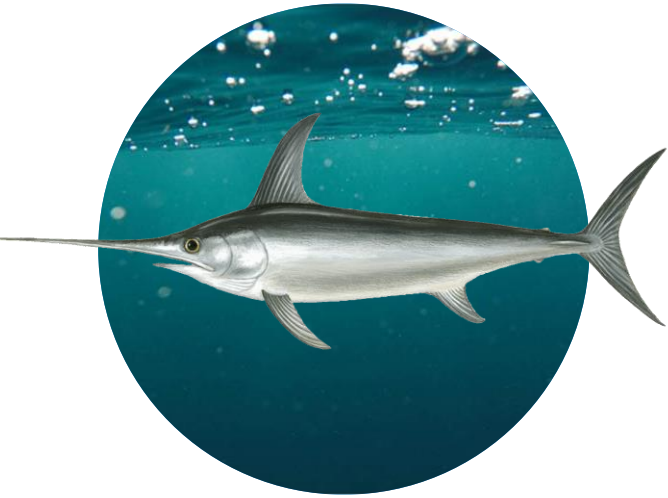


Indian ocean Swordfish Management procedures evaluation : status report

IOTC TCMP05 – 13-14th May 2022

Thomas Brunel, Iago Mosqueira



Status of the SWO MSE work

- OM based on 2019 WPB SS3 assessment and covered the dynamics of the swordfish until the year 2018.

→ updated to the current year (2022), by projecting the stock forward based on the reported catches for 2019 and 2020 and assuming constant catches in 2021 and 2022 at the 2020 level.

- Candidate MPs explored
 - Model-based (surplus production)
 - Data-based (Joint LL CPUE)
- Tuning objectives set in TCMP-04 (2021)
- Work conducted at WMR (funding contract FAO) with support of WMP MSE

Candidate MPs

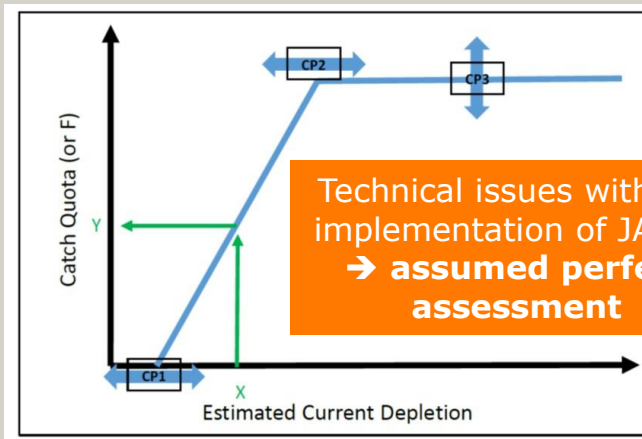
MODEL BASED MP

INPUT : Total annual catches

CPUE (UJPLL_NW, UTWLL_NW)

Model (JABBA) → Current depletion SB/SB0

HCR → TAC



CP1 : Set at $SB/SB0 = 0.1$

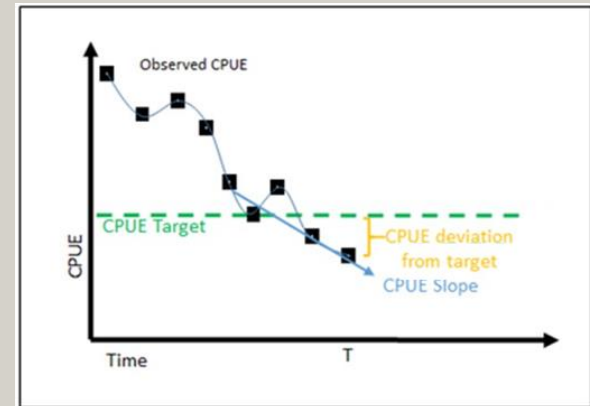
CP2 : Set at $SB/SB0 = 0.4$

CP3 : Estimated by tuning

DATA BASED MP

INPUT : CPUE (UJPLL_NW)

MP → % change in the TAC



Responsiveness to CPUE slope and deviation from target : set
CPUE target : Estimated by tuning

