WCPFC yellow fin tuna peer review meeting 1: 17-12-201

Agenda:

- Meet and great
- Some background
- The peer review process – working together, timing, logistics etc.
- Some initial work planning/tasking
- What do you need from us, reporting formats and info. etc….
- General discussion

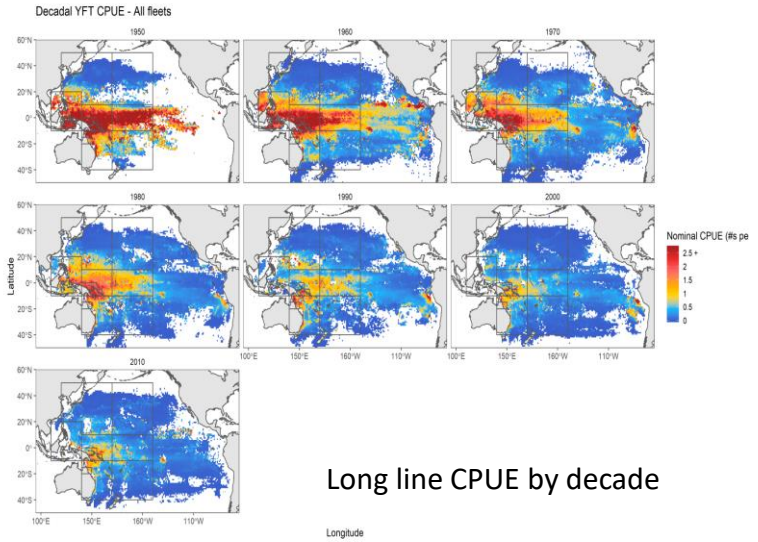
Yellowfin Tuna – and peer review, background

17/12/2021 meeting 1

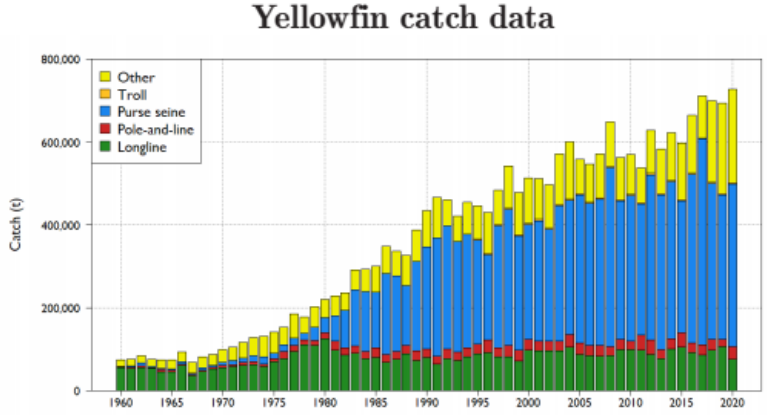
Assessment background

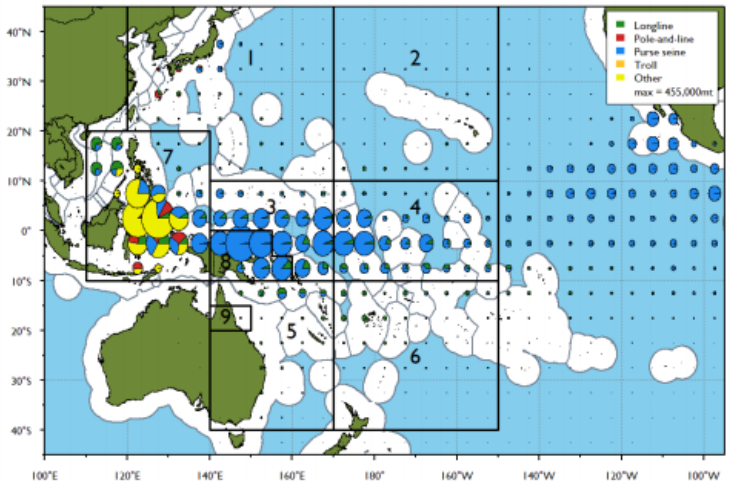
- Multifan-CL
- Length-based, age-structured, spatial structure (9 regions)
- Catch, effort, length frequency and weight frequency, tagging
- Key new biol. information for 2020: growth from otoliths
- Quarterly time step, 1962-2018
- 32 extraction fisheries, 9 index fishers (LL) (VAST standardisation)
- Log-likelihood function: catch, length frequency, weight frequency, tagging data
- Fit to the CPUE data does not influence the fit as an explicit likelihood component but rather as a penalty on the effort deviates

