



# A compendium of indicators for target tuna stocks



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# Introduction

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- The “Indicators” paper is an annual SC report tracking a set of indices for the four target tuna stocks (since SC9)
- Includes short-term (3 year) projections under status quo (2023) catch/effort levels
- An additional report on South Pacific albacore (SA-IP-07) is also produced annually, but results not presented here
- Will present indicators for the three tuna stocks other than South Pacific as there is a new assessment (not reported in this paper)
- There is overlap with GEN-1, possible time savings to combine; alternatively open to suggestions for enhancements to this paper

# Indicators

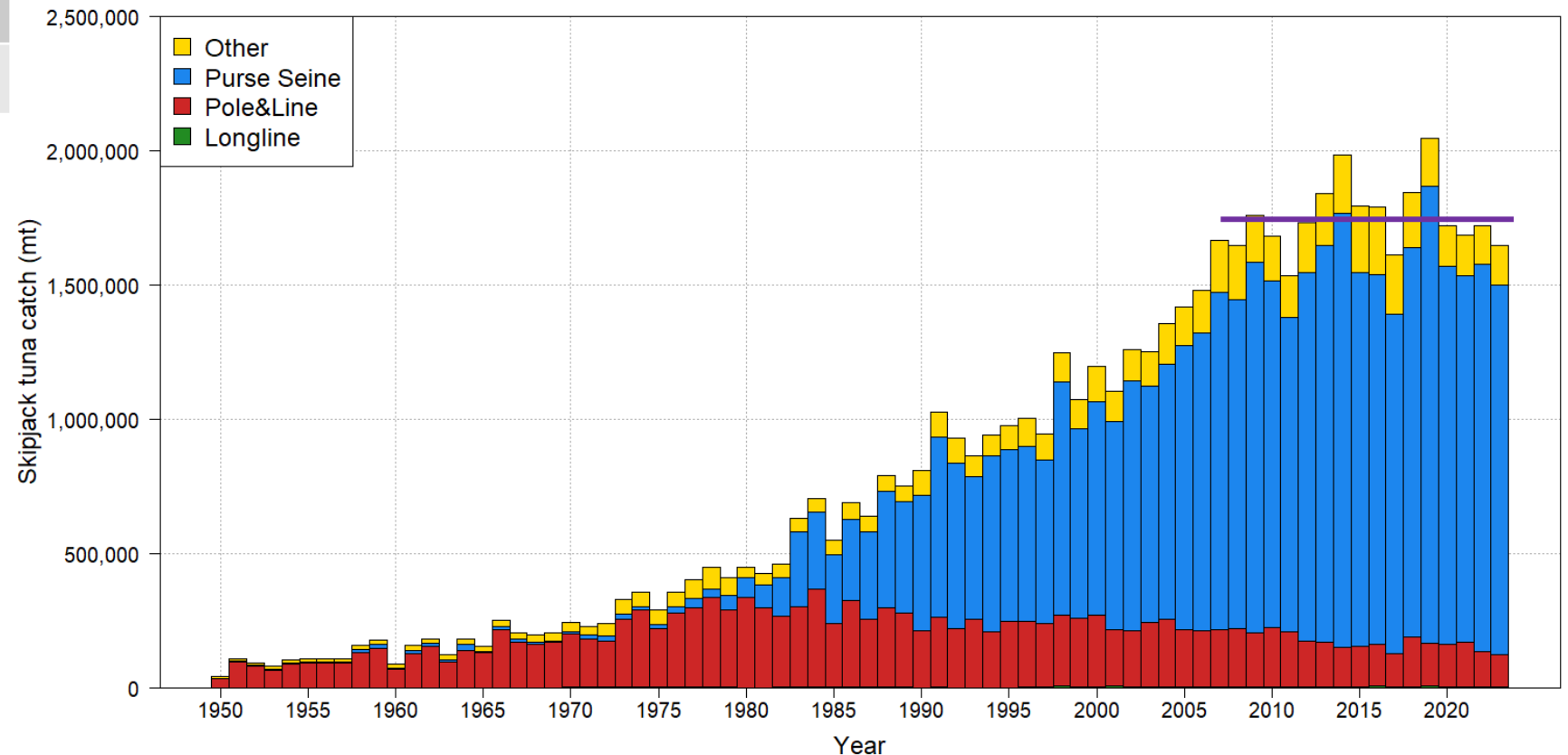
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- Catch by gear
- CPUE indices by gear
- Spatial maps of catch, effort and CPUE
- Catch at length/weight by gear type
- Mean weight by gear type
- Stochastic stock projections