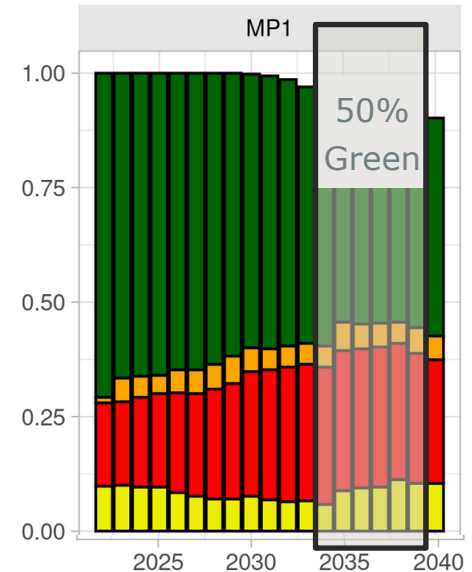
Candidate MPs

■ MP constraints and implementation

- Maximum 15% year-to-year change in the TAC (up- or downwards)
- 3 year advice (first TAC set for 2023)
- 2 year lag (1 data, 1 advice) : 2021 data used in 2022 assessment to set TAC for 2023-2025

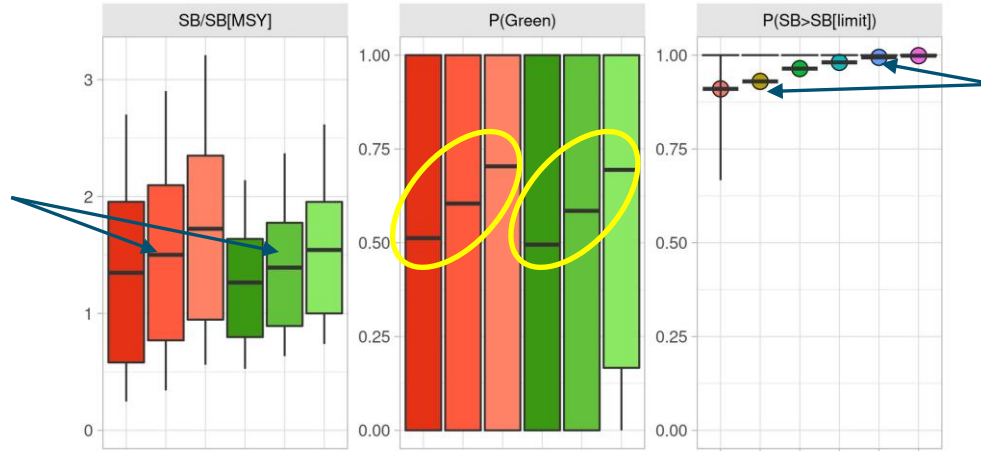
■ Tunning

- For Max catch (model-based MP) and target CPUE (data-based MP)
- Tunning separately for with 3 objectives :
 $p(\text{Kobe Green})_{2034-2039} = 50\%, 60\% \text{ or } 70\%$



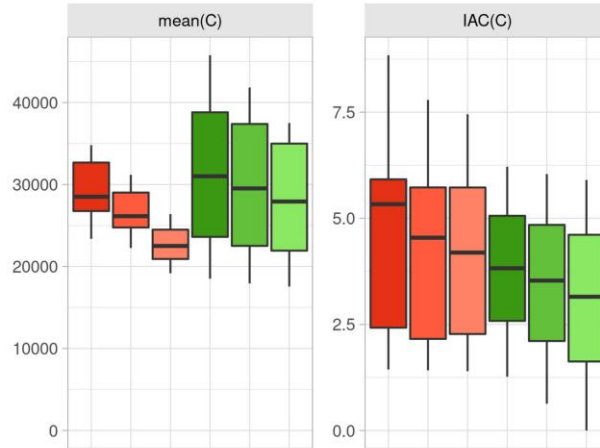
MP performance (2034-2039)

dataMP higher average SB, but wider distribution
NOTE : no SA in the model-based MPs



