



Pacific
Community
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Yellowfin Tuna Assessment Review

Background and Work Plan



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SPC Pre-Assessment Workshop (PAW)
Noumea, 31 March 2022

Overview

Background *2020 assessment*

Review Process *WCPFC review, panel, format, objectives*

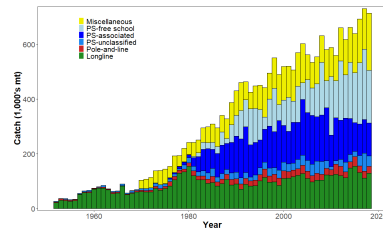
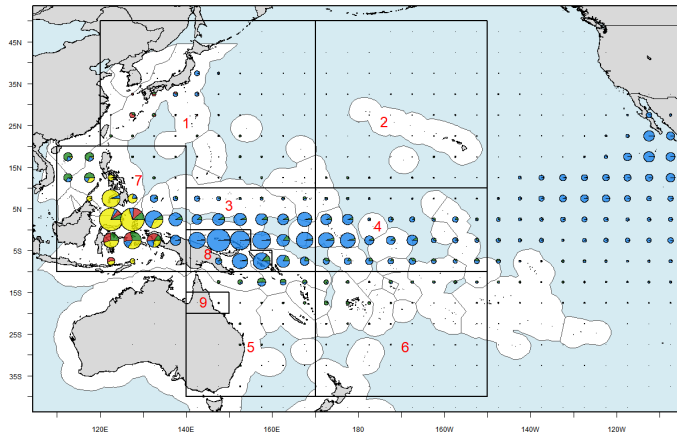
Model Development *phases I–III, 2023 assessment, regional structure*

2020 Assessment

2020 Assessment Data

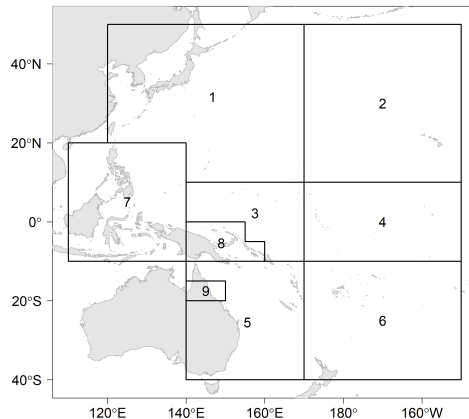
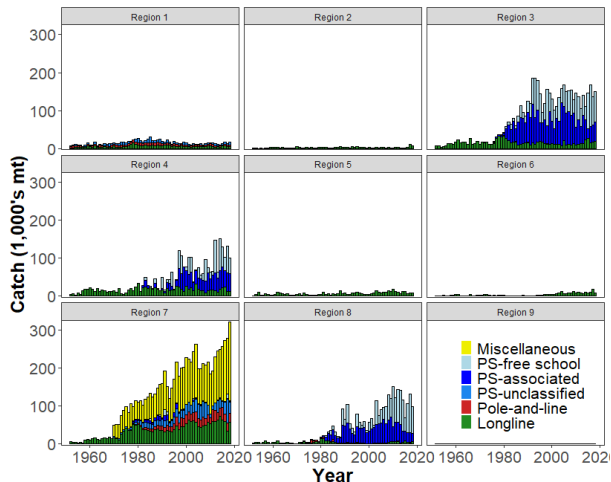
Catches

purse seine (blue), miscellaneous (yellow), longline (green), pole-and-line (red)