# Skipjack – Total catch by gear

Gear	Prop.	Change from	
		2022	2018-22
PS	84%	- 4%	-7%
PL	8%	- 8%	- 25%
Other	8%	+ 3%	+ 11%
All	100%	- 4%	- 9%

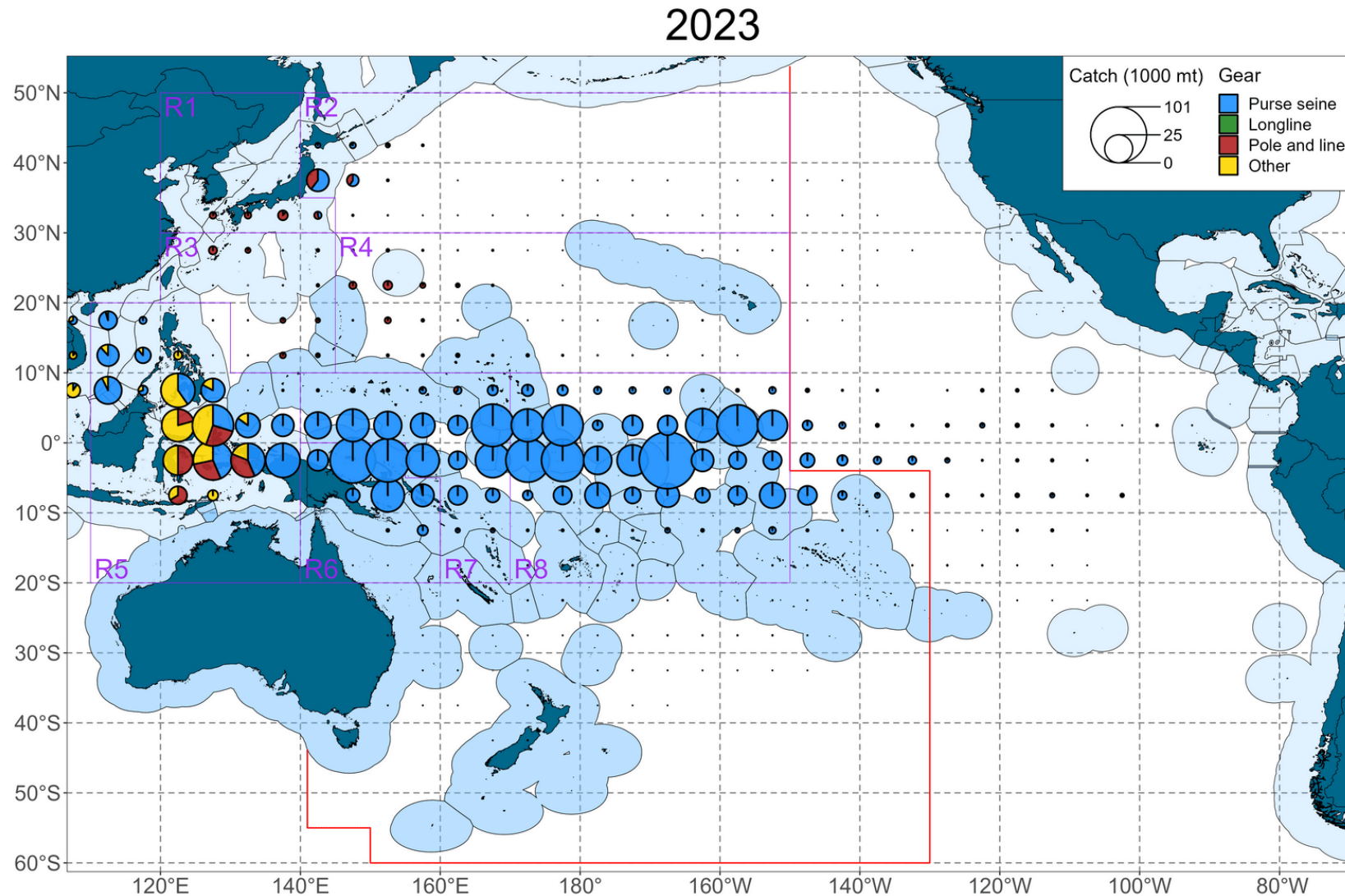
2023 catch – 1,647,702t. (15<sup>th</sup> highest)



