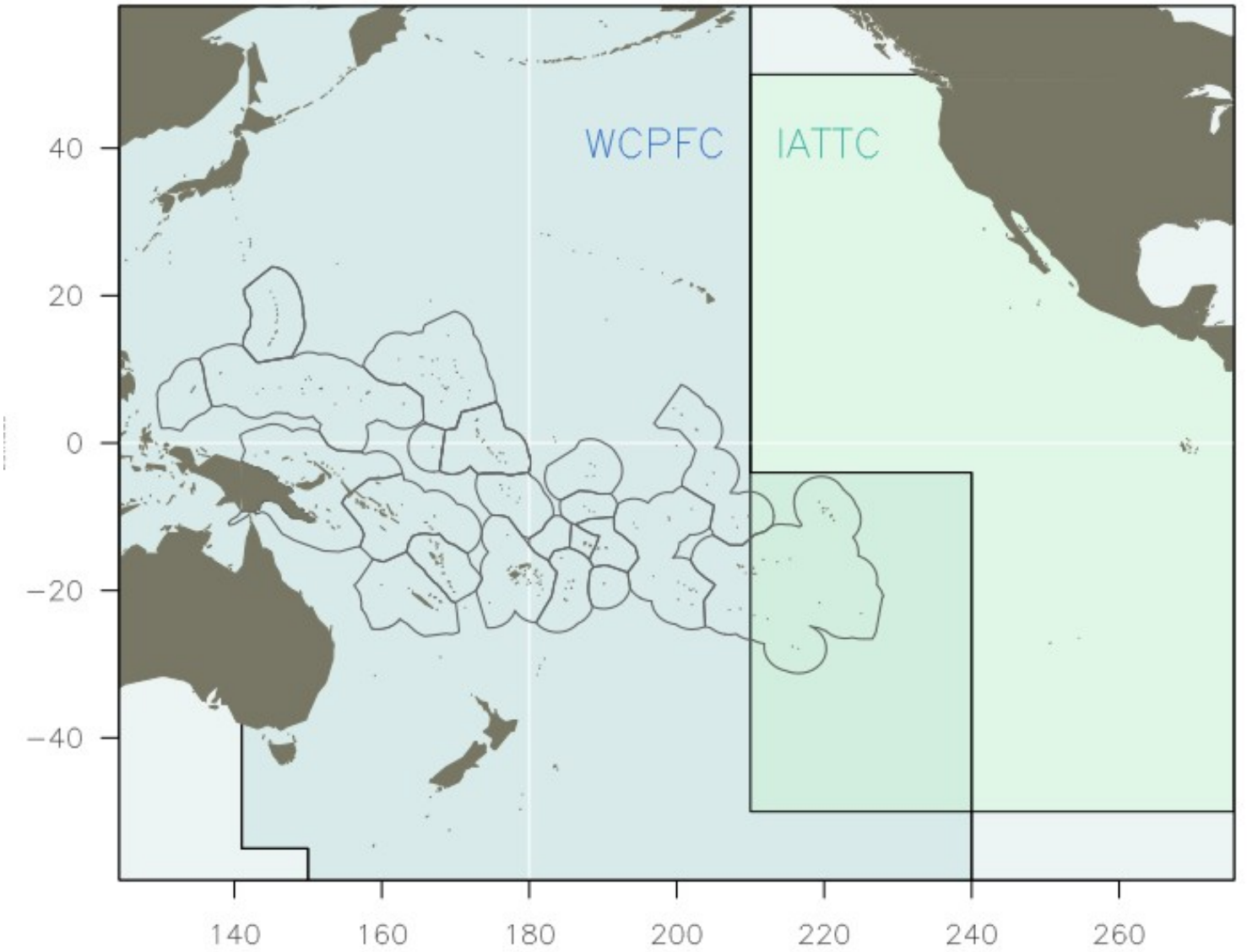
Pacific Community
Communauté du Pacifique

Pacific-wide stock assessment of bigeye tuna and sensitivity to geographical boundaries

IATTC, 7th Meeting of the Scientific Advisory Committee
La Jolla, May 9-13th 2016

