

Do we need good data for stock assessment of Tunas in the Western and Central Pacific Ocean?

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Oceanic Fisheries Programme (OFP): Scientific Services Provider for Western and Central Pacific Fisheries Commission (WCPFC)

- Data Management (Tiffany Vidal)
- Fisheries and Ecosystem Monitoring and Analysis (Simon Nicol)
- Stock Assessment and Modelling (Paul Hamer)

Conduct/oversee stock assessments for 10 stocks in the WCPO:

Western and Central Pacific



skipjack



yellowfin



bigeye

South Pacific albacore



Southwest Pacific

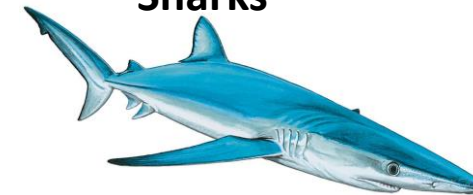


striped marlin



swordfish

Sharks



SWP blue shark



WCPO silky shark



WCPO oceanic whitetip



SWP shortfin mako

Stock assessments in the WCPFC?

- SPC present stock assessments to the Scientific Committee (SC) meeting in August each year
- SC decide whether they accept stock assessment
- If accepted, the stock status and projections are presented to the Commission meeting in December for management advice
- Management procedures and harvest control rules are in the process of being negotiated, agreed and introduced for tuna species
- Management Strategy Evaluation used to test harvest control rules

Timeline for WCPFC Tuna Assessments

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Albacore	3		3			3	3	3		4	4		1	1		1	1			8			5			4			4
Bigeye						4	5	5	5	6	6		6	6	6	6			9			9			9			9	
Skipjack					2	6	6	6		6			6		3	3			5		5 (7)			5 (8)			8		
Yellowfin						7	5	5	5	6	6 (7)	6		6		6			9			9			9			5	



WCPFC

2023 tuna assessments



SCIENTIFIC COMMITTEE
NINETEENTH REGULAR SESSION
Koror, Palau
16–24 August 2023

Stock assessment of bigeye tuna in the western and central Pacific Ocean: 2023

WCPFC-SC19-2023/SA-WP-05 (Rev. 2)

Revision 2 September 15, 2023

J. Day¹, A. Magnusson¹, T. Tears¹, J. Hampton¹, N. Davies², C. Castillo Jordán¹,
T. Peatman³, R. Scott¹, J. Scutt Phillips¹, S. McKechnie¹, F. Scott¹, N. Yao¹,
R. Natadra¹, G. Pilling¹, P. Williams¹, P. Hamer¹



SCIENTIFIC COMMITTEE
NINETEENTH REGULAR SESSION
Koror, Palau
16–24 August 2023

Stock assessment of yellowfin tuna in the western and central Pacific Ocean: 2023

WCPFC-SC19-2023/SA-WP-04 (Rev. 2)

15 September 2023

A. Magnusson¹, J. Day¹, T. Tears¹, J. Hampton¹, N. Davies², C. Castillo Jordán¹,
T. Peatman³, R. Scott¹, J. Scutt Phillips¹, S. McKechnie¹, F. Scott¹, N. Yao¹,
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Stock assessment framework

- Stock assessment models
simple to very complex
- WCPFC tuna assessments
integrated assessment, combine multiple data sources
- Use model to fit data
estimate parameters to best explain the data

Good quality representative data critical for good stock assessments
complete, error corrected, filtered, standardised

Integrated stock assessment

Integrated assessments aim to give:

parameter estimates that produce the best overall fits to all of the data simultaneously

High tension balancing act, especially if there is conflict in the data, or poor quality data

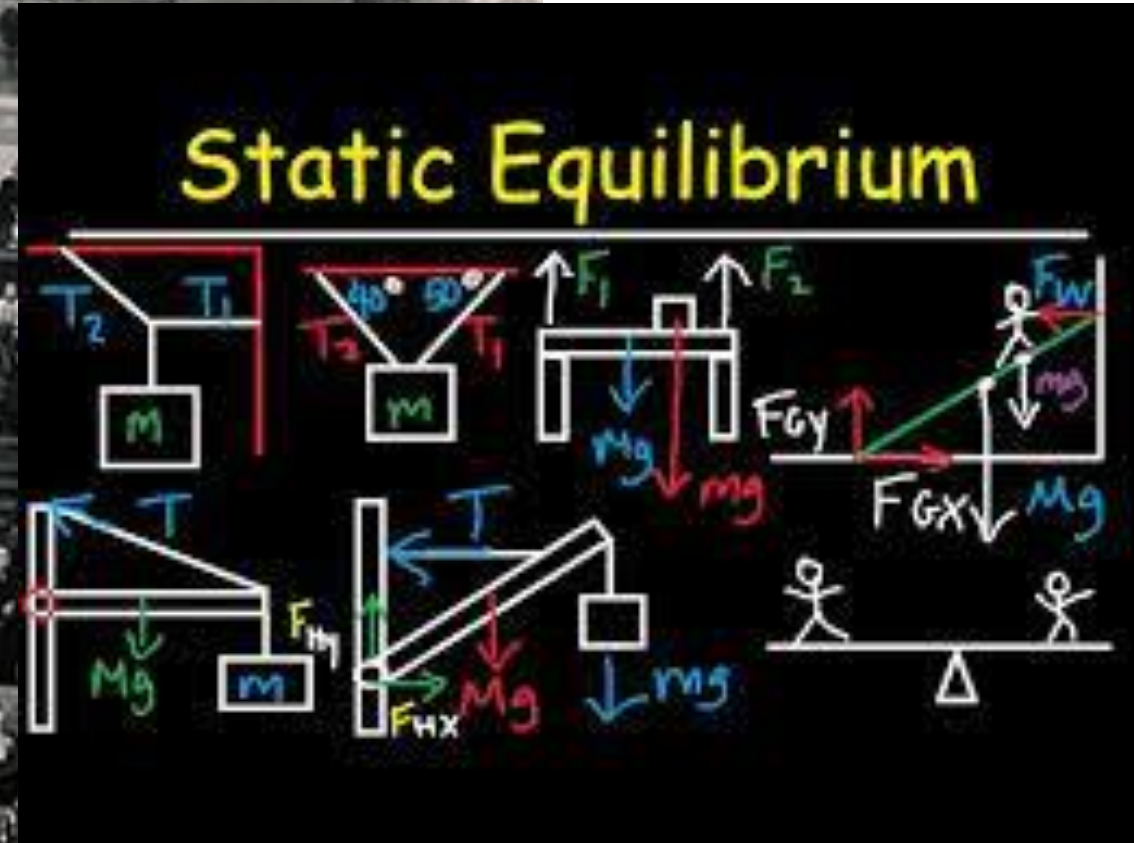
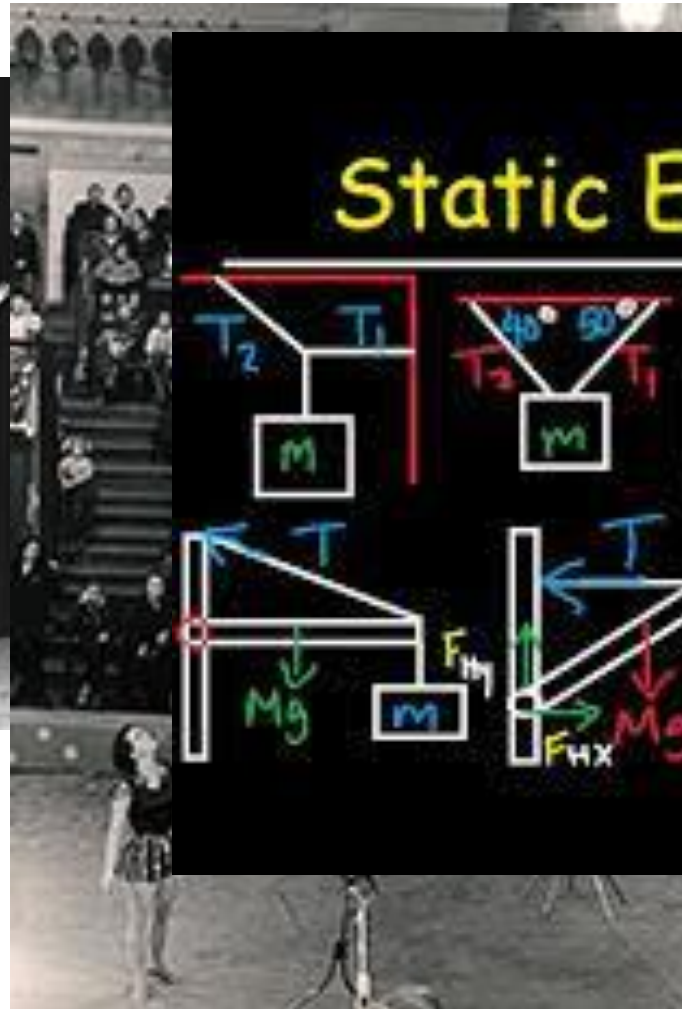
High tension? Balancing?