## Info of note:

- A relatively stable fishery for 15 years
- 2023 PS catch was highest proportion on record (same as 2022)
- 2023 PL catch was lowest in 50 years

# Skipjack – distribution of catch

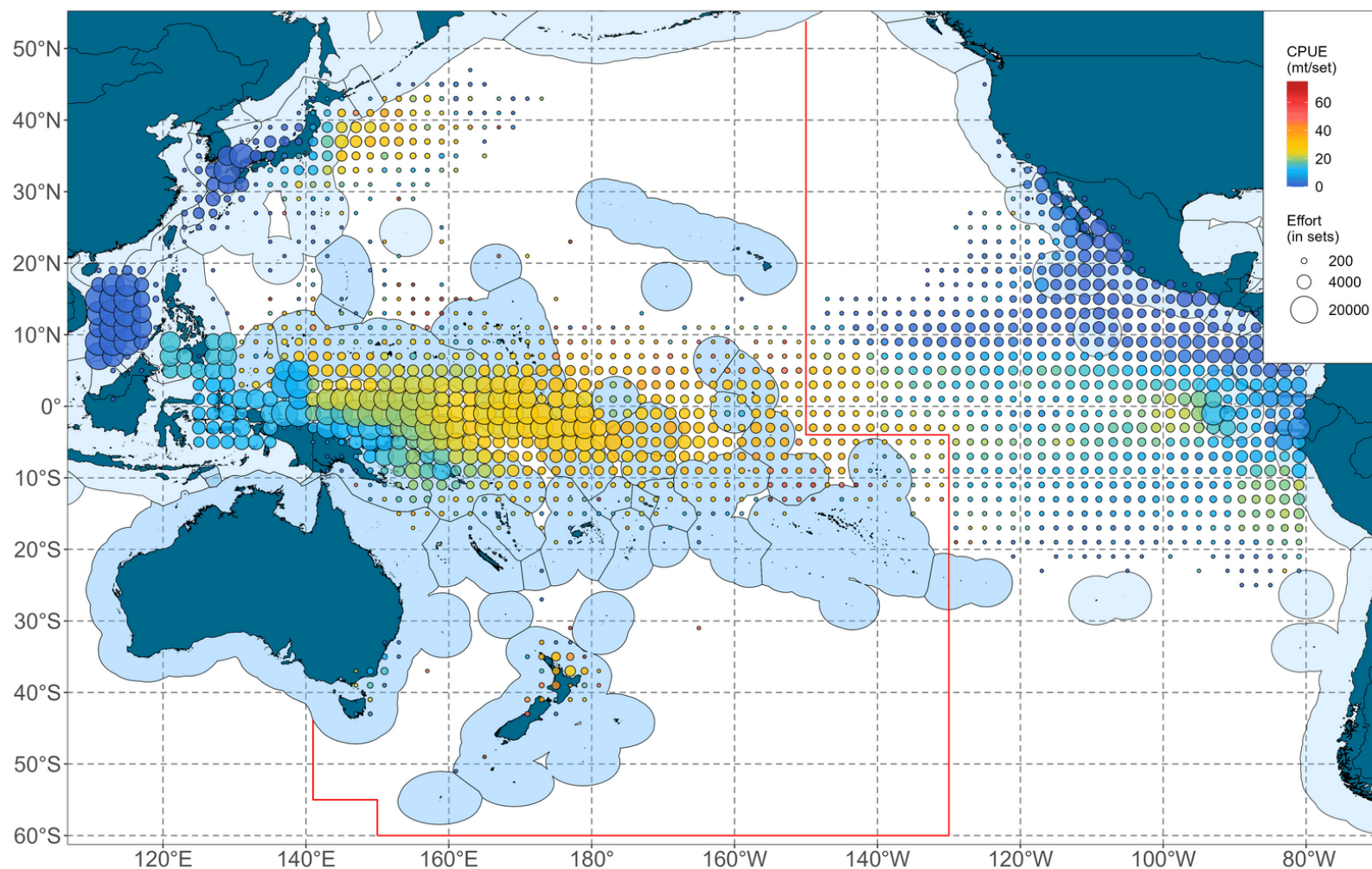


## Catch map details:

- 2023 Eq. Pacific catches shifted back east relative to recent years (likely due to El Niño conditions)