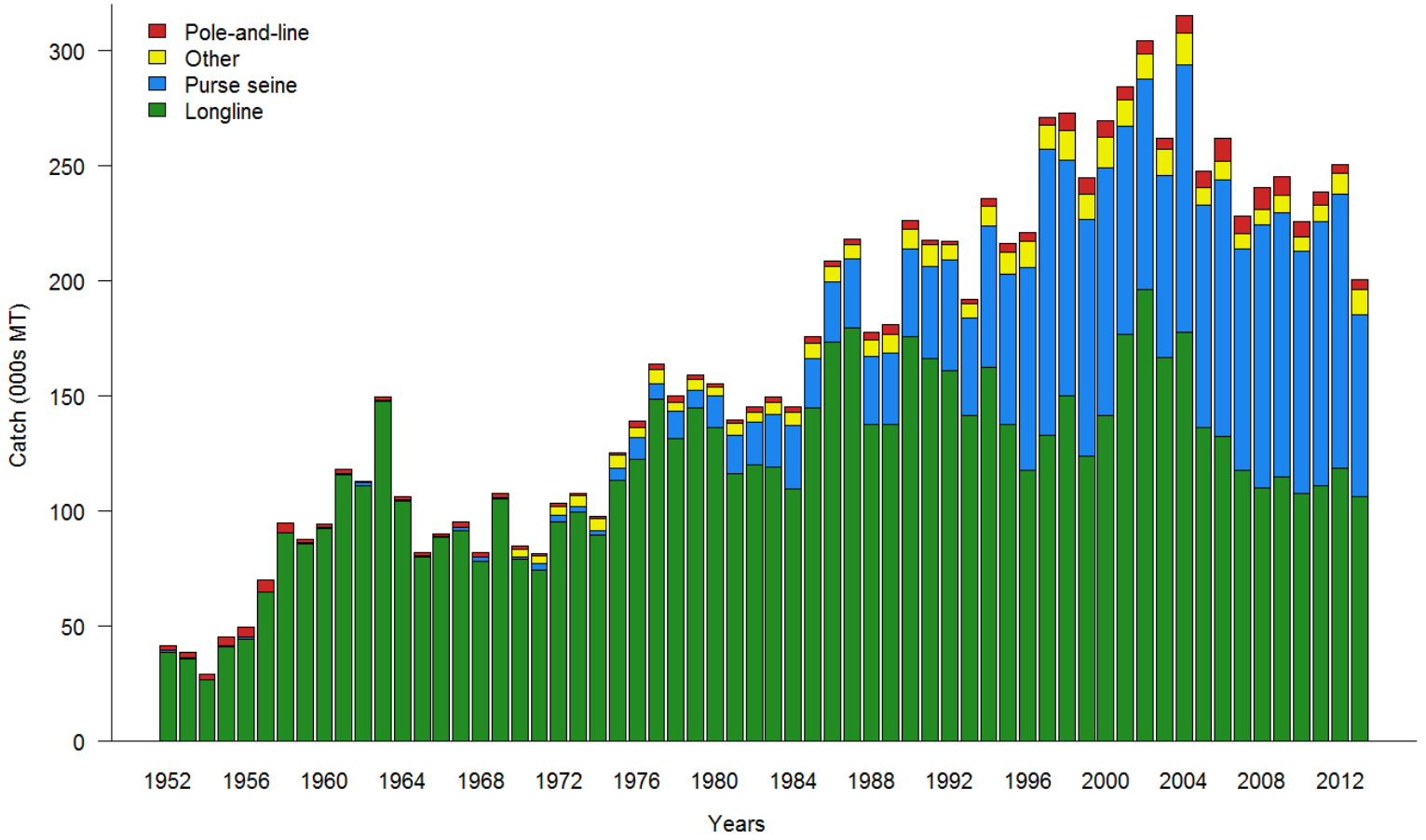
Oceanic Fisheries Programme
Secretariat of the Pacific Communities
Nouméa, New Caledonia

Bigeye tuna in the Western Central Pacific Ocean (WCPO)



2014 catch: 154 601 vs. 93 532 tonnes in EPO

Main fisheries:
longline (target), purse-seine (w/ SKJ)