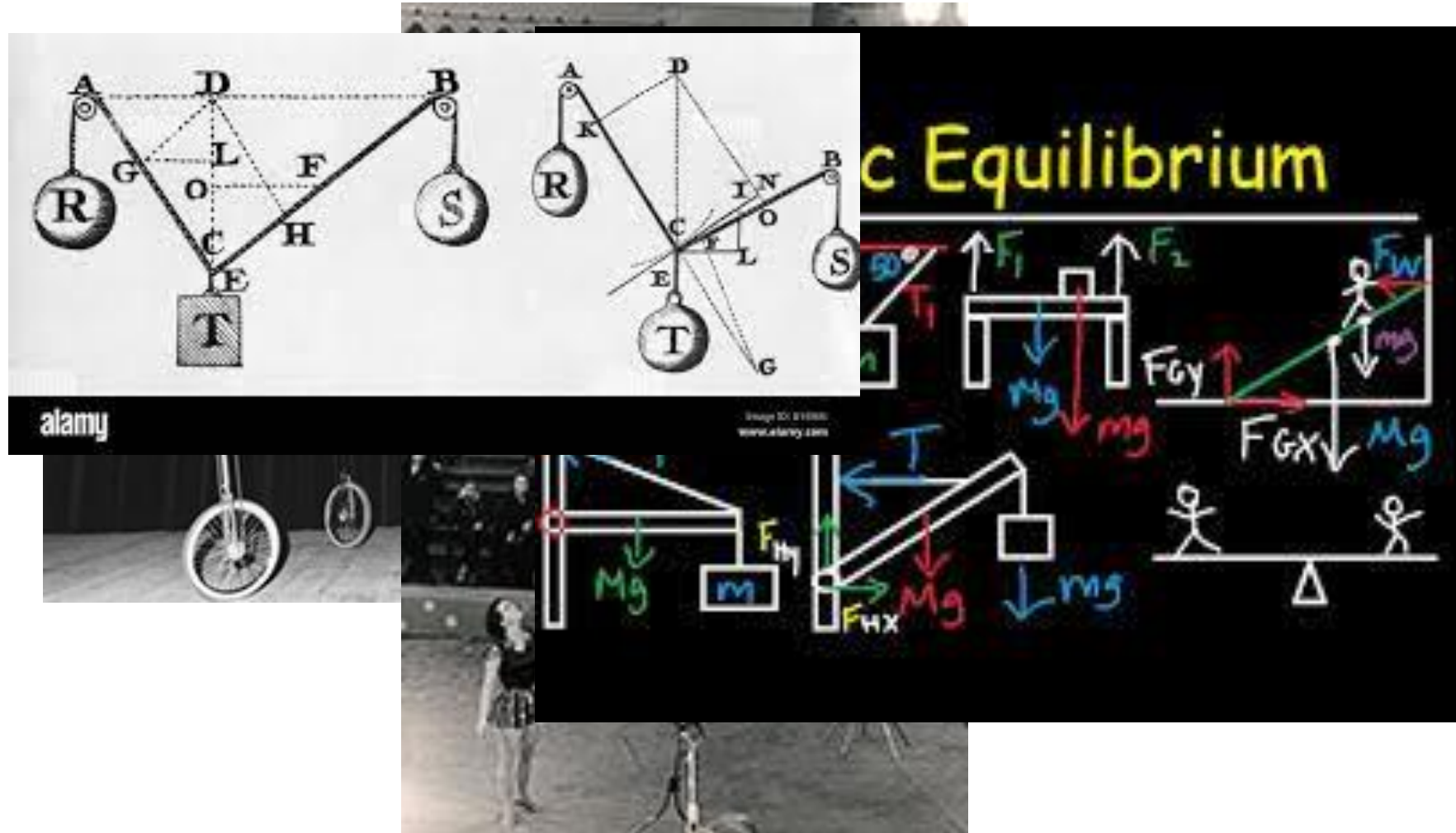
High tension? Balancing?



High tension? Balancing?