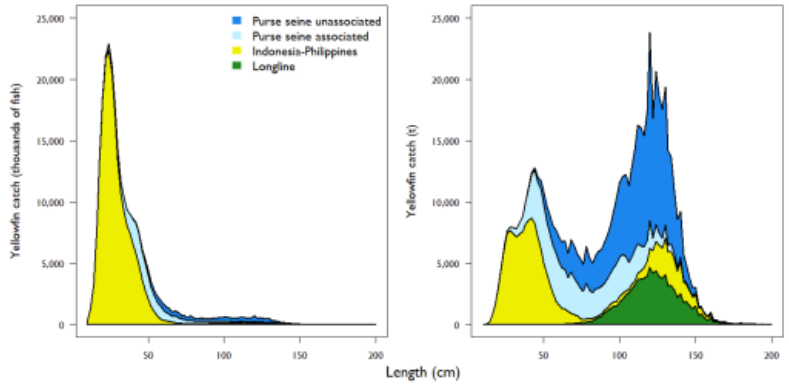
2020 total WCPO catch approx.:
720,000 mt, 27% of total tuna harvest



Long line CPUE by decade





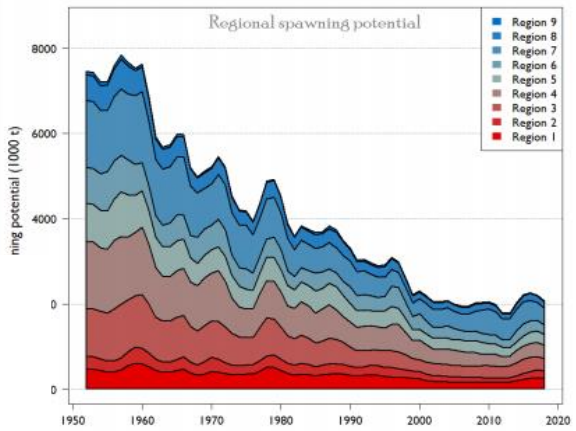


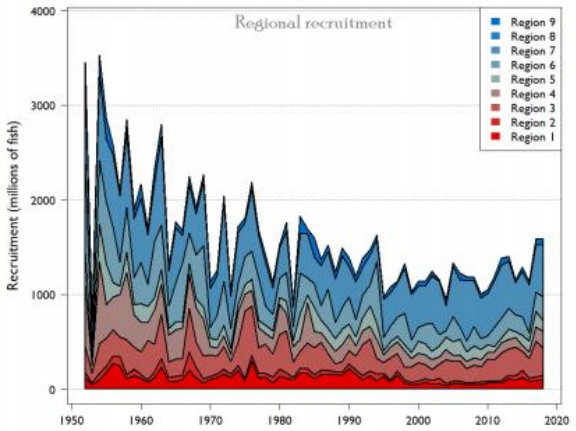
Outcomes

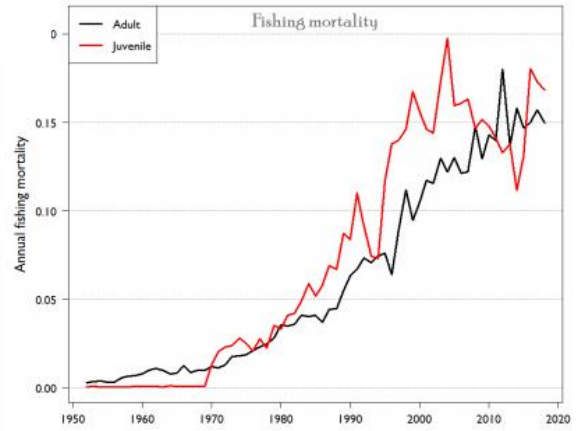
Structural uncertainties

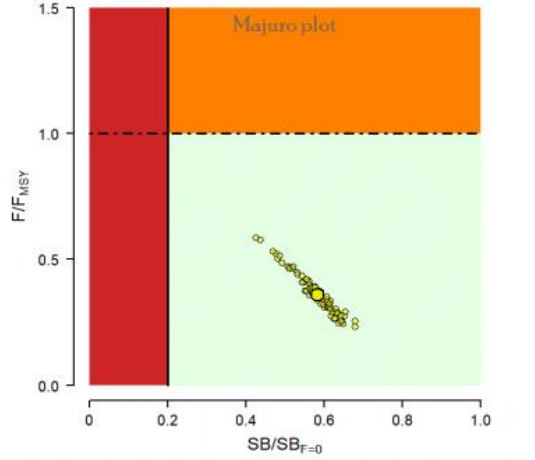
Axis	Levels	Option
Steepness	3	0.65, 0.80*, or 0.95
Growth	3	Modal estimate, External otolith, Cond age-at-length*
Size frequency weighting	4	sample sizes divided by 20, 60*, 200, or 500
Tag mixing	2	1 quarter, 2 quarters*