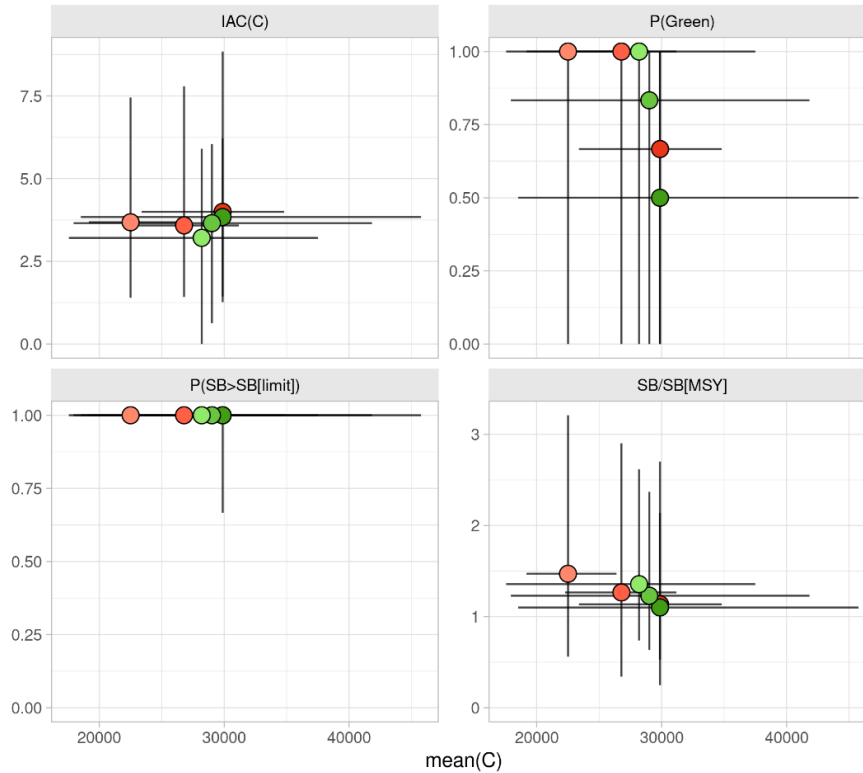
dataMP higher biological risk

dataMP lower Catch, with narrower distribution, but higher temporal variation



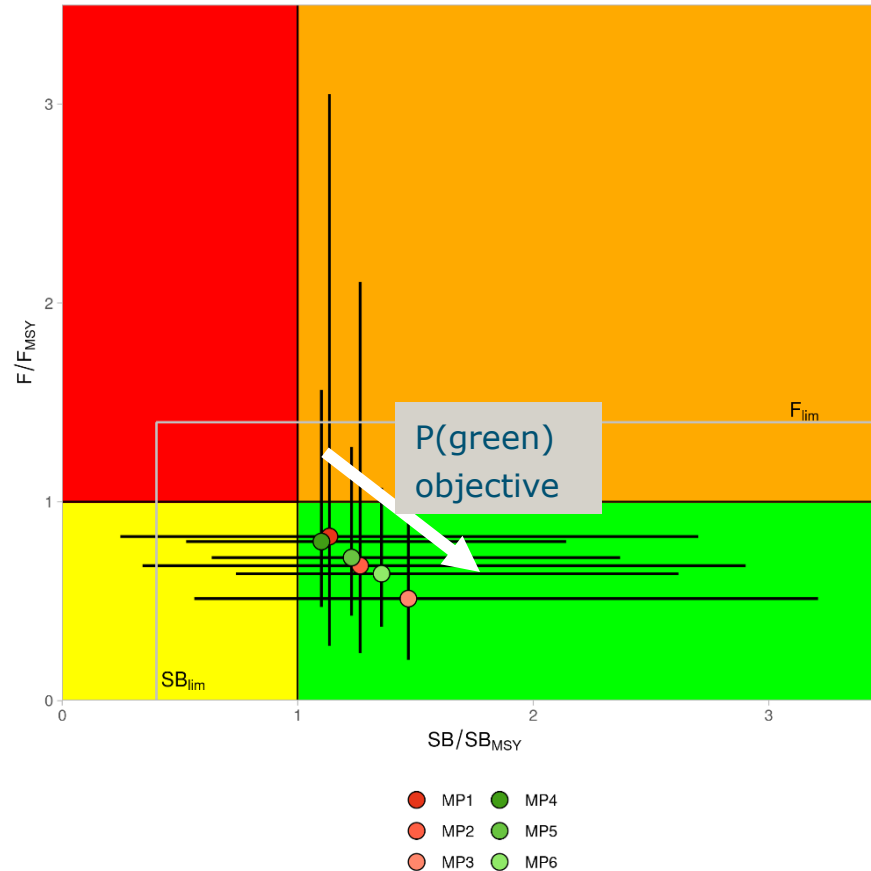
- MP1
 - MP2
 - MP3
 - MP4
 - MP5
 - MP6
- Legend:
- Data-based (CPUE idx)
 - "model"-based (perfect SA)