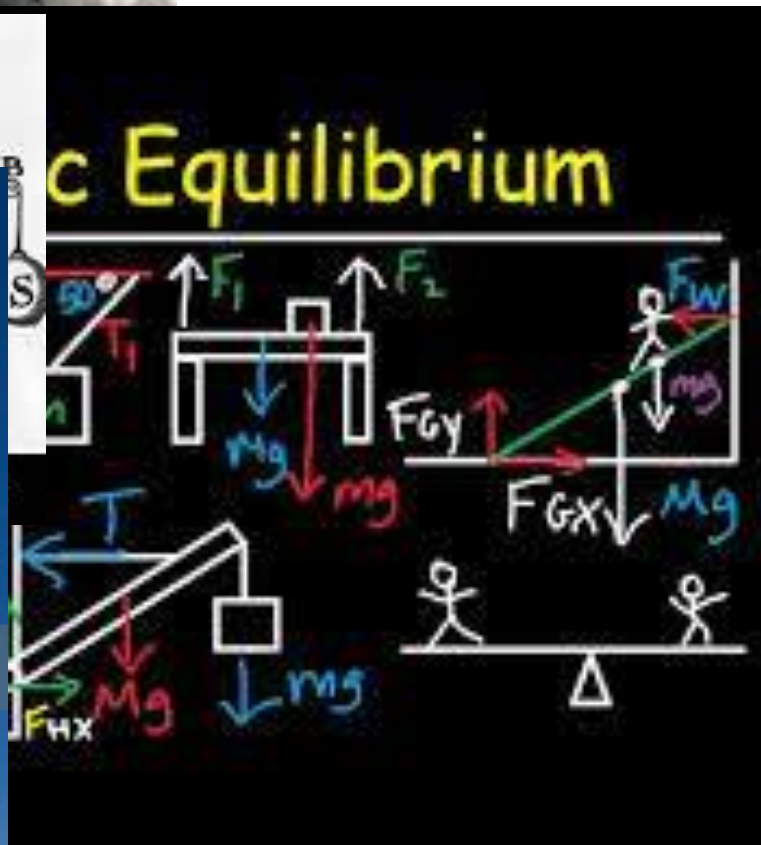
High tension? Balancing?



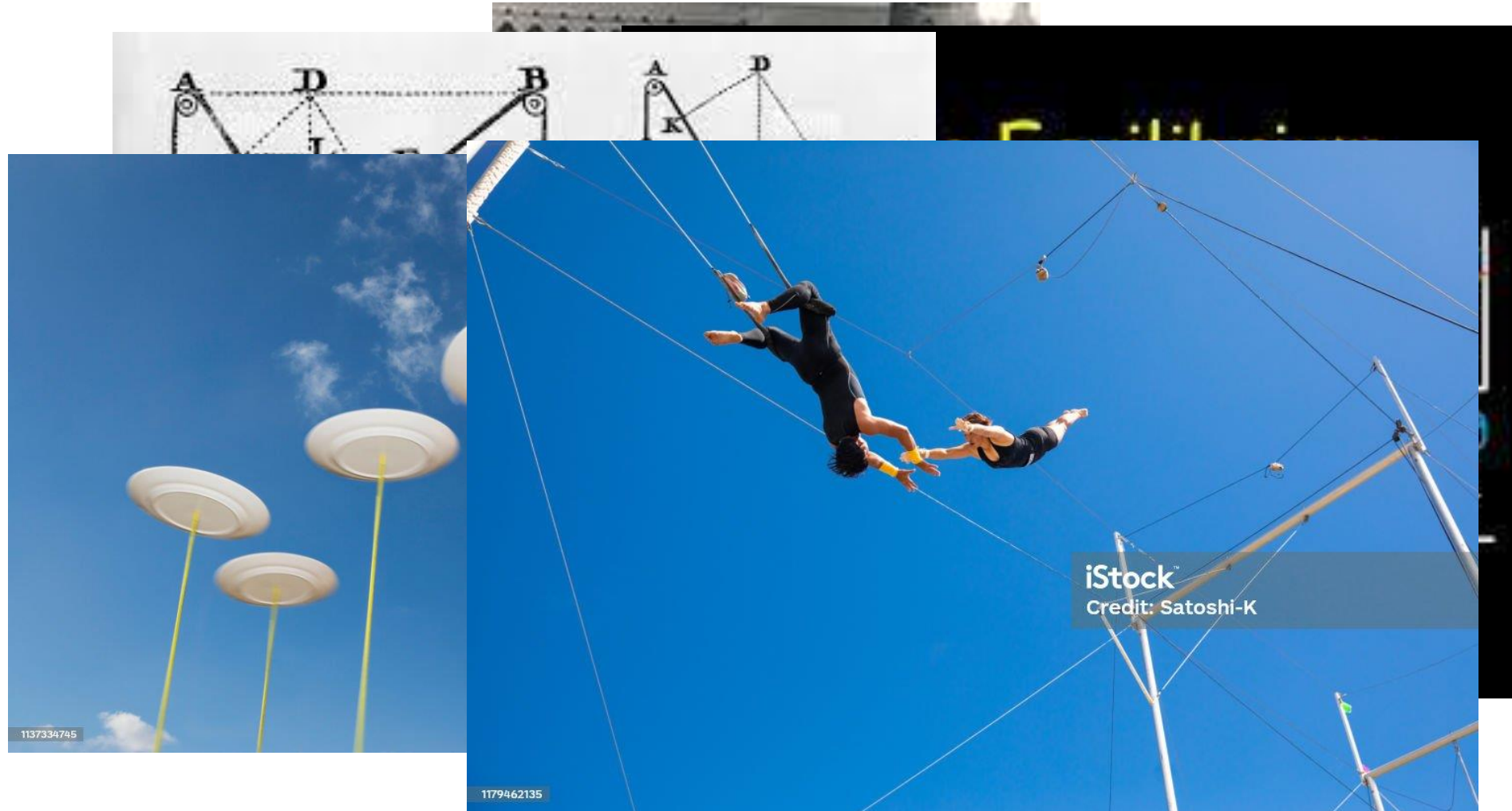
High tension? Balancing?



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High tension? Balancing?



High tension? Balancing?

