Some comments relating to the proposal by FISHERIES/2020/JUN/SWG-PEL/38rev

SWG-PEL Meeting

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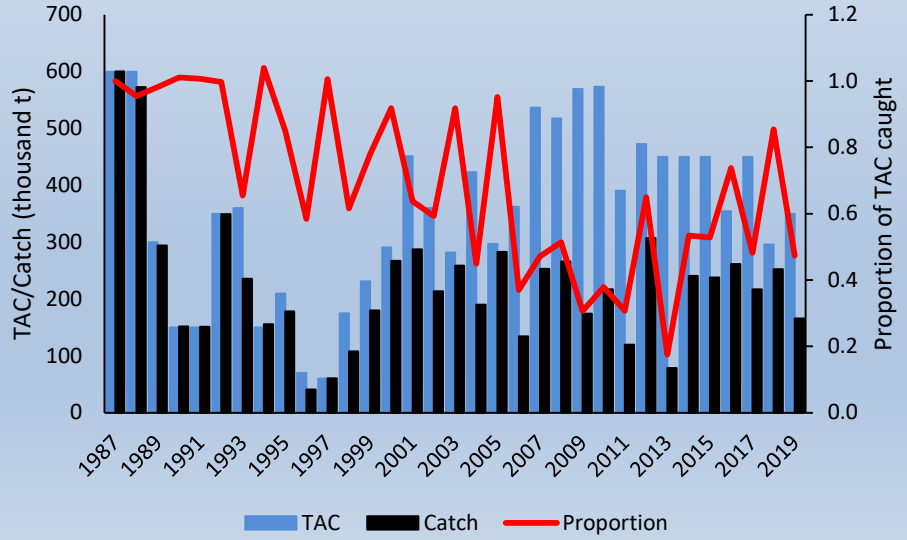
Carryn de Moor

Marine Resource Assessment and Management Group (MARAM)
Department of Mathematics and Applied Mathematics
University of Cape Town

Exploitation Rates

- Caution against the proposal to use exploitation rates (provided by comparison with other fisheries) to set the South African anchovy TAC

- TAC has been under caught for many years. The historical avg ER quoted by Bergh (2020) and SAPFIA (2020) (0.086) is not a reflection of the historical management of anchovy, but rather of realised catches, and based on an assessment using data up to 2015



Exploitation Rates

- 200 000t TAC would correspond to an ER point estimate of 11-18% based on the 6 models of de Moor (2020b)
- Assuming DEPM no longer provides an absolute index of abundance (and subject to finalisation of the anchovy maturity ogives), the expected ER is as follows:

	200 000t	210 000t	220 000t	230 000t	240 000t	250 000t
-2SE of B						
-1SE of B						
ER MLE	0.12	0.13	0.13	0.14	0.15	0.15
+1SE of B						
+2SE of B						

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-2SE of B	0.23	0.24	0.25	0.26	0.28	0.29
-1SE of B	0.16	0.17	0.18	0.18	0.19	0.20
ER MLE	0.12	0.13	0.13	0.14	0.15	0.15
+1SE of B	0.10	0.10	0.11	0.11	0.12	0.12
+2SE of B	0.08	0.09	0.09	0.10	0.10	0.10

±95%CI

- Uncertainty -> caution

Exploitation Rates

- Final year estimates of biomass are typically more uncertain
- This provides additional uncertainty if trying to advise TACs based on a chosen/desired ER. The realised ER outcome could be different.
- Had ER been used to set anchovy TACs in the past, the realised ERs would have been 13-14% higher than desired.

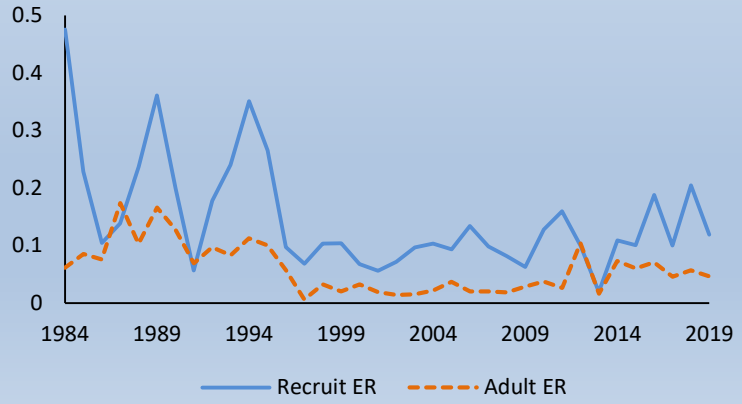
	200 000t	210 000t	220 000t	230 000t	240 000t	250 000t
-2SE of B	0.23	0.24	0.25	0.26	0.28	0.29
-1SE of B	0.16	0.17	0.18	0.18	0.19	0.20
ER MLE	~~0.12~~ 0.14	~~0.13~~ 0.15	~~0.13~~ 0.15	~~0.14~~ 0.16	~~0.15~~ 0.17	~~0.15~~ 0.17
+1SE of B	0.10	0.10	0.11	0.11	0.12	0.12
+2SE of B	0.08	0.09	0.09	0.10	0.10	0.10