Current status (2014): Fcur/Fmsy = 1.57

SB/SB0 = 0.16

External review of 2011 WCPO BET stock assessment

WCPO model: MULTIFAN-CL, length-based stock assessment

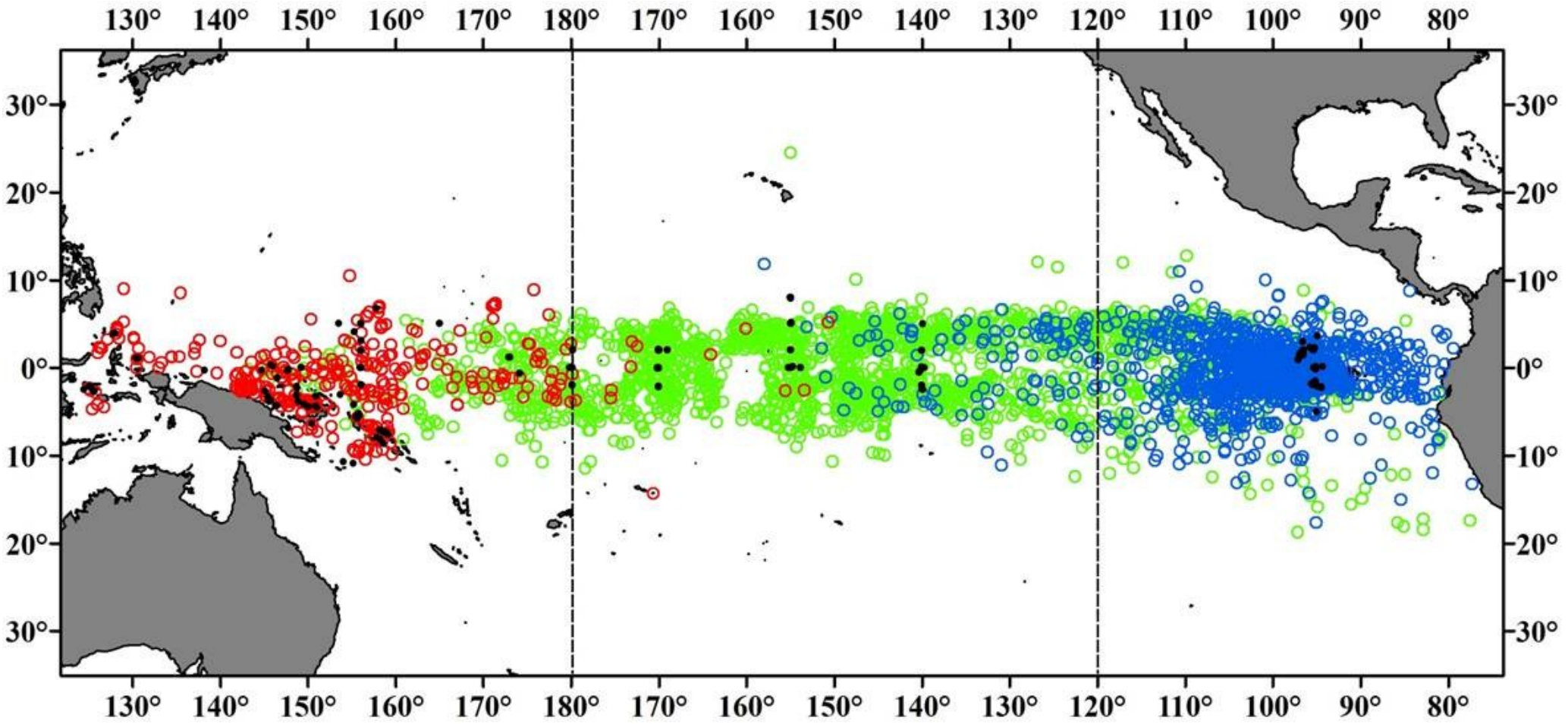
- Integrated, with multiple regions: catch/effort, size, standardized CPUE, tags

- Amongst key recommendations:

  Assess assumption that WCPO dynamics are not impacted by the exclusion of the EPO from the stock assessment

  - Recommendation based on tagging data indicating considerable movement between the two regions

Ianelli, Maunder and Punt (2012) Independent review of 2011 WCPO bigeye tuna stock assessment. WCPFC 8th Scientific Committee