- Pole and line proportion continues decline
- 2023 EPO catches incomplete

# Skipjack – distribution of PS CPUE

1997 - 2023

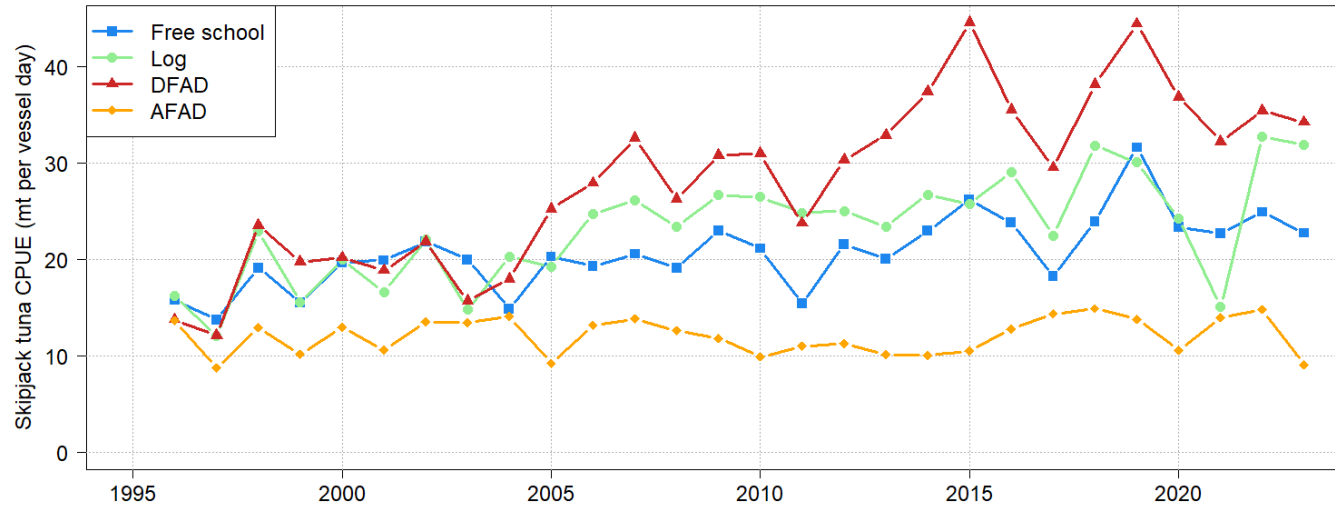


## CPUE map details:

- 2023 saw very high CPUE just east of Phoenix islands
- El Niño effect most likley