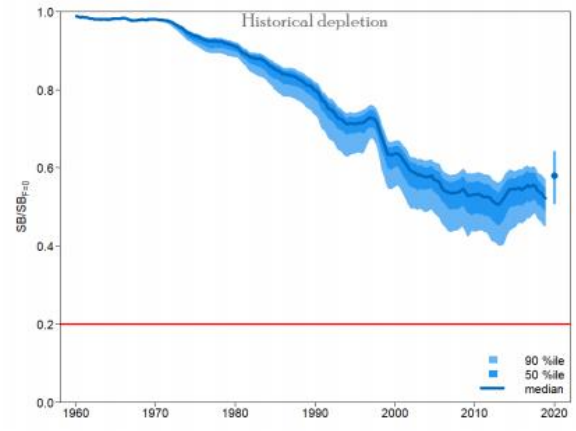
- All models > 20% $SB/SB_{F=0}$, median terminal depletion 0.58 (10-90th percentiles 0.51-0.64)
- All model show $F<_{MSY,}$ median F/F_{MSY} = 0.36 (10-90th percentiles 0.27-0.47)
- Depletion notably greater in the tropical regions, temperate regions showing limited fishing impacts
- Concerns of buffering by high recruitment in temperate regions, lack of information on small fish for these regions, models moves fish into more heavily exploited regions to fit other data
- Concerns the assessment provides overly optimistic estimates of stock status