Trade-offs (2034-2039)



higher Catches ~ Lower p(green)
Lower (SB/SB_{MSY})

Kobe performance 2034-2039



Kobe time series 2022-2040

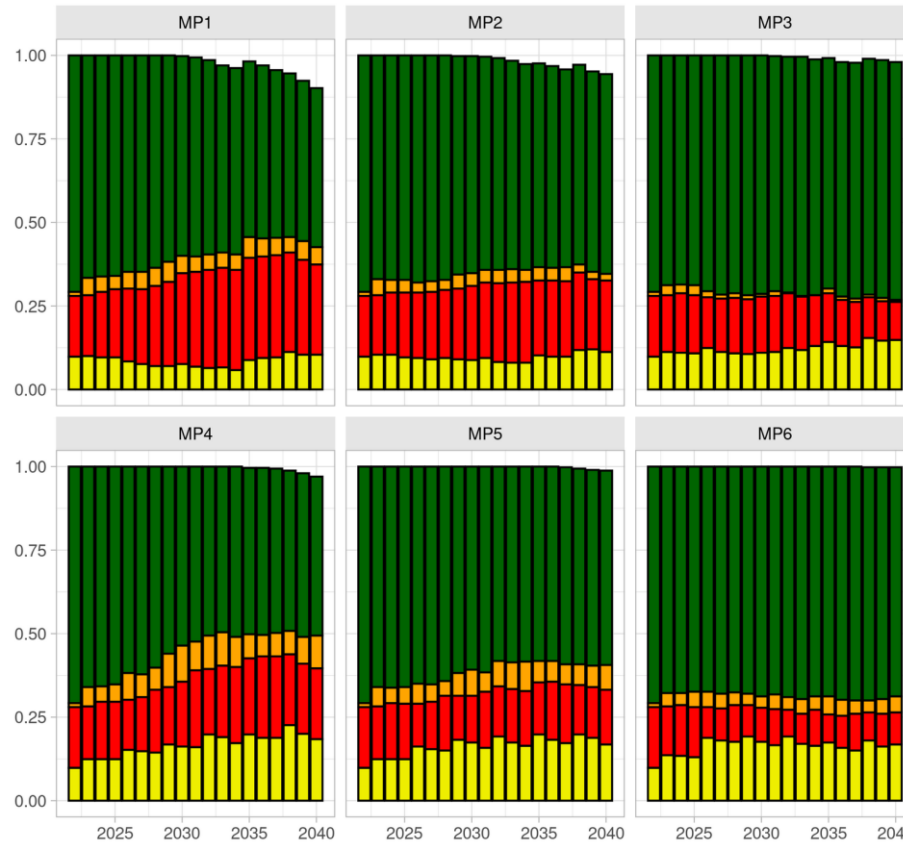
50%

60%

70%

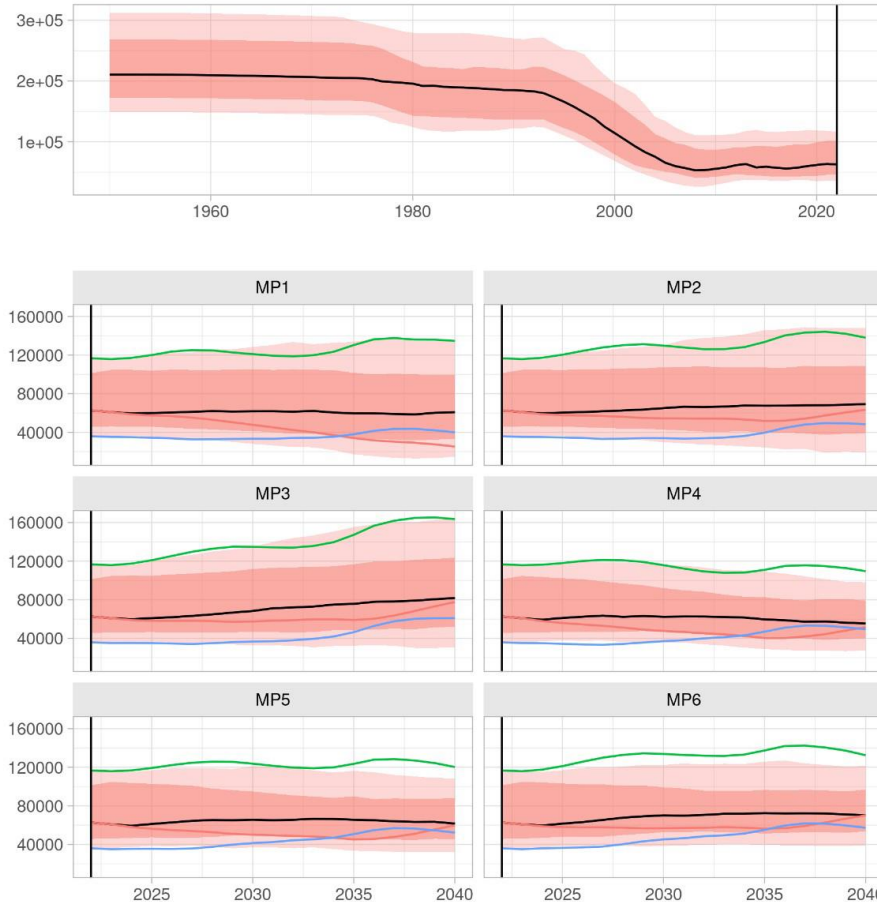
P(green)