# Skipjack – CPUE indices (nominal)

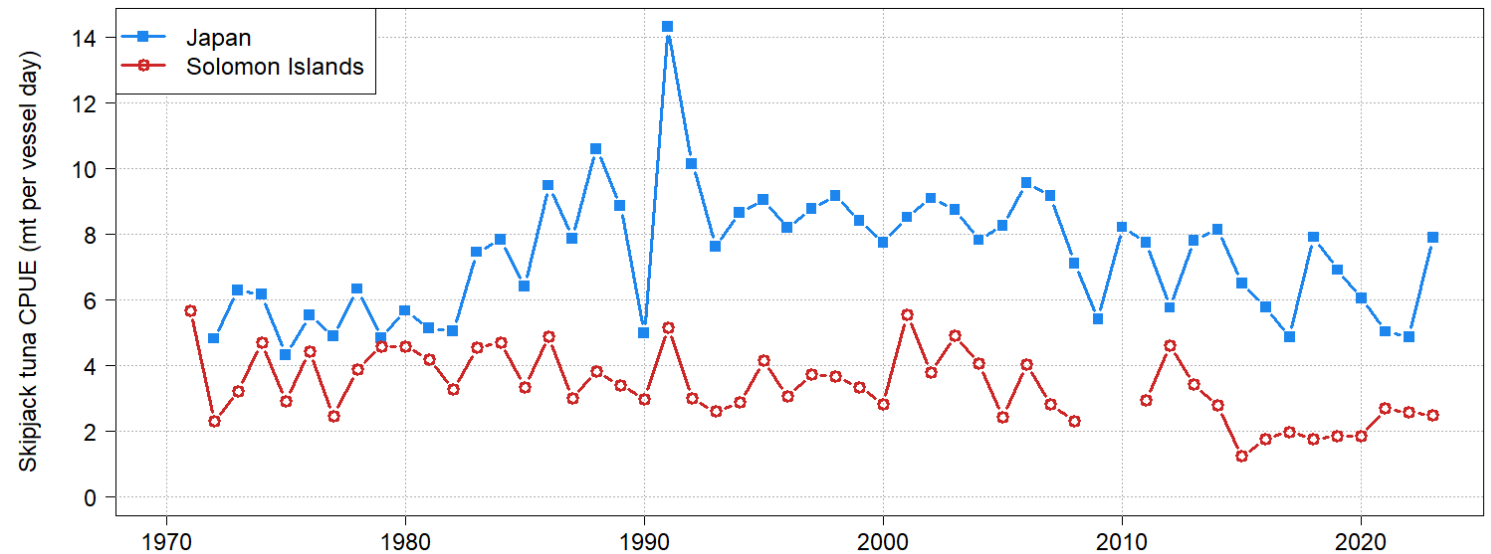
## Purse seine



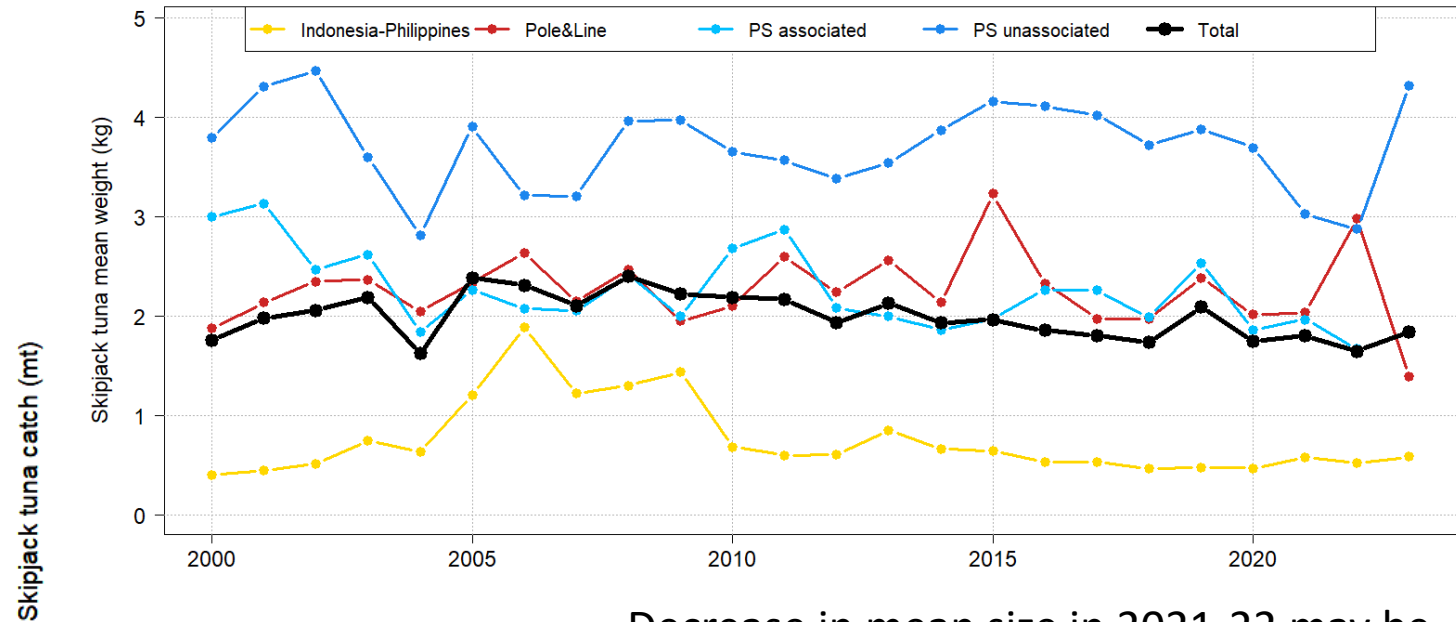