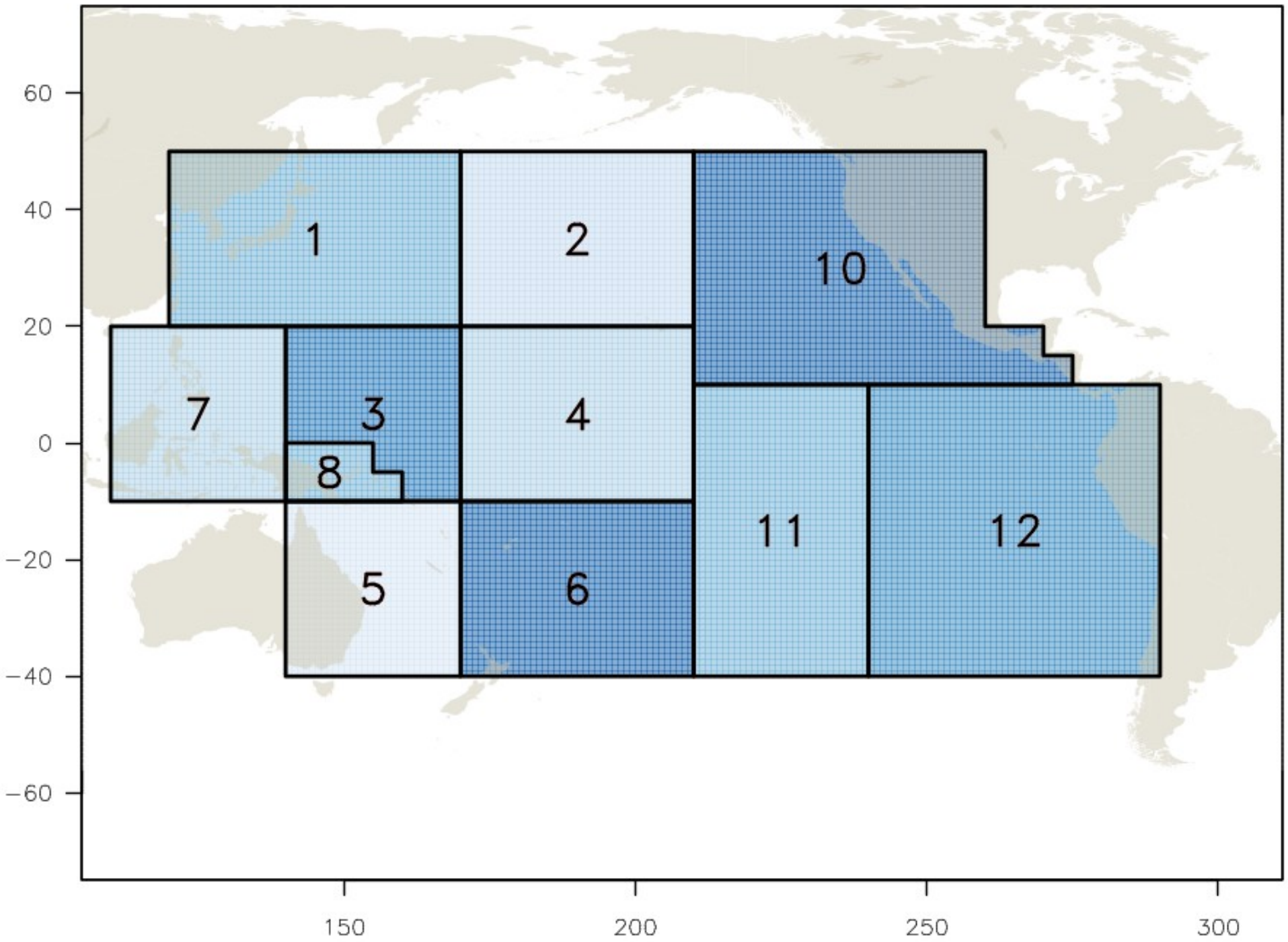
Release locations (black) and recoveries that were released in the west (red), central (green) and east (blue) Pacific.

From Schaefer *et al.* (2015).

BET 2015 Pacific-wide assessment

- Covered the entire Pacific, divided in 12 regions
- Used updated CPUE indices from new operational LL dataset
- Used extended tagging dataset:
  - IATTC and Pacific Tuna Tagging Programme (PTTP)
- Also included a 'control' assessment with the WCPO only, but using the new data

McKechnie et al (2015) Sensitivity of the WCPO bigeye tuna stock assessment results to the inclusion of EPO dynamics within a Pacific-wide model. WCPFC 11th Scientific Committe, SA-WP-03


60
40
20
0
−20
−40
−60
150
200
250
300
1
2
10
7
3
4
8
11
12
5
6

Key findings

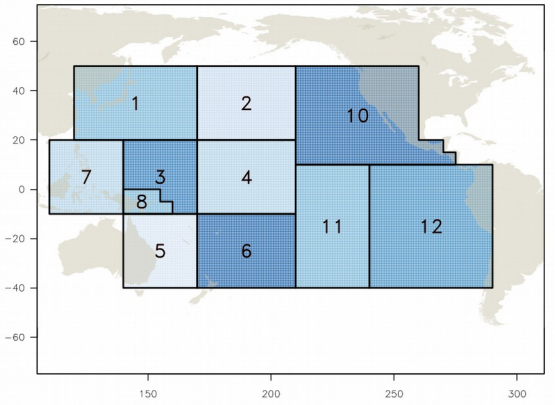
- Stock status for the WCPO—SB/SB_0
  - 2014 WCPO: 0.16
  - 2015 WCPO: 0.15
  - 2015 Pacific-wide: 0.14
- Greater difference with the WCPO model

  i.e. CPUE indices are probably inducing difference

2014 WCPO

2015 WCPO

2015 Pacific-Wide



Proportion of total spawning potential - SB/SB(F=0)

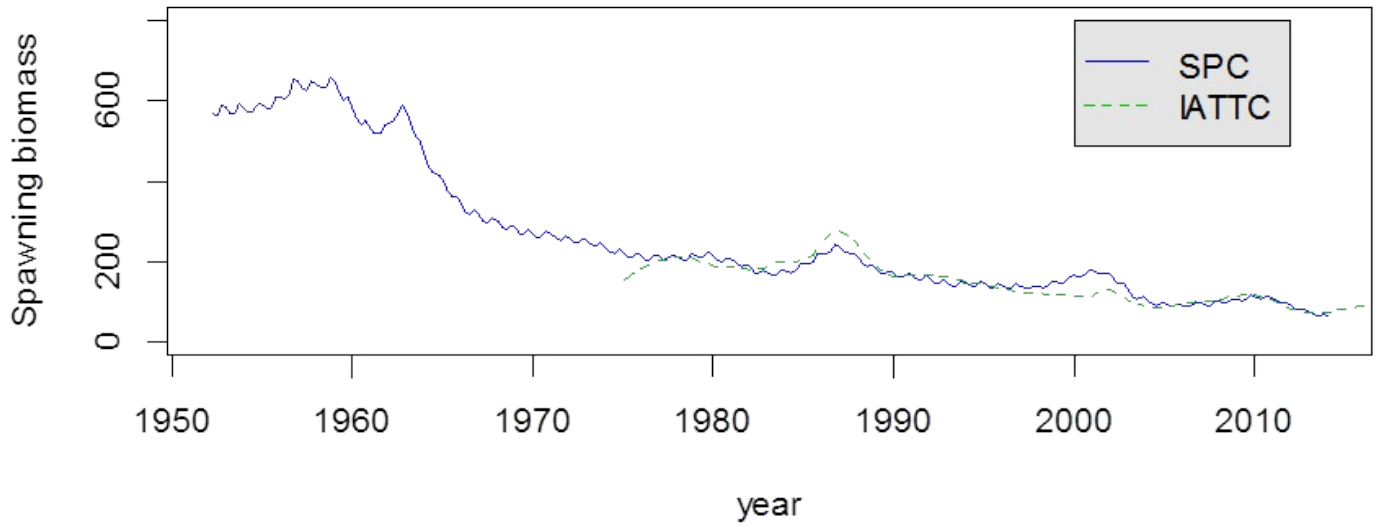
Region 1 | Region 2 | Region 3 | Region 4

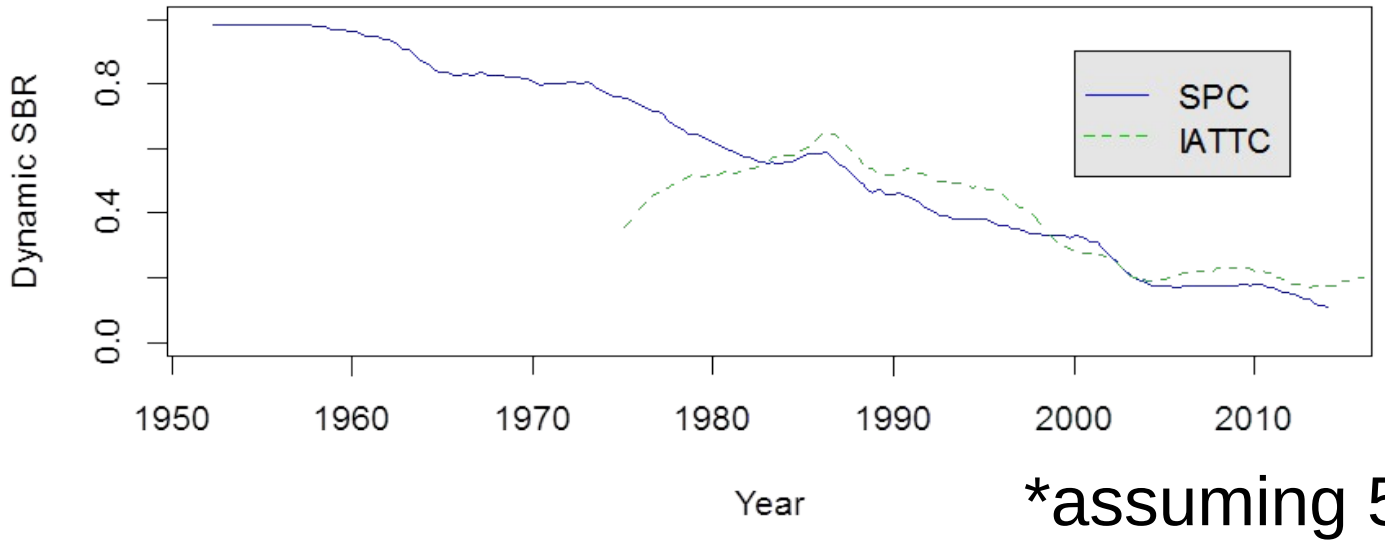
Region 5 | Region 6 | Region 7 | Region 8