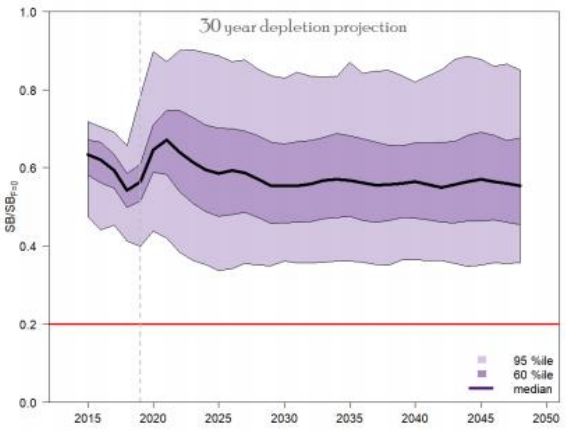


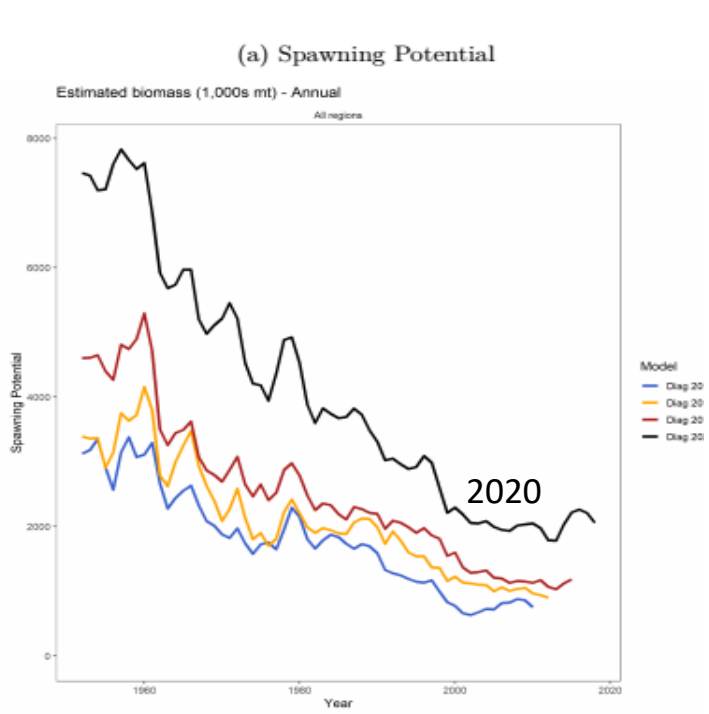


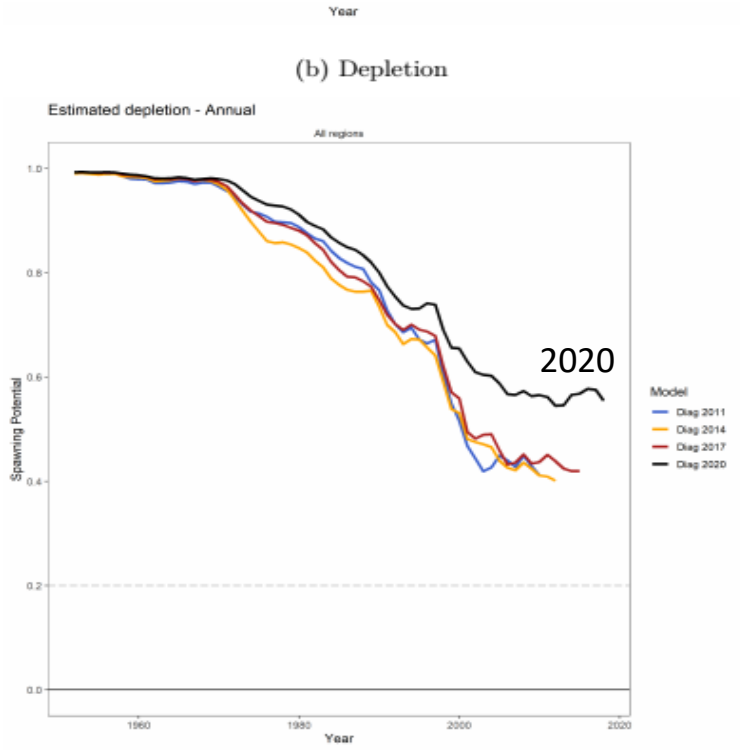


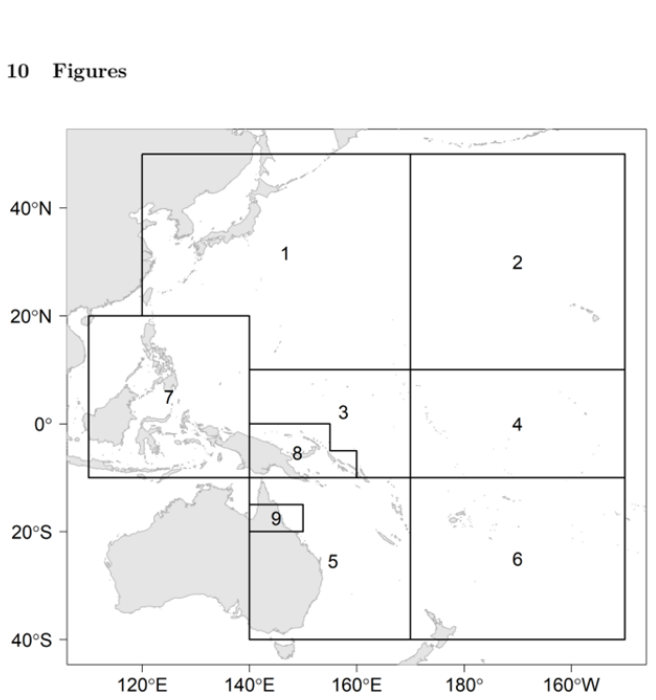












- Follow-up work and peer review of the yellowfin assessment (with consideration of bigeye also) was recommended by SC16

This assessment was fraught with strife due to conflict among data inputs –
M Vincent July 2020

Concerns

- 2020 yellowfin tuna assessments was presented with some cautionary caveats, and concerns it presented an overly optimistic stock status, buffering of tropical regions by lightly fished southern regions etc….
- Some key concerns of the assessment team for the 2020 yellowfin assessment related to:
    - Selectivity (in particular purse seine selectivity, estimation of early size/age classes)
    - Tagging data (mixing period, tag reporting rates on bound, tagger effects etc…)
    - **New Growth** – new otolith based growth information had a major impact, interacted with selectivity – needed more time to explore complex effects of the new growth
    - CPUE standardisation, lack of sensitivity to covariates, influences on regional scaling??
    - Natural mortality – different plausible levels of M lead to really different and unexpected outcomes (reduction in M (0.23 diag, meta-anal using new growth 0.11-0.15) lead to large increases in biomass and less depletion)
    - Limited data from which to estimate the spawning potential ogive, better data to inform gilled-gutted - whole weight conversion
    - Conflict among data sources, is the model was too complex and needs some simplification (i.e. spatial structure)
    - Non-positive definite Hessian solution