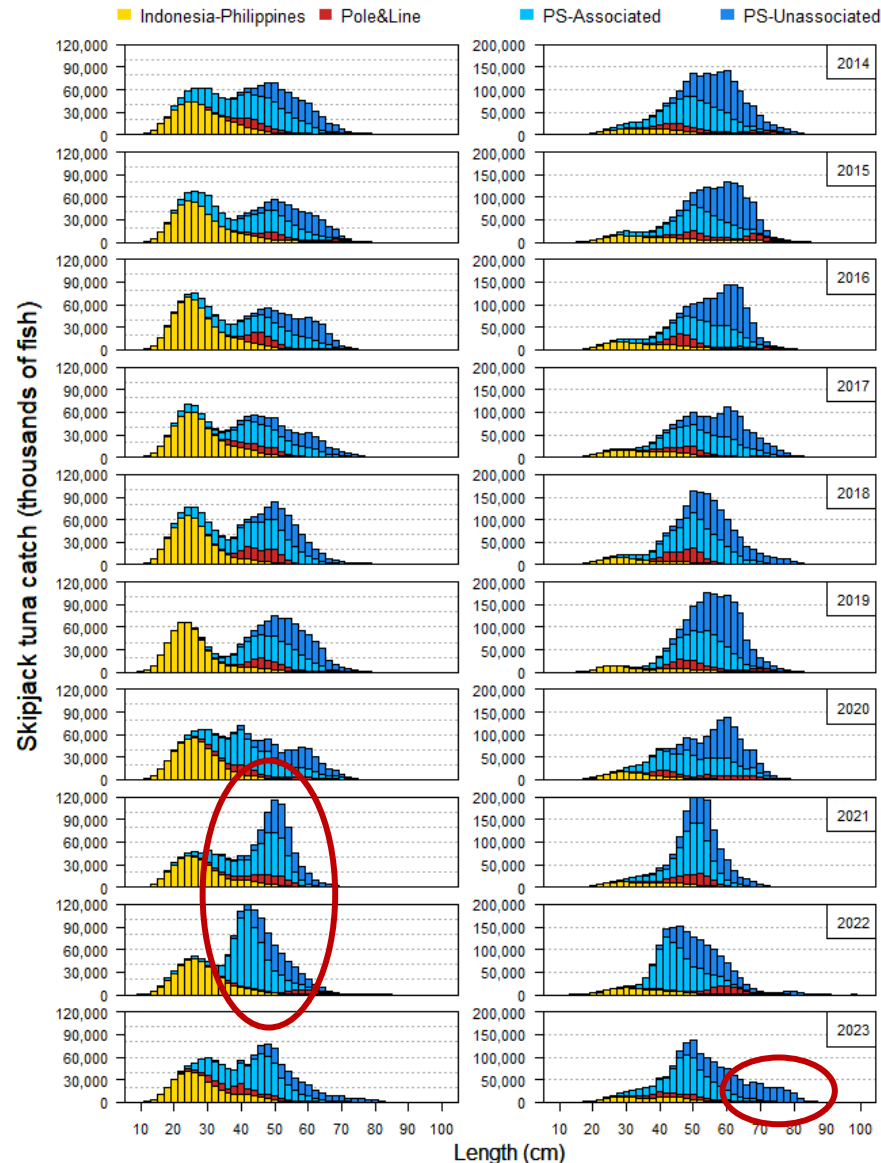
All four PS indices decreased from 2022; anchored FAD by 39%

