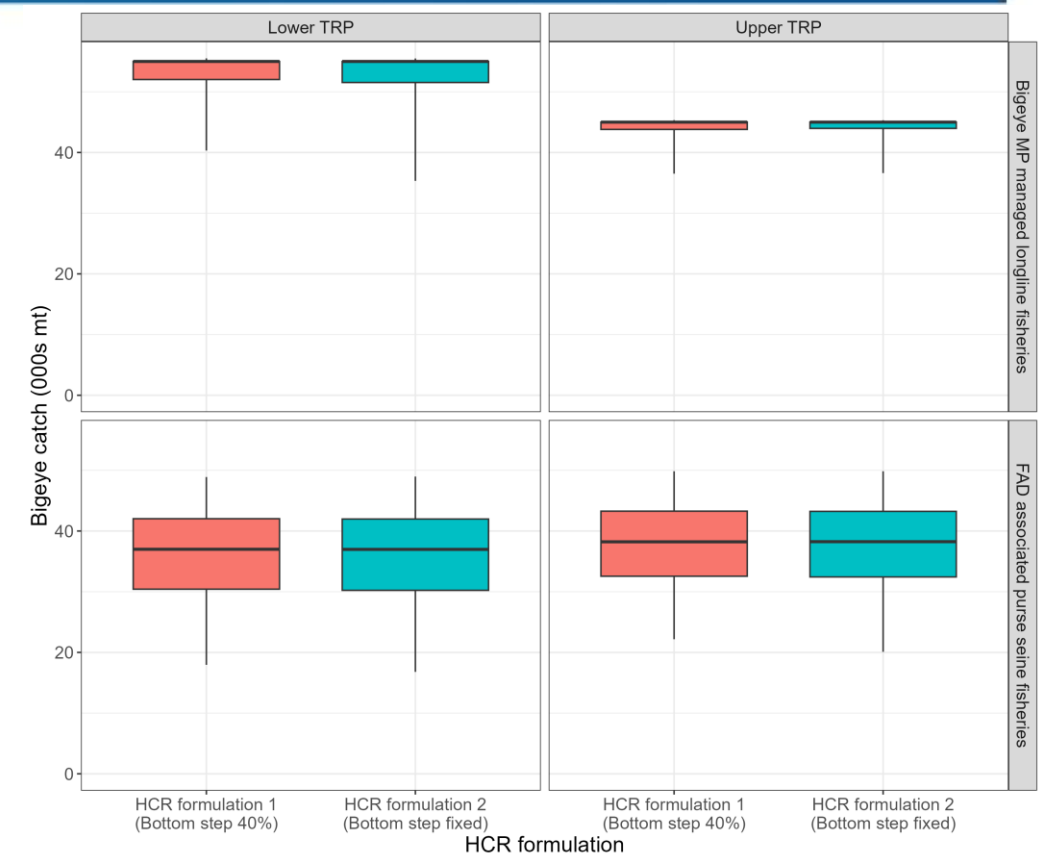
HCR design	HCR input	Longline catch limit (000mt)	EEZ FAD open period (months)
HCR 1	0.7	29.9	6.8
HCR 1	1.0	52.5	12.0
HCR 2	0.7	38.4	9.1
HCR 2	1.0	52.5	12.0

HCR design	HCR input	Longline catch limit (000mt)	EEZ FAD open period (months)
HCR 1	0.7	31.7	5.0
HCR 1	1.0	57.5	9.0
HCR 2	0.7	39.1	8.3
HCR 2	1.0	57.5	9.0

Example results

Target	HCR formulation 1 (bottom step at 40% Hillary step)	HCR formulation 2 (bottom step fixed)
Lower TRP	0.88	0.86
Upper TRP	0.95	0.93

- Showing WCPO excl. SIDS scenario
- Probability of being above the LRP
- Slightly higher risk with HCR formulation 2



- Long-term expected catches are similar, on average.
- Relative performance is similar.
- But with not insignificant chance of being to the left of the step important to consider HCR design.

BMW02 request

- Consider the approach used to define the design of candidate HCR shapes presented here.
- Provide guidance on the shape of a limited number (e.g. 2) of alternative HCR formulations to be evaluated for that reduced set of combinations – specifically defining the HCR's descending (and if desired ascending) limb(s).
- That shape should be specified as a formulation that allows all HCRs to be pre-specified, given the Commission's planned negotiations across the arc of possibilities.