Data based MPs

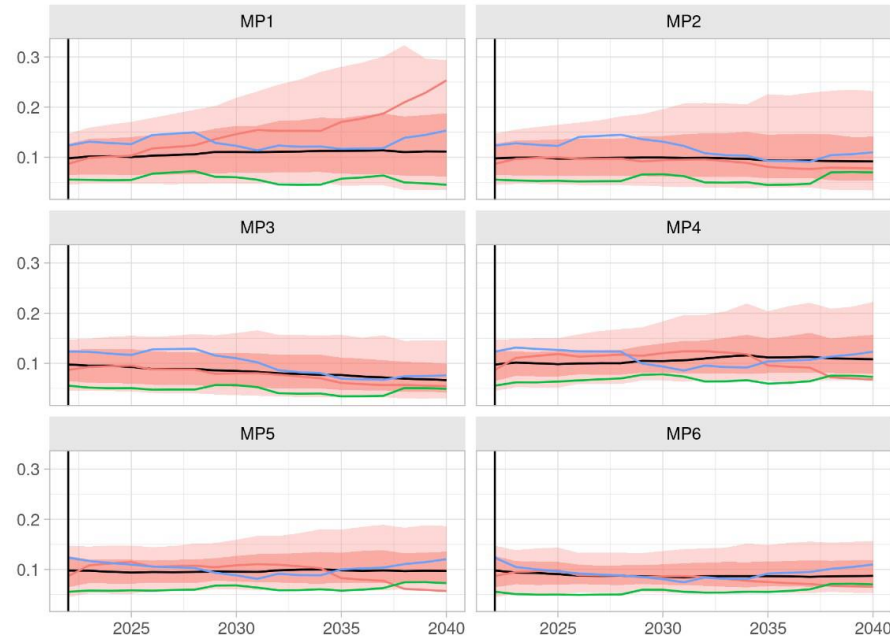
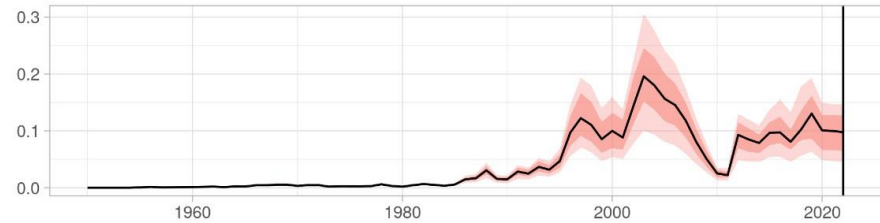