Japan PL recovered to CPUE seen between 2010-2018; Solomons remains low

## Pole and line



# Skipjack – size distribution in catches



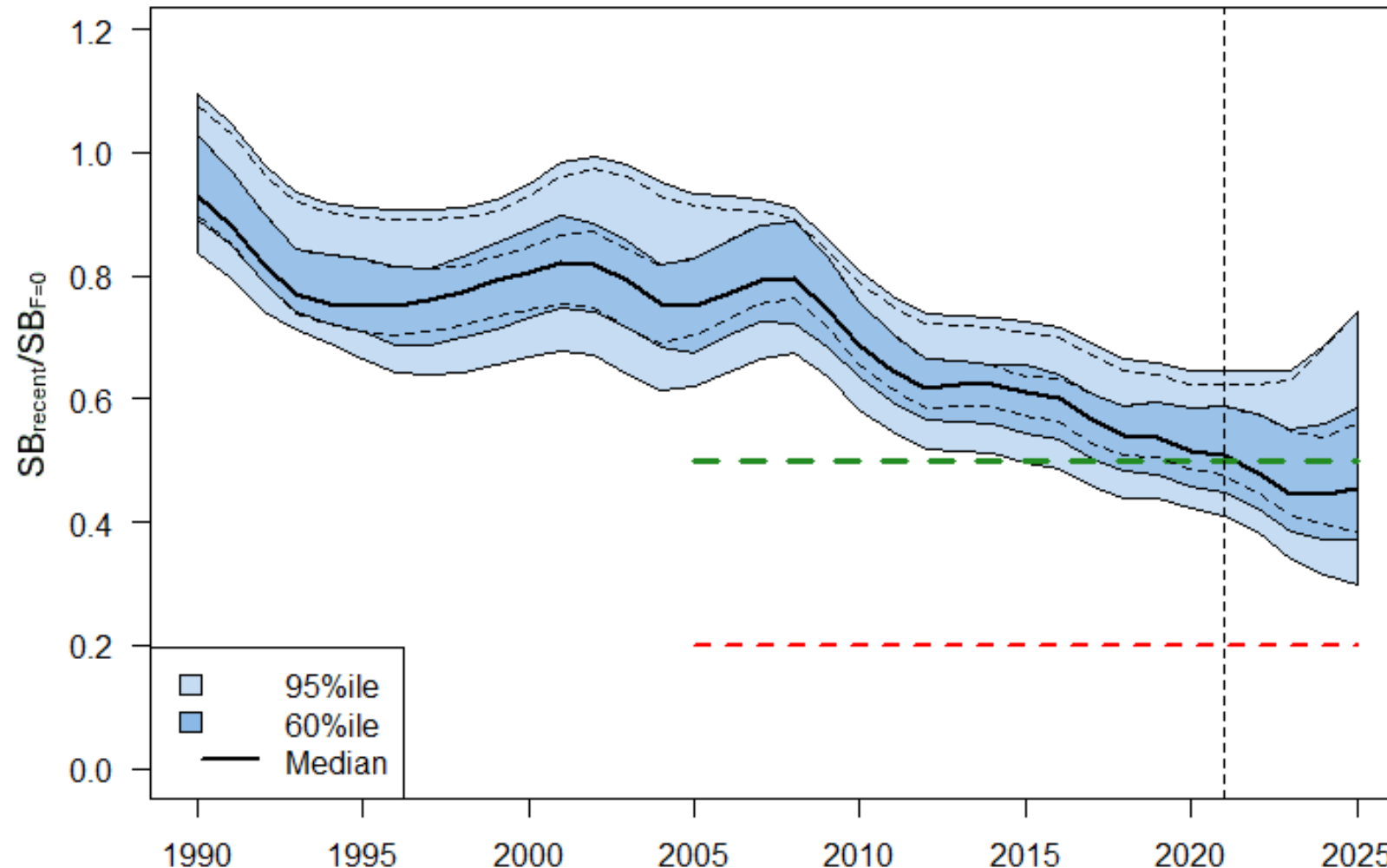
## Info of note:

- Usually bimodal distribution of catch by length, with equal numbers of 20-40 cm and 45-70 cm

Decrease in mean size in 2021-22 may be biased observer sampling as most samples come from PNG, Solomon Islands AW and HSP 1. Big jump in PS Unassociated mean weight



# Skipjack – short term projections



## Projection details:

