Management Strategy Evaluation

Work reference (contract, meeting, . . .)

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- Management objectives
- Tuning objectives
- Secondary objectives

3 Methods

3.1 Simulation and Evaluation Framework

- ADD MSE simulation workflow

3.2 Operating Models (OMs)

- DESCRIBE OM structure
- TABLE OMs tested

3.2.1 Conditioning

- DESCRIBE input data

3.2.1.1 Operating model update

- New dataset for (IOTC 2025) assessment
  - Updated annual nominal catch series from 2010
- Differences in catch not large enough to affect productivcity estimates, thus no full re-conditioning
- **PLOT** Comparison SS3 runs

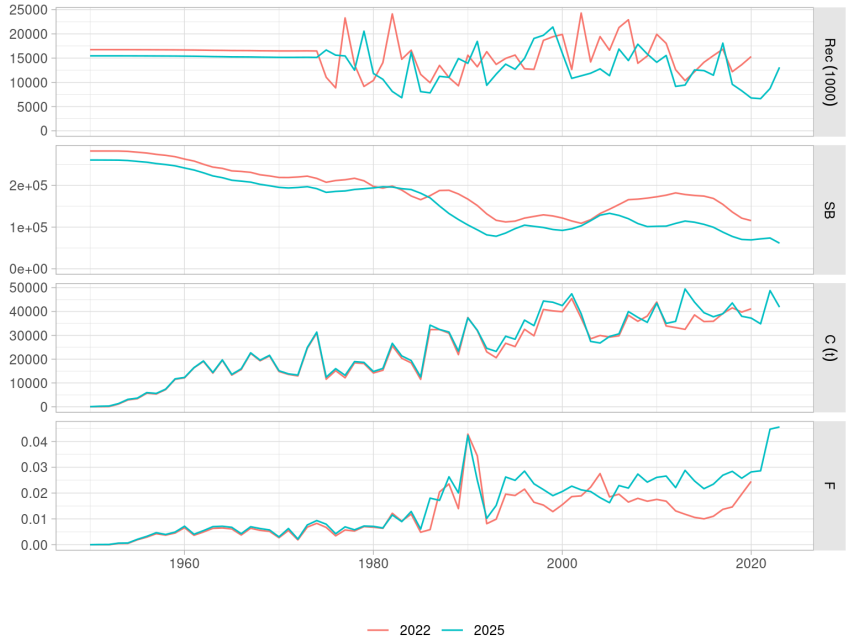

Figure 1: Time series of annual recruitment, spawning stock biomass, catch and fishing mortality estimated by the 2022 and 2025 NW LLCPUE stock assessment model runs for Indian ocean albacore tuna.

- 2025 SS3 model not fully endorsed, problems.

- Conditioned OM updated to 2024 by
  - Projecting forward using the new catch series 2010:2024
  - Recruitment deviances from the conditioned OM used in 2022 assessment, on top of SRR with new SSB 2010-2020, and from future deviances (LM, sigmaR and rho by sample) 2021-2024
  - Proportions by quarter kept as in projection set up, no changes between the two datasets, constant in time (Fiigure 2)

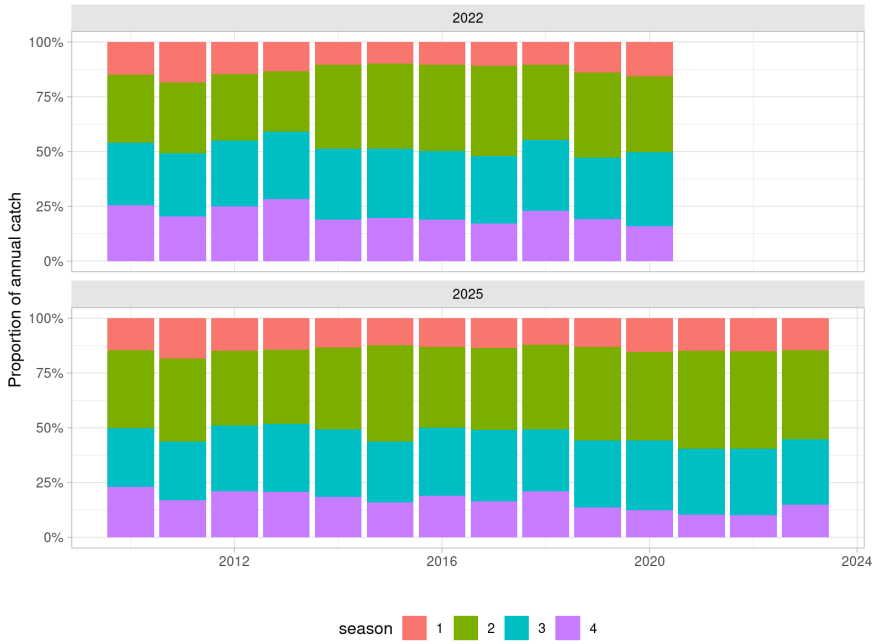

Figure 2: Annual proportion by season of the total catch for Indian ocean albacore tuna, obtained from the inputs to both the 2022 and 2025 stock assessment model runs.

- Updated observations of abundances and indices
- **PLOT** Comparison updated and original OMs
- **PLOT** Comparison updated and original indices

3.2.2 Reference set

- DESCRIBE om5b
-

3.2.3 Robustness set

3.2.4 Climate change

3.3 Observation Error Model (OEM)

3.4 Future Projections

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3.5.2 Harvest Control Rules

3.5.2.1 HCR A

- HCR diagram

3.5.3 # Implementation System

3.6 Implementation Error Model

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3.7.1 Experimental Setup

3.7.2 Performance statistics

- *SB*, Spawner biomass.
- *SB/SB[0]*, Spawner biomass relative to unfished.
- *min(SB/SB[0])*, Minimum spawner biomass relative to unfished.
- *SB/SB[MSY]*, Spawnwer biomass relative to SBMSY.
- *R*, Recruitment.
- *HR*, Annual relative harvest rate, computed as an seasonal average of the sum of the harvest rates by fishery over the HR at MSY reference point, $\sum_{f=1}^{6} HR_f / HR_{MSY}$.
- *P(Green)*, Probability of being in Kobe green quadrant, $SB > SB_{MSY} \wedge HRMSY < 1$.
- *P(Orange)*, Probability of being in Kobe orange quadrant, $SB > SB_{MSY} \wedge HRMSY >= 1$.
- *P(Yellow)*, Probability of being in Kobe yellow quadrant, $SB <= SB_{MSY} \wedge HRMSY < 1$.
- *P(Red)*, Probability of being in Kobe red quadrant, $SB <= SB_{MSY} \wedge HRMSY >= 1$.
- *P(SB>=SB[MSY])*, Probability of SB greater or equal to SBMSY.
- *P(SB>SB[limit])*, Probability that spawner biomass is above 10% SB0.
- *C*, Total catch.
- *C/MSY*, Proportion of MSY.
- *AAV(C)*, Annual variability in catch.
- *IAC(C)*, Percentage inter-annual change in catch, $(C_{y-1} - C_y)/C_y$.
- *P(shutdown)*, Probability of fishery shutdown, taken to be when catch falls below 1% of MSY.

4 Results

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7.5 Length-weight relationship

7.6 Maturity

7.7 Biomass quantities

7.8 Exploitation rate

7.9 Survey indices

8 Appendix B: Harvest Control Rules

8.1 HCR A

Exploration

IOTC. 2025. "Report of the 15th Session of the IOTC Working Party on Temperate Tunas: Assessment Meeting." IOTC–2025–WPTmT09(AS)–R[E]. Indian Ocean Tuna Commission.