- Further uncertainty -> further caution

MSC requirement 0.5xER_{MSY}
= 0.5x0.24 = 0.12 (Bergh)
= 0.5x0.18 = 0.09 (Hilborn et al. 2020)

Exploitation Rates

- RSA anchovy fishery is primarily a recruit fishery off the west coast.
- Setting a quota based on a desired/target ER of the adult November biomass (primarily Cape Point – Mossel Bay) -> substantial risk due to the disconnect between the November biomass and forthcoming recruitment.
- (Substantial disconnect between desired/target ER and realised ER on recruitment)
- ER of recruits frequently substantially higher than that of adults
- OMPs therefore typically set initial TACs lower to allow a buffer if recruitment is poor.
- Not directly comparable with ERs of other non-recruit fisheries which primarily remove catches from estimated biomass



Exploitation Rates

- Doc #23 – a 1st step to consider the impact (if any) of ER on subsequent anchovy biomass.
- If average ER impacts subsequent trends, then expect higher/lower avg ER to correspond with decreasing/increasing trends. Not the case for TB.
- Doc #38rev quotes avg ER of 0.25 (SSB) or 0.33 (TB) to correspond to increasing [sustainably fished] resources. But lower avg Ers correspond to decreasing [unsustainably fished] resources
- 2nd step not yet provided. Have requested shorter 'impact' periods be considered (short-lived species) and to separate results by stock status (e.g. increasing/decreasing trends v good/poor status)
- No method of trying to obtain information about 'acceptable' ERs from other anchovy fisheries has thus far proven satisfactory
- Doc #23 uses running 5-year means, Doc #38rev uses fixed 5/6-year bins – results sensitive to the selection of time periods
- Figs 12&13 of Doc #38rev indicate low biomass *results* from higher ER

Dynamic B_0

- Dynamic B_0 currently being explored for RSA small pelagics to provide some info on

i) the proportion of the historical trajectory that is due to fishing compared to that due to the environment

ii) the possibility of (SS)B:Dynamic(SS)B_0 being used to provide TRPs in the future

- (i) commonly used in some tuna and small pelagic assessments elsewhere
- 'depletion' not always annual (SS)B_y:Dynamic(SS)B_{0y}, but rather (SS)B_y:RegimeDynamic(SS)B_0
- i.e. instead of SSB_{2019}:DynamicSSB_{02019} = 0.69 and B_{2019}:DynamicB_{02019} =0.70, rather SSB_{2019}:Dynamic$SSB_{0(00\text{-}19)}$ = 0.33 and B_{2019}:Dynamic$B_{0(00\text{-}19)}$ =0.40
- Berger (2019) considers Dynamic B_0 more useful for management of longer-lived than shorter-lived species! Contrary to our exploration of Dynamic B_0 for inter-annual changes in biomass due to highly variable environmentally-linked recruitment

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- Use of Dynamic B_0 to provide RPs for management purposes (ii) or stock status avoided thus far internationally
- Premature to compare Dynamic B_0 ratios to MSC's $0.75B_0$
- Can't compare e.g. groundfish RPs to those of forage fisheries

F_{MSY}

- Doc #38rev uses high steepness to calculate F_{MSY} (ASPM)
- More accurate steepness h=0.34 by this method gives F_{MSY} = 0.30 and ER_{MSY} = 0.24
- RSA anchovy steepness is low compared to all other assessments in RAM -> further reason to caution against trying to set RSA anchovy ER based on other fisheries
- More detailed analyses (Hilborn *et al*. 2020) estimated RSA anchovy ER_{MSY} = 0.18, but only used for stock status, considered too high as a RP

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Thank you!