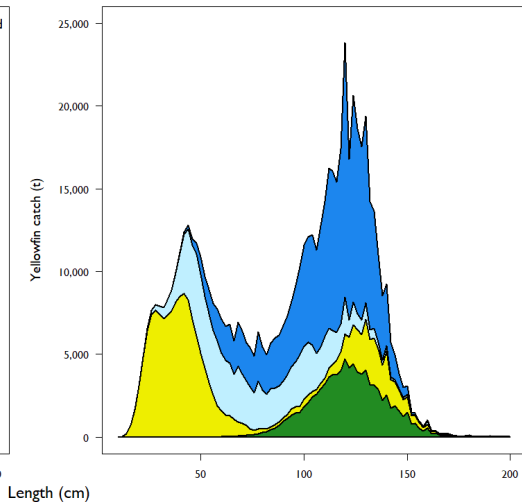
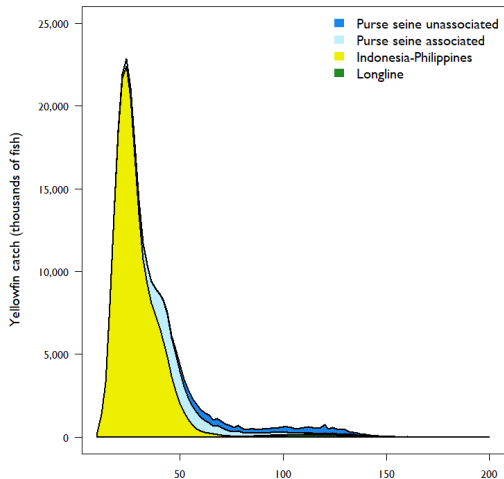
2020 Assessment Data

Catches



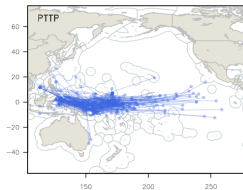
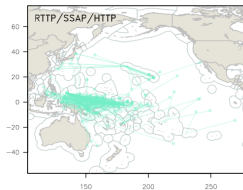
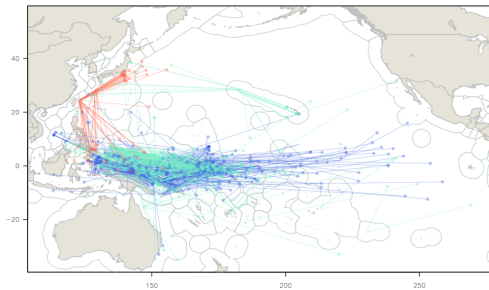
2020 Assessment Data

Catches



2020 Assessment Data

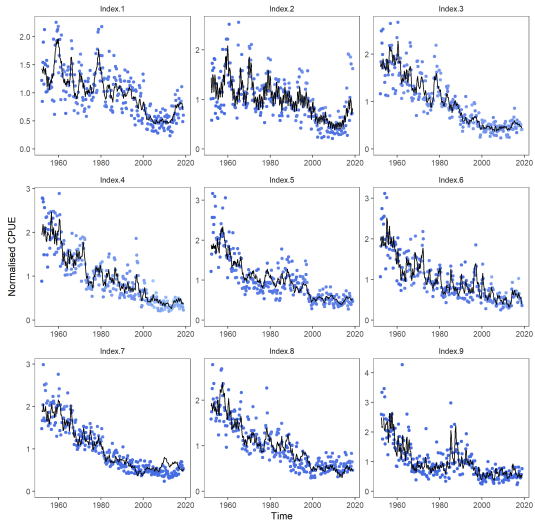
Tagging Data



Program	Years	Groups	Releases	Recoveries
JPTP	1999–2017	58	10551	1024
PTTP	2006–2017	53	79339	17002
RTTP	1989–1995	34	26235	4380