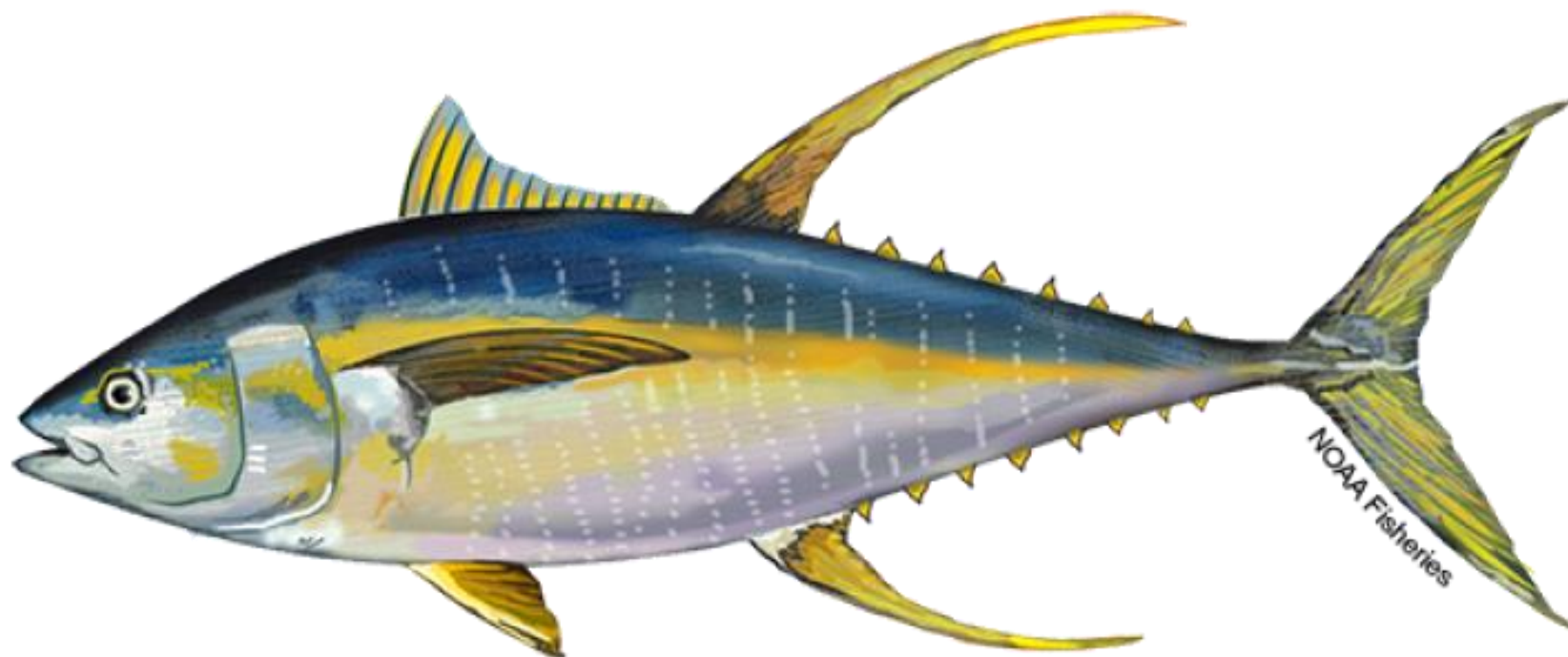


Data sources

- Catch
- Effort
- Size composition (length and/or weight frequencies)
- Age (otoliths, epigenetic ageing)
- Tag (mark-release- recapture, Close Kin Mark Recapture)
- Biological (maturity, length weight relationship, conversion factors)

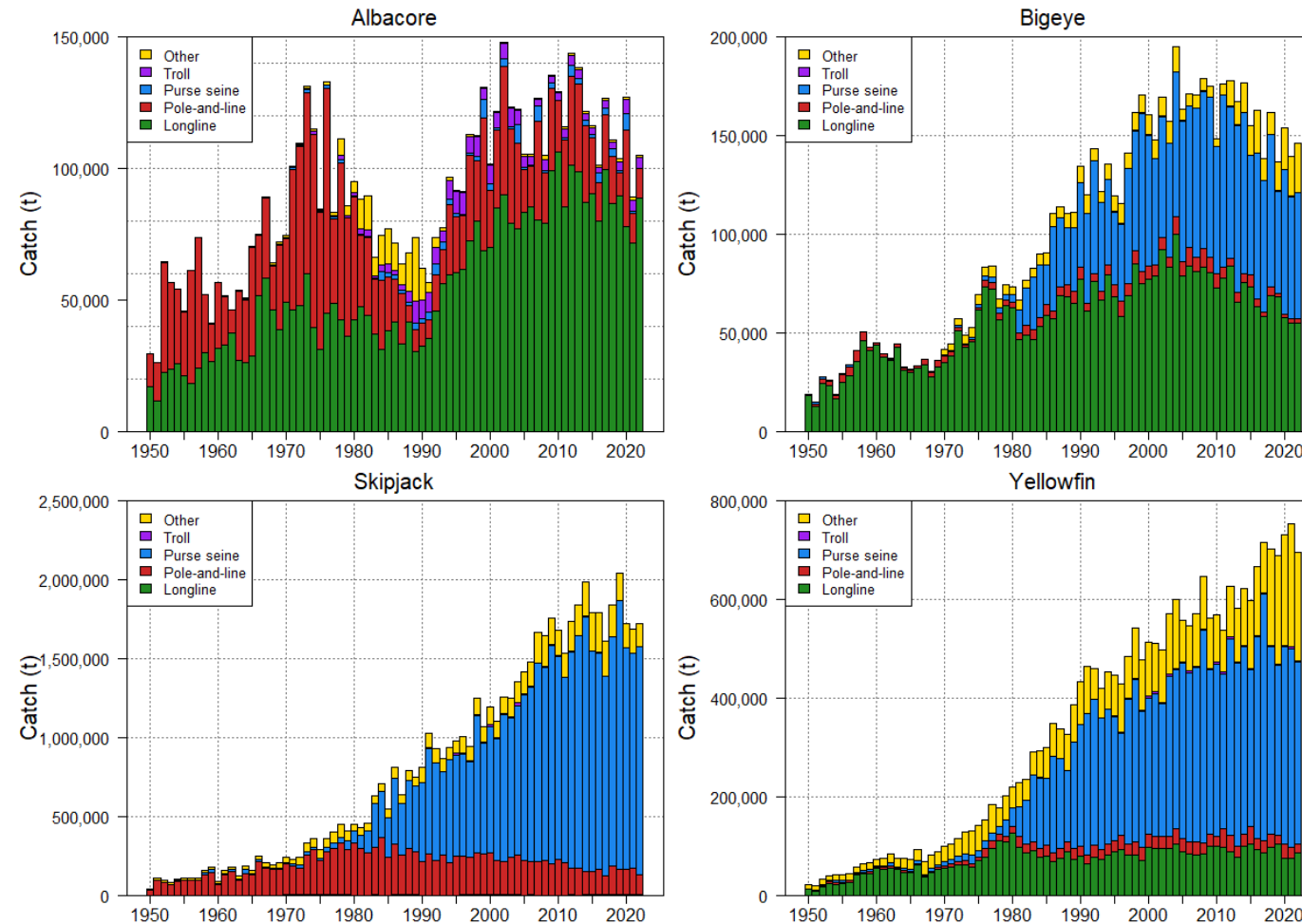
Integrated assessments fit to all of these data sources simultaneously