Region 9 | Region 10 | Region 11 | Region 12

1950 1970 1990 2010

Comparison of 2016 IATTC model*





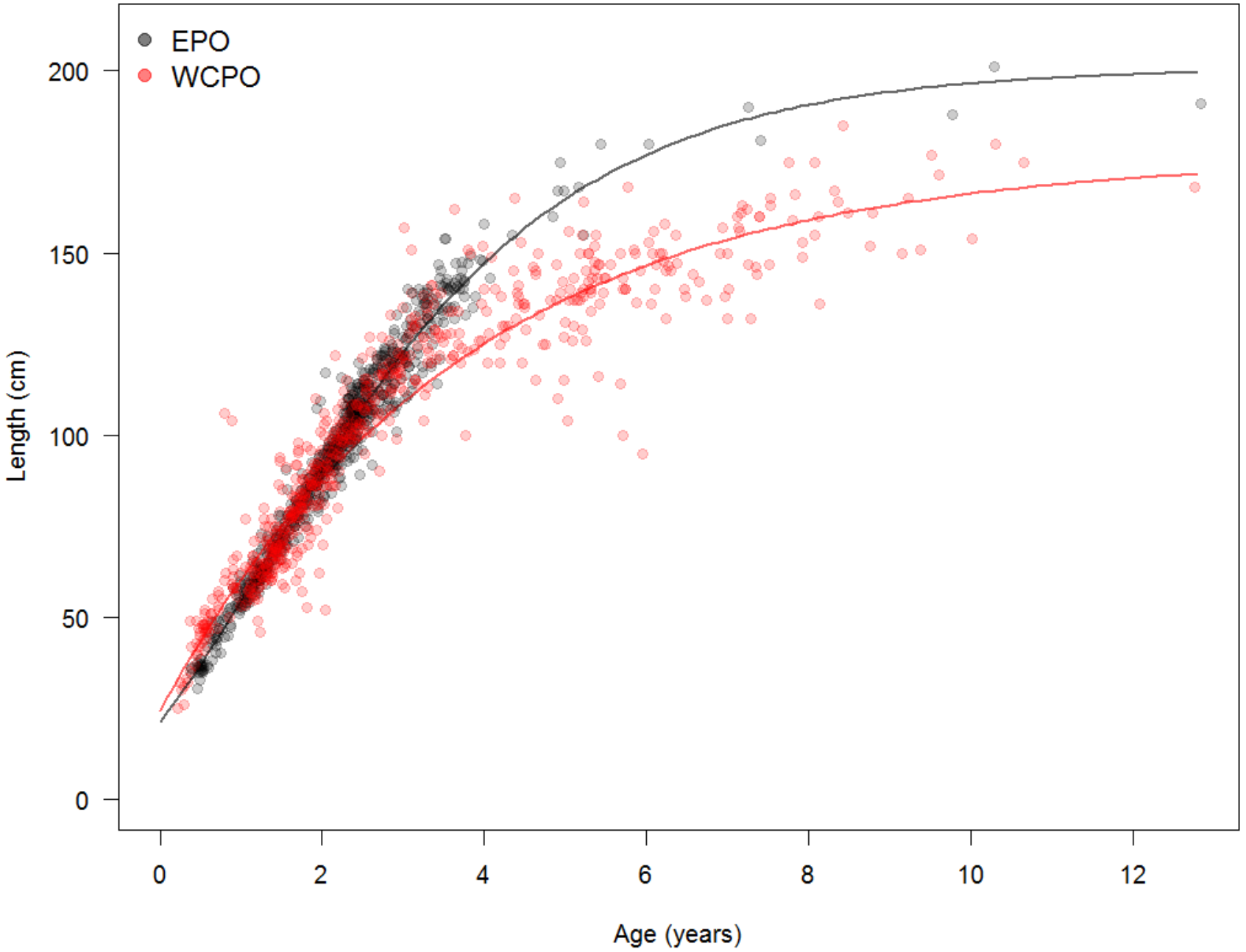
*assuming 50% sex-ratio

Growth

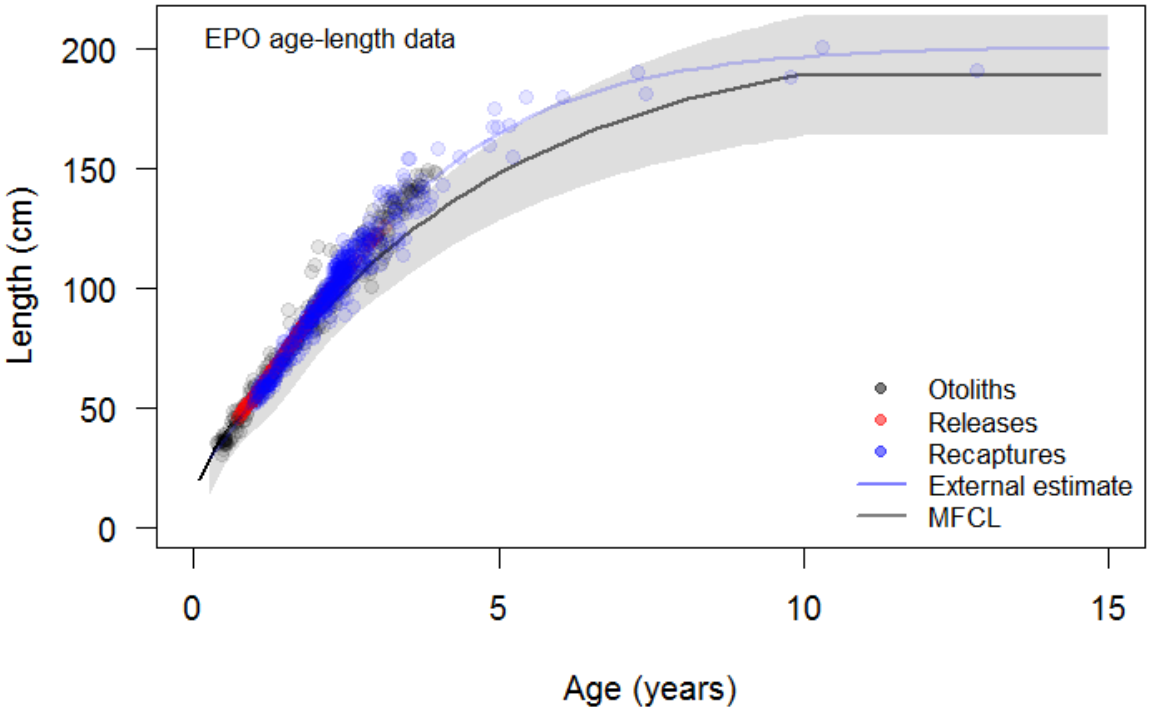
Unexpected: growth estimates equivalent between 2014 WCPO and 2015 Pacific-Wide

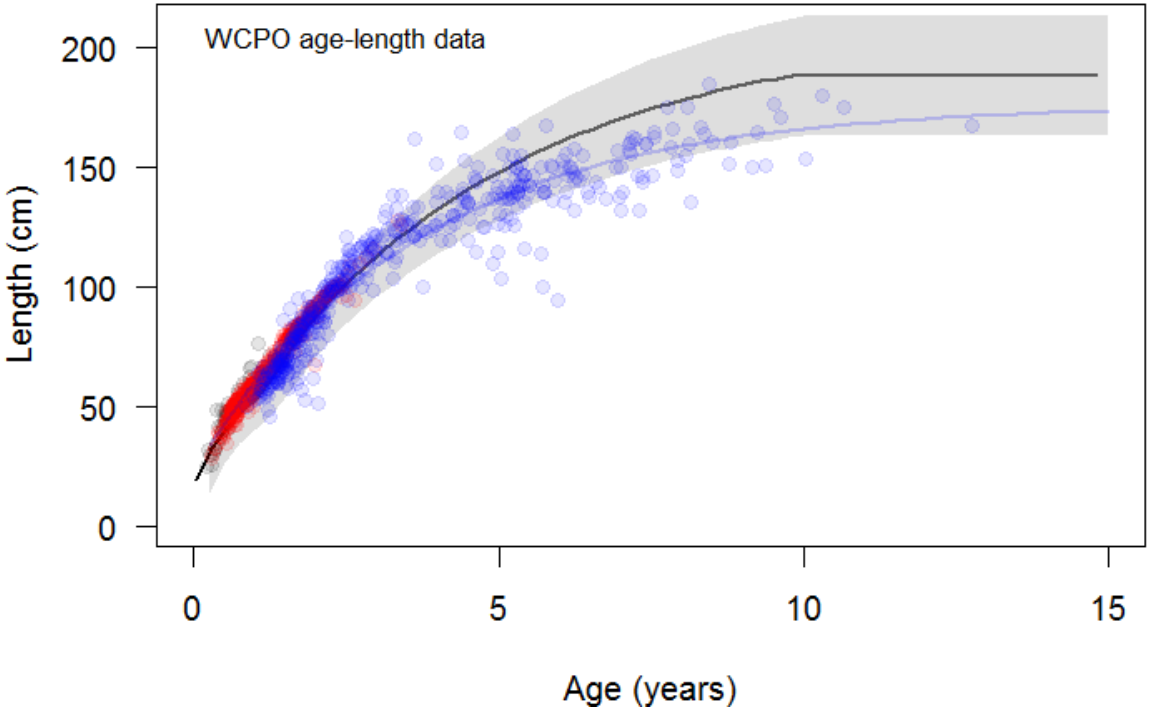
- Faster growth thought to occur in the East

External analysis shows equivalent growth in early ages, but older fish 25cm larger (age 10+) in the EPO