2020 Assessment Data

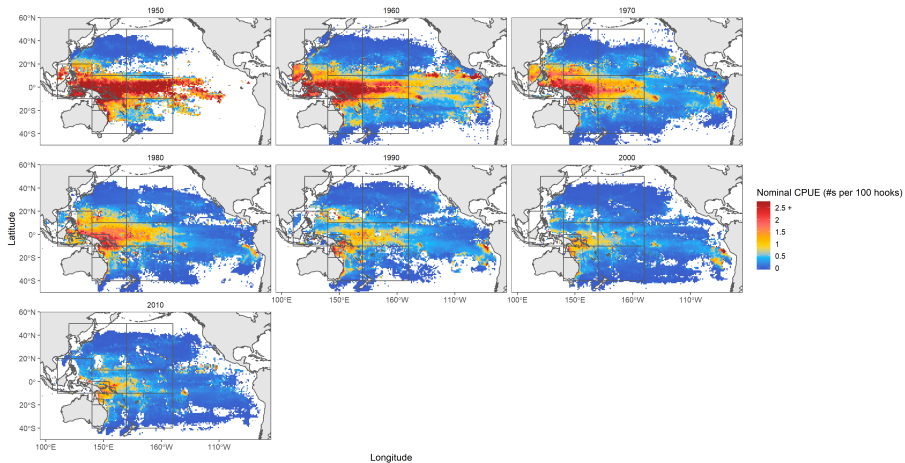
CPUE



2020 Assessment Data

CPUE

Decadal YFT CPUE - All fleets



2020 Assessment Model

Multifan-CL with

- 9 regions

- 1962–2018, quarterly time step

- 32 extraction fisheries

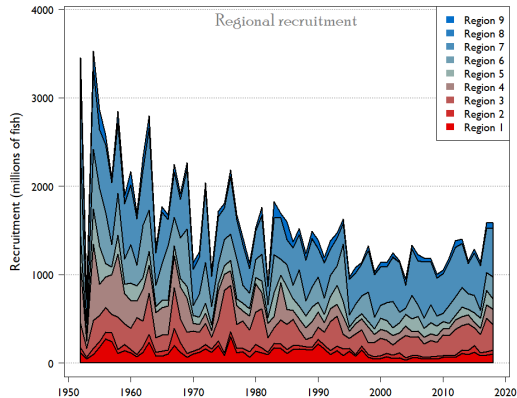
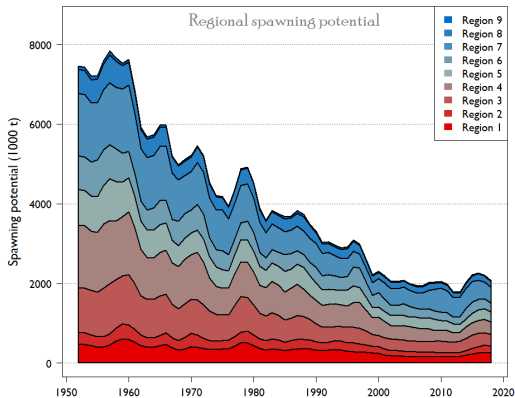
- 9 index fisheries, VAST analysis of longline CPUE

- 11671 estimated parameters

- 72 models in uncertainty grid (steepness, growth, sample size, tag mixing)

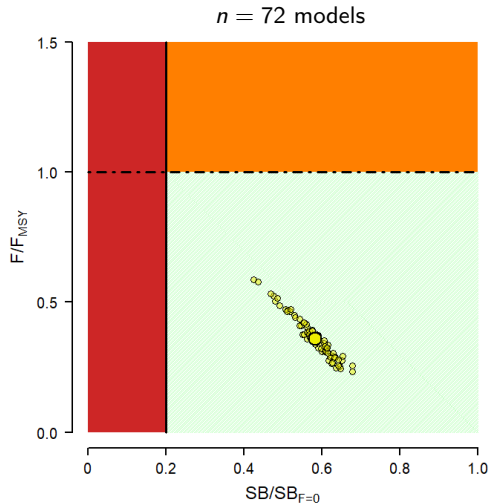
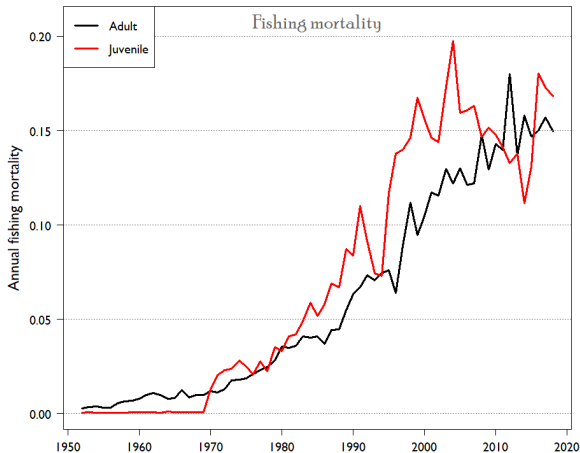
2020 Assessment Results

Spawning Potential and Recruitment



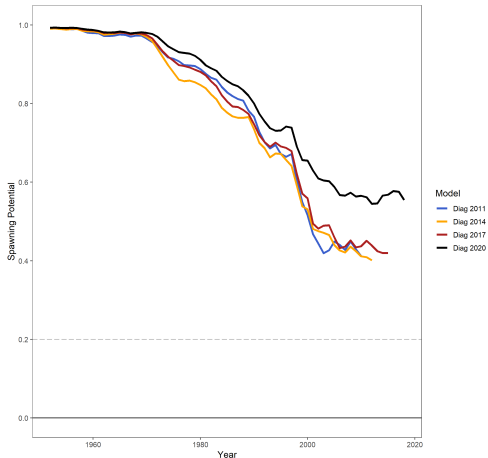
2020 Assessment Results

Fishing Mortality and Stock Status



2020 Assessment Results

Stock Status, Differences Between Assessments



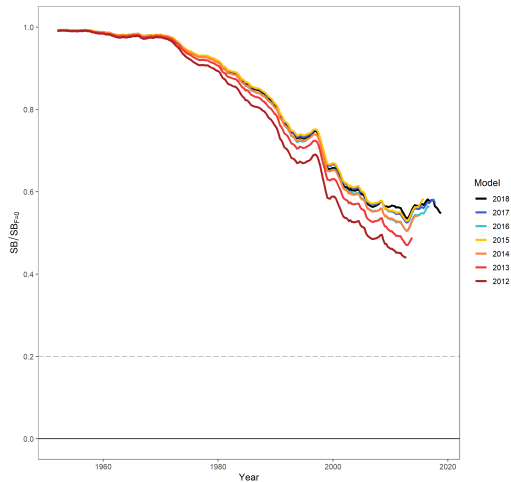
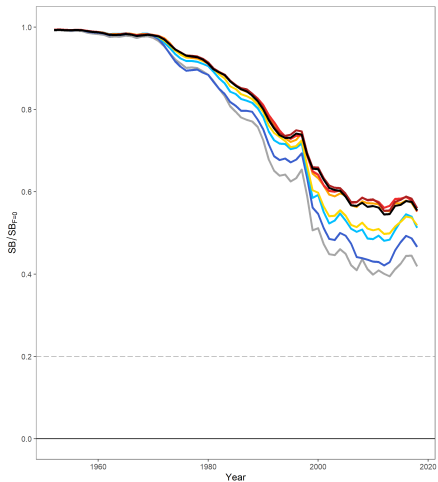
Considerably more optimistic than previous assessments — why?

New features in the 2020 assessment

- Growth data from both otoliths and tag recaptures
- Richards growth model
- Updated spawning potential based on maturity at length
- 'Index fishery' approach with 9 VAST CPUE series
- 'Pseudo catch conditioned' estimation of F
- Increased maximum age from 7 to 10 years old
- Uncoupled selectivity parameters between regions

2020 Assessment Results

Stepwise and Retrospectives



Review Process

Review Process and Panel

WCPFC review requested by SC16 to examine possible improvements for the 2023 assessment, SC17 approved Terms of Reference

Review panel: Mark Maunder, Jim Ianelli, André Punt (chair)



Review Panel



An artist, an economist, and a biologist entered a stock assessment review meeting...

The Biologist [squeezes a fish and some eggs come out]:

"There are still some spawners left, so the stock should be fine"

The Economist [looks at the financial report]:

"They are still making some money, so the stock should be fine"

The Artist [looks at the stock assessment report]:

"These are quite good, but I have seen better abstract paintings"

Review Format

Continuous format: quick chats (milestones) in December 2021, April 2022, June 2022

Main review meeting in Noumea 7–13 September 2022

Review panel reports back to SC

Many of the concerns raised for the yellowfin tuna assessment are relevant to the bigeye tuna assessment, so the peer review will also have relevance to the bigeye assessment

Model Development

Model Development

Phase I focuses on the use of new features in MFCL:

- ▶ Catch-conditioned estimation of F
- ▶ Orthogonal polynomial recruitment
- ▶ Dirichlet-multinomial estimation of sample sizes

Phase II will focus on regional structure:

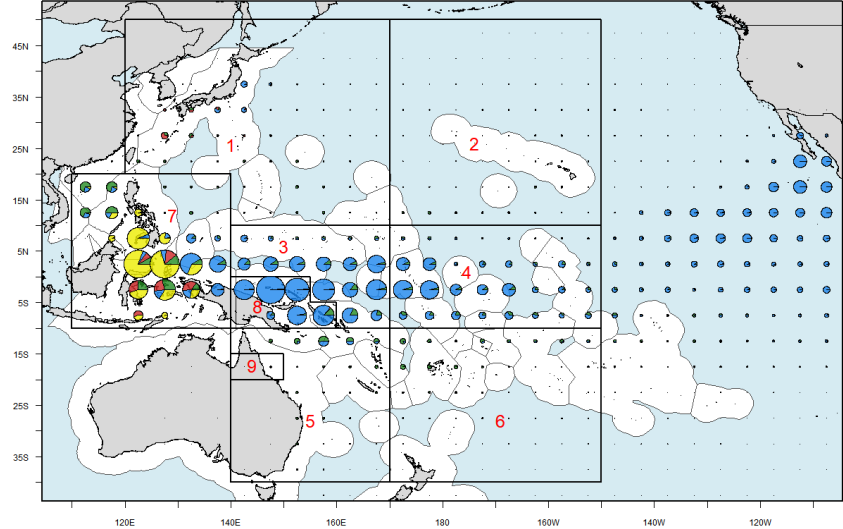
- ▶ 1 region
- ▶ 4 regions
- ▶ 9 regions

Phase III will focus on additional issues raised by the review panel and move towards the 2023 assessment

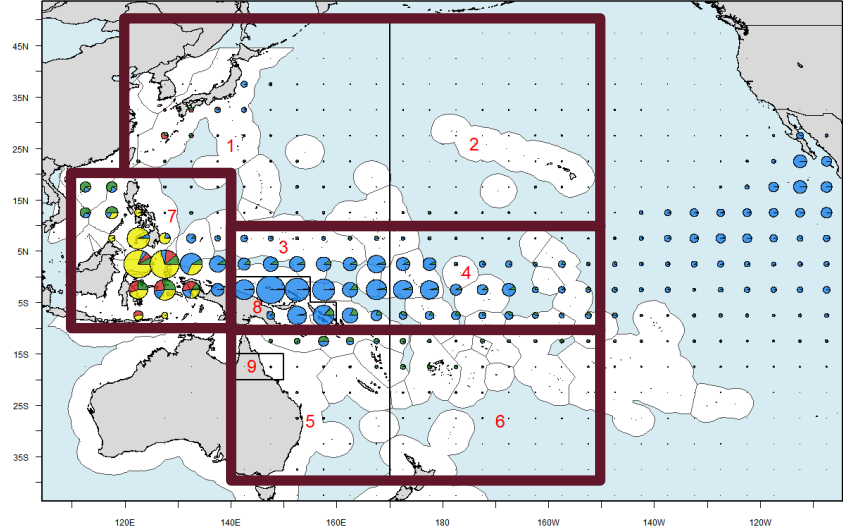
The review process and model development can be followed on GitHub:

[PacificCommunity/ofp-sam-yft-review](https://github.com/PacificCommunity/ofp-sam-yft-review)

Regional Structure



Regional Structure



Discussion

It would be valuable to hear your thoughts about 1 vs. 4 vs. 9 region model

These models

- ▶ ask different questions
- ▶ answer different questions
- ▶ will also raise different questions

The scientific advice for the yellowfin tuna fishery is spatially explicit to some extent

The main assessment model could still have a coarse resolution, if augmented with advice based on high-resolution analyses to address local questions