Yellowfin tuna focus

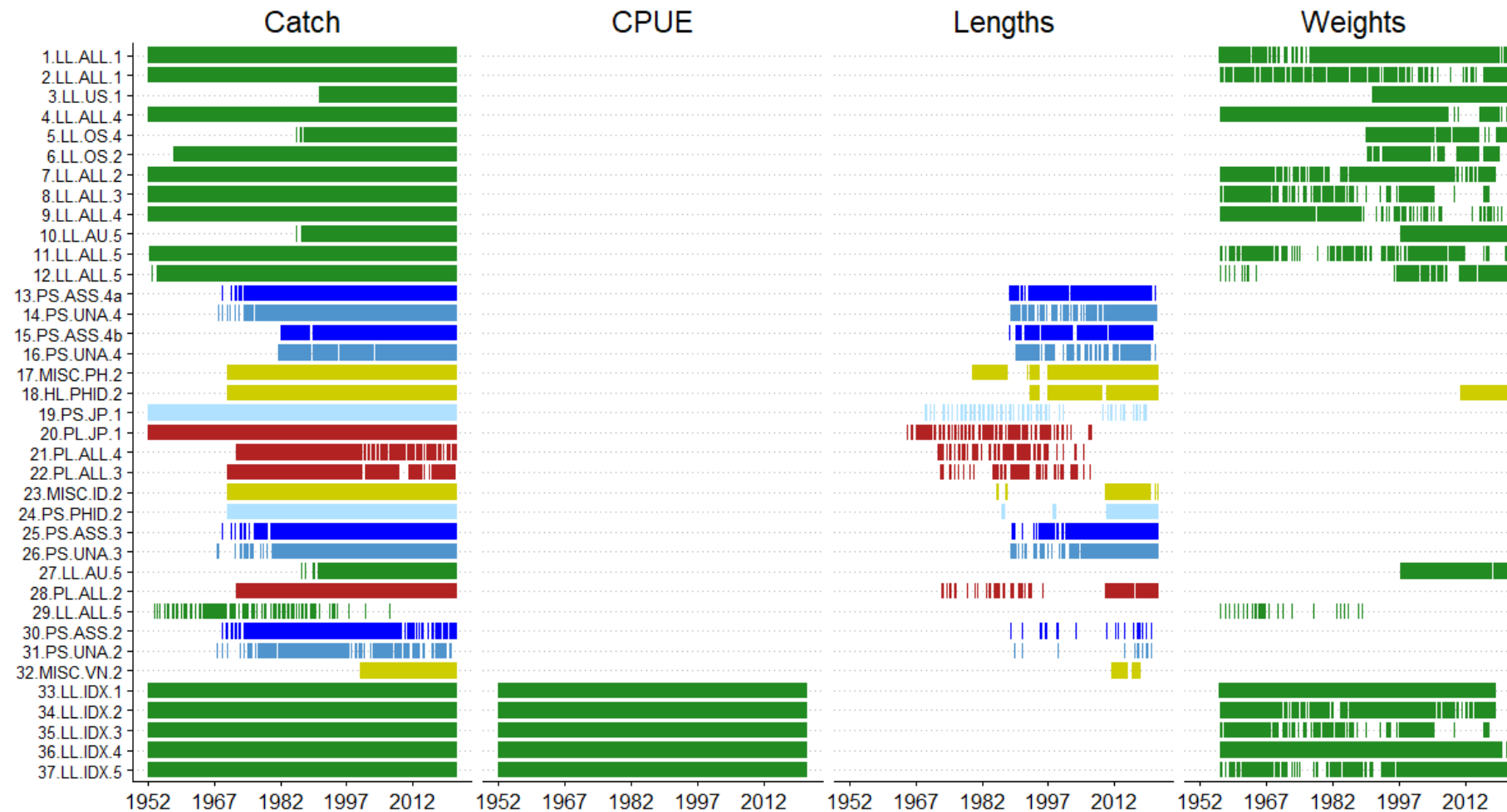


Catch by species and gear: 1950-2021

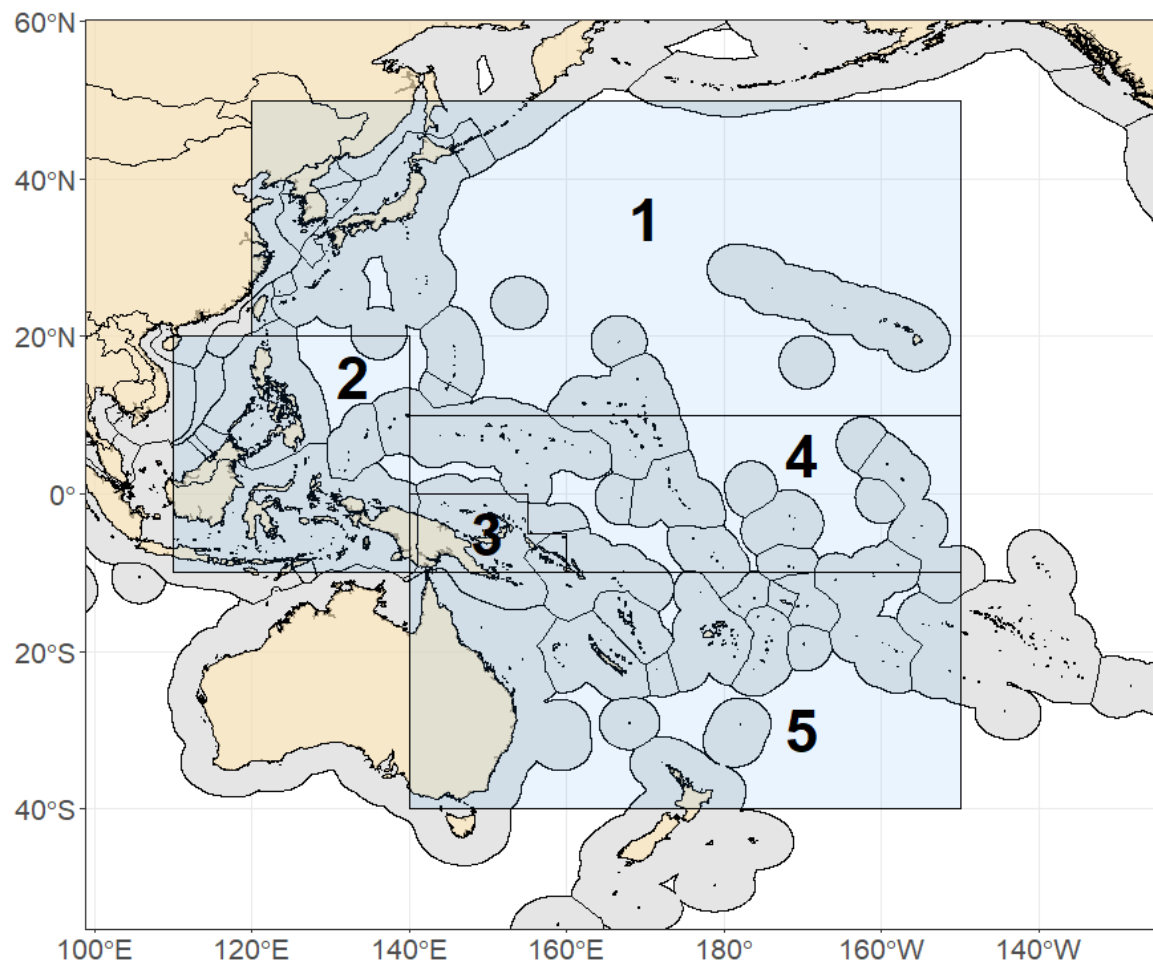
WCPFC species catch by gear



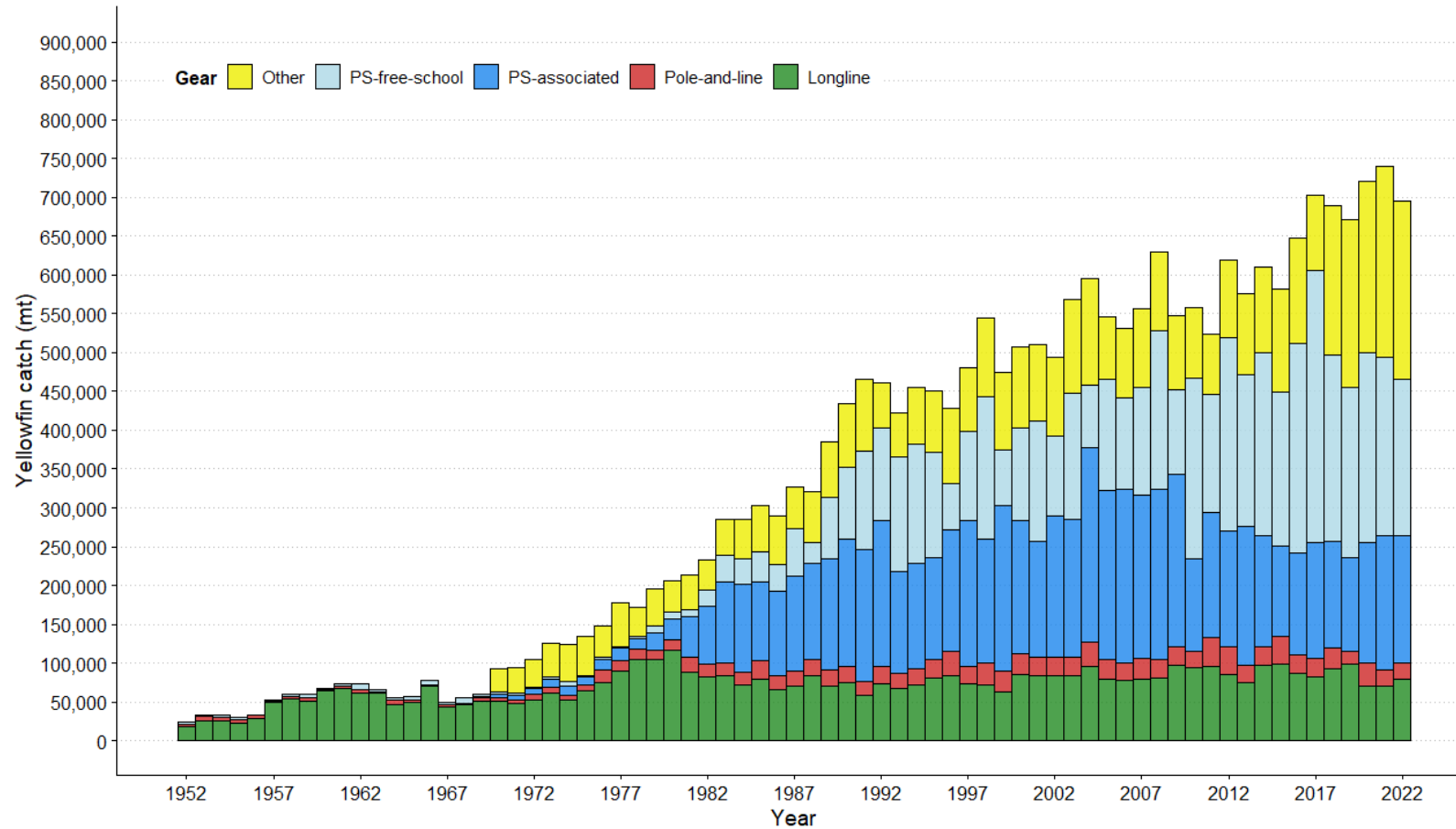
Data availability by fishery



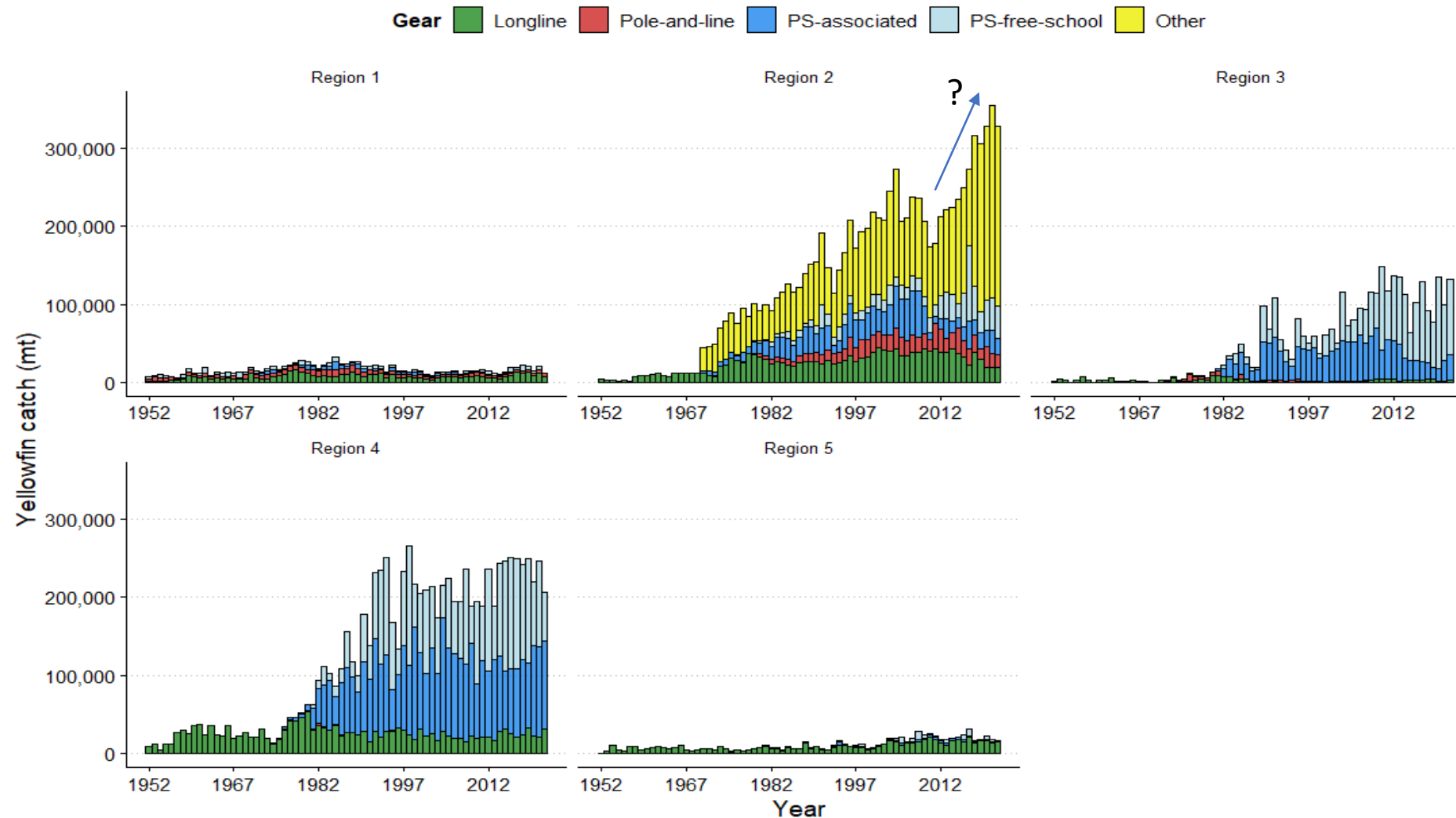
Spatial structure (5 regions)



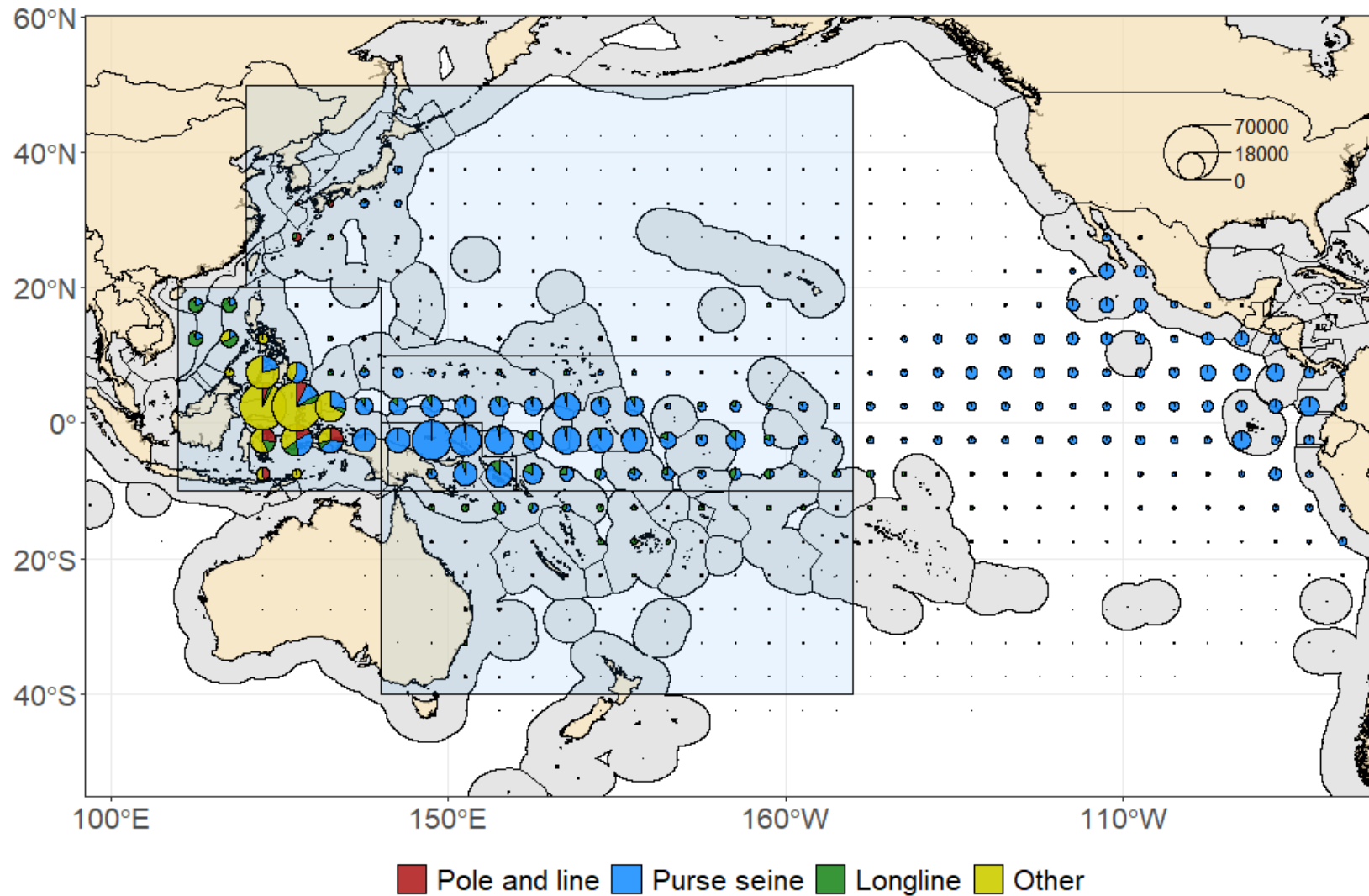
Catch by gear: 1952-2021



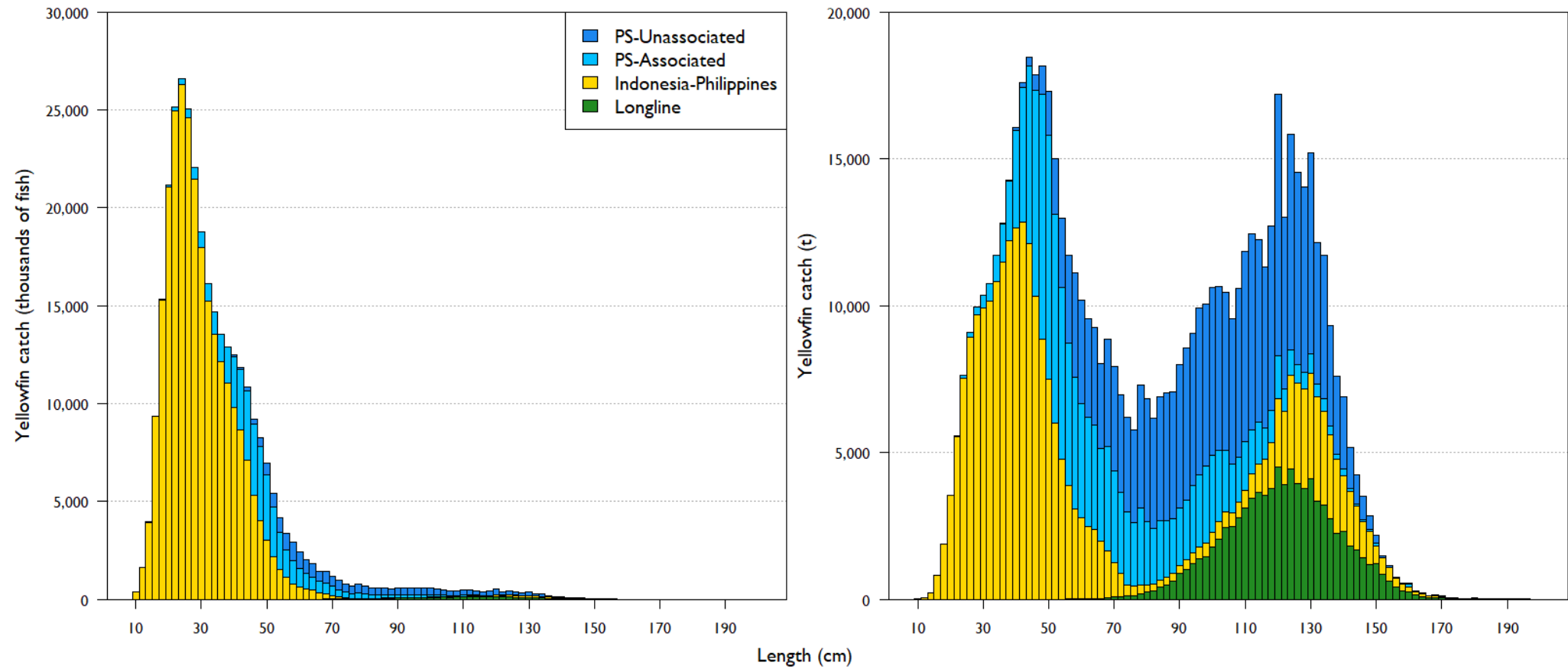
Catch by gear and region: 1952-2021



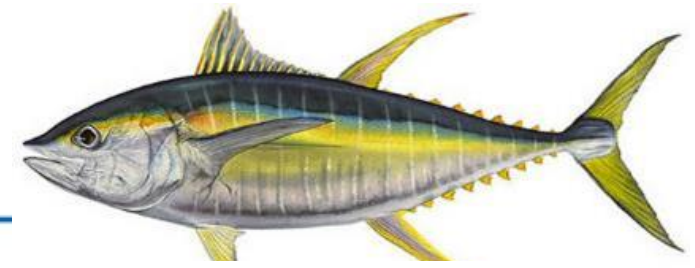
Catch: 2012-2021



Size comp (2017-21): numbers, weight



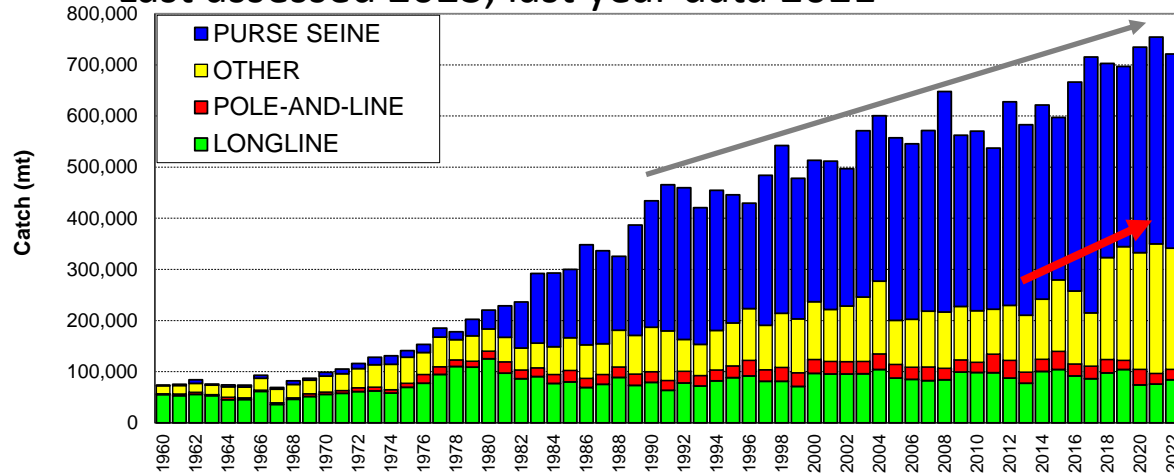
Stock status recap - Yellowfin



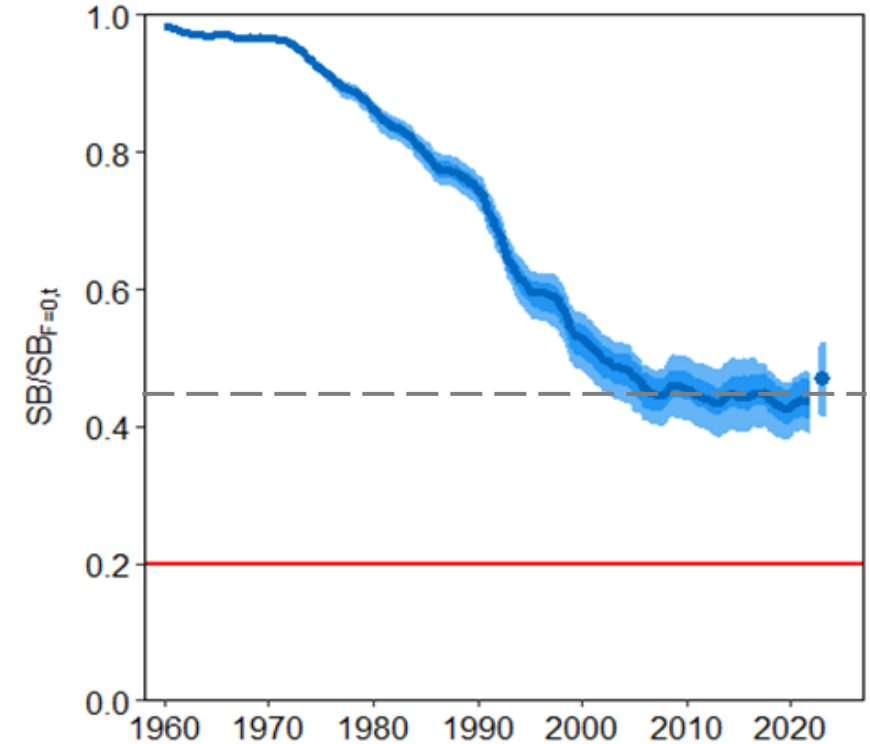
Yellowfin

© Flickr Ford

- Last assessed 2023, last year data 2021



Recently 650 – 750,000 mt, increasing



CMM 2021-01 *para 13*

- Objective, average of 2012—2015 depletion = 0.44
- Recent median depletion ($SB_{\text{recent}}/SB_{F=0}$) = 0.47
- 54 models

Conclusion

- Stock assessment data: Garbage in, garbage out!
- High recent catches of yellowfin and high estimated fishing mortality in region 2
- Good representative data is essential for good stock assessments