Model based MPs

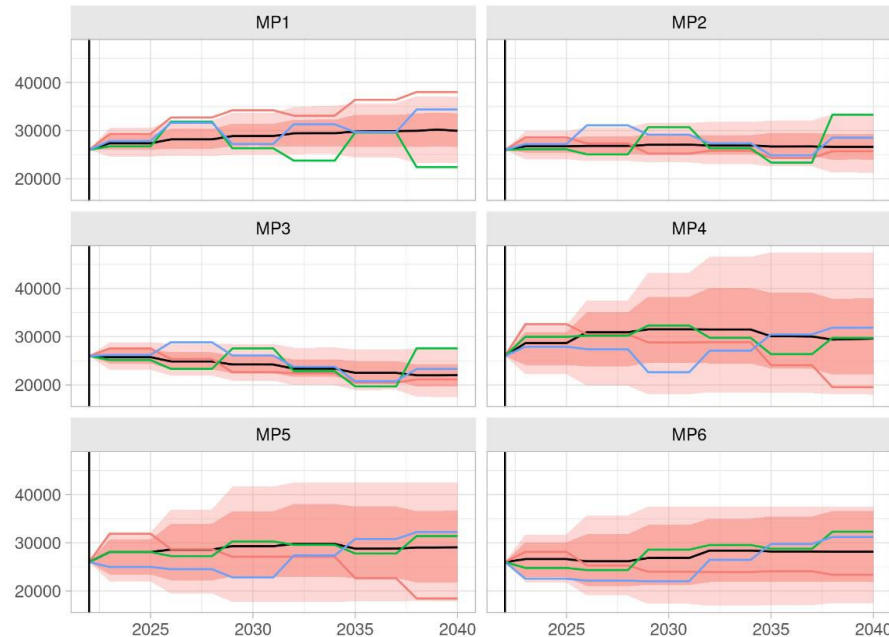
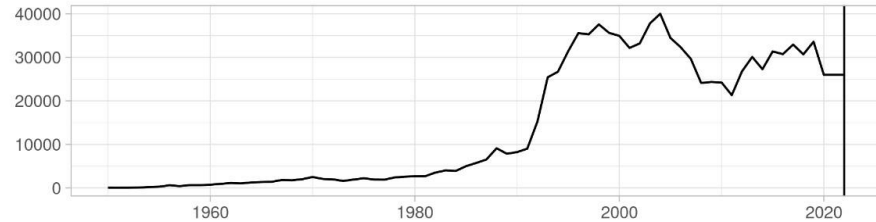
SB trajectories (OM and simulated 2022-2040)



F trajectories (OM and simulated 2022-2040)



Catch trajectories (OM and simulated 2022-2040)



Summary

- Higher P(Kobe green) tuning objective → larger stock, reduced bio risk, lower average catches and lower inter-annual catch variability.
- MP type also important for performance :
 - data-based MP : larger SB but with a wider distribution → higher probability of $SB < SB_{limit}$.
 - data-based MPs : (slightly) lower catches with a narrower distribution but higher IAV.
 - Conclusions may change when an actual JABBA is finally run (due to SA error)

Next steps

- Finalise implementation of the JABBA model
- Robustness tests (e.g. effect of recruitment failure)
- Refine choices for OM construction (parameter grid)

Thank you for your attention

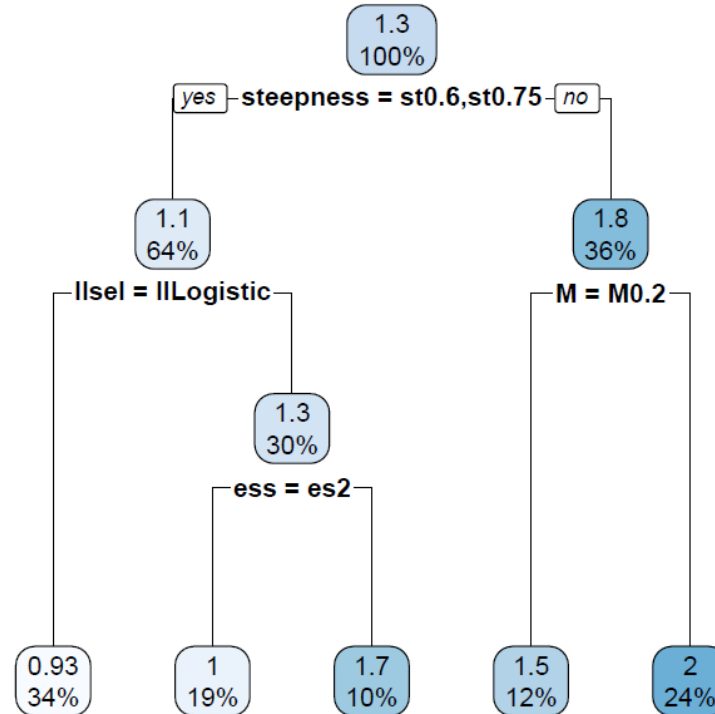
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OM construction (parameter grid in SS3)

Regression tree done on current stock status ($SB/SB_{MSY}(2018)$)



OM construction (parameter grid in SS3)