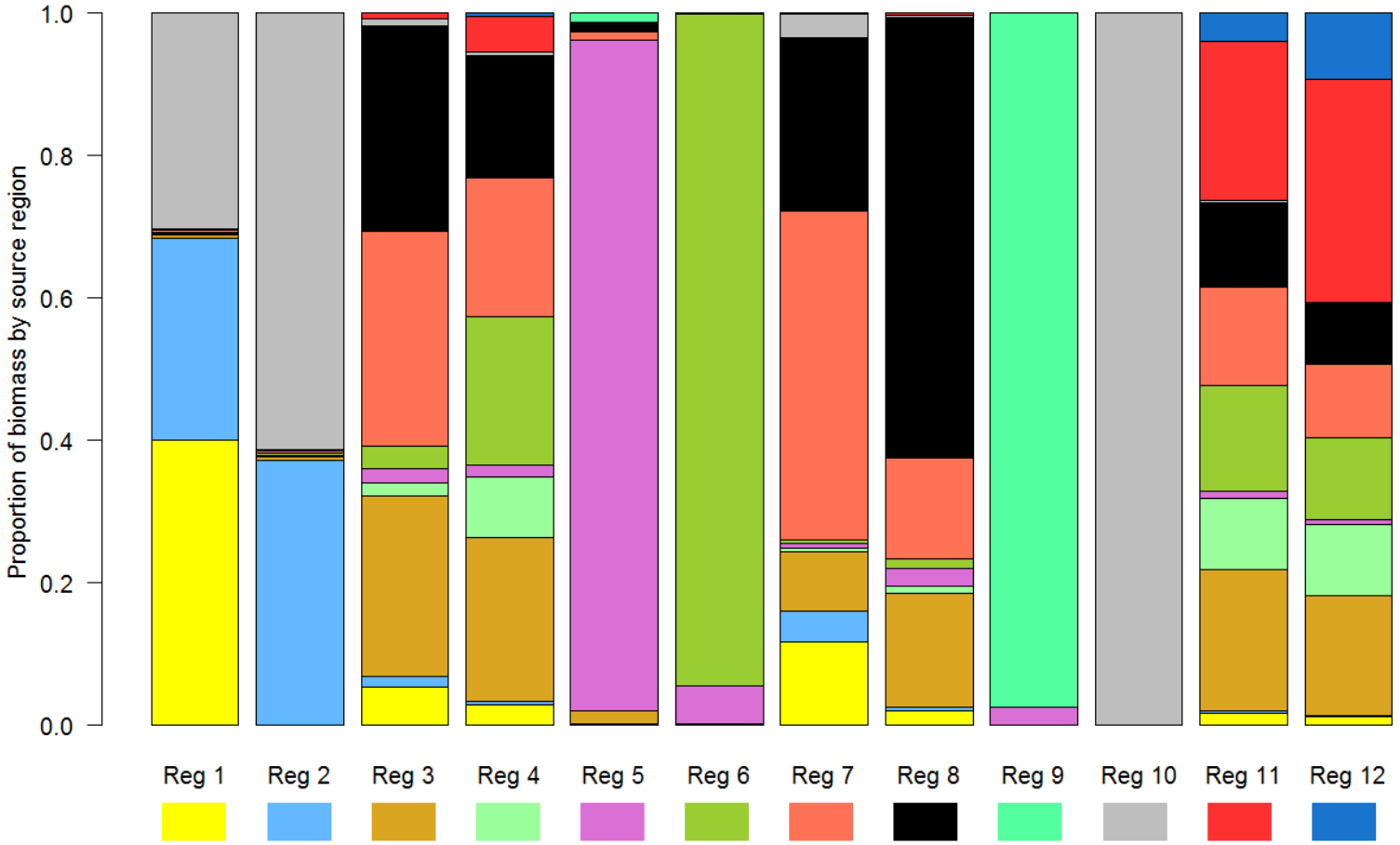
*Most tag recaptures from WCPO come from the Western Pacific (Coral Sea between PNG and Australia)

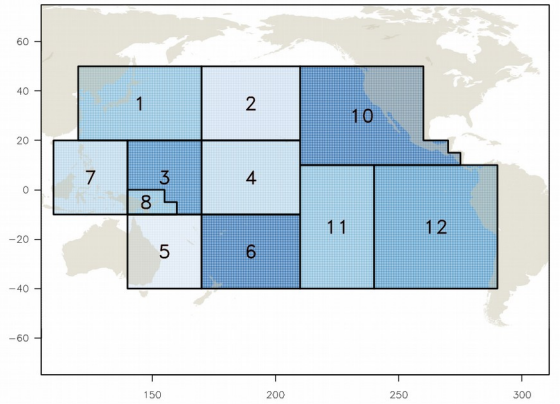




Movement

- Greater movement of fish from WCPO to EPO than in the opposite direction
- About 70% of PW recruitment from the WCPO





Pacific-wide sensitivity analysis: conclusion

- OK to proceed as before w/ WCPO boundaries (subregional stock assessment)
- Assumption of constant growth to be further investigated
- For EPO: two different modelling approaches yield similar estimates of depletion

Future Pacific-wide approaches

- No formal stock assessment planned
- Ongoing implementation of MSE for skipjack and albacore (first), then bigeye and yellowfin
- Current status:
  - Past workshops to agree on management objectives
    - 50% SB/SB_0 for SKJ (target reference point)
    - South Pacific albacore discussions ongoing
- Expert consultation workshop in New Caledonia June 2016
- TBD Pacific-wide scenario for BET MSE
  - could be used to explore sensitivity to assumptions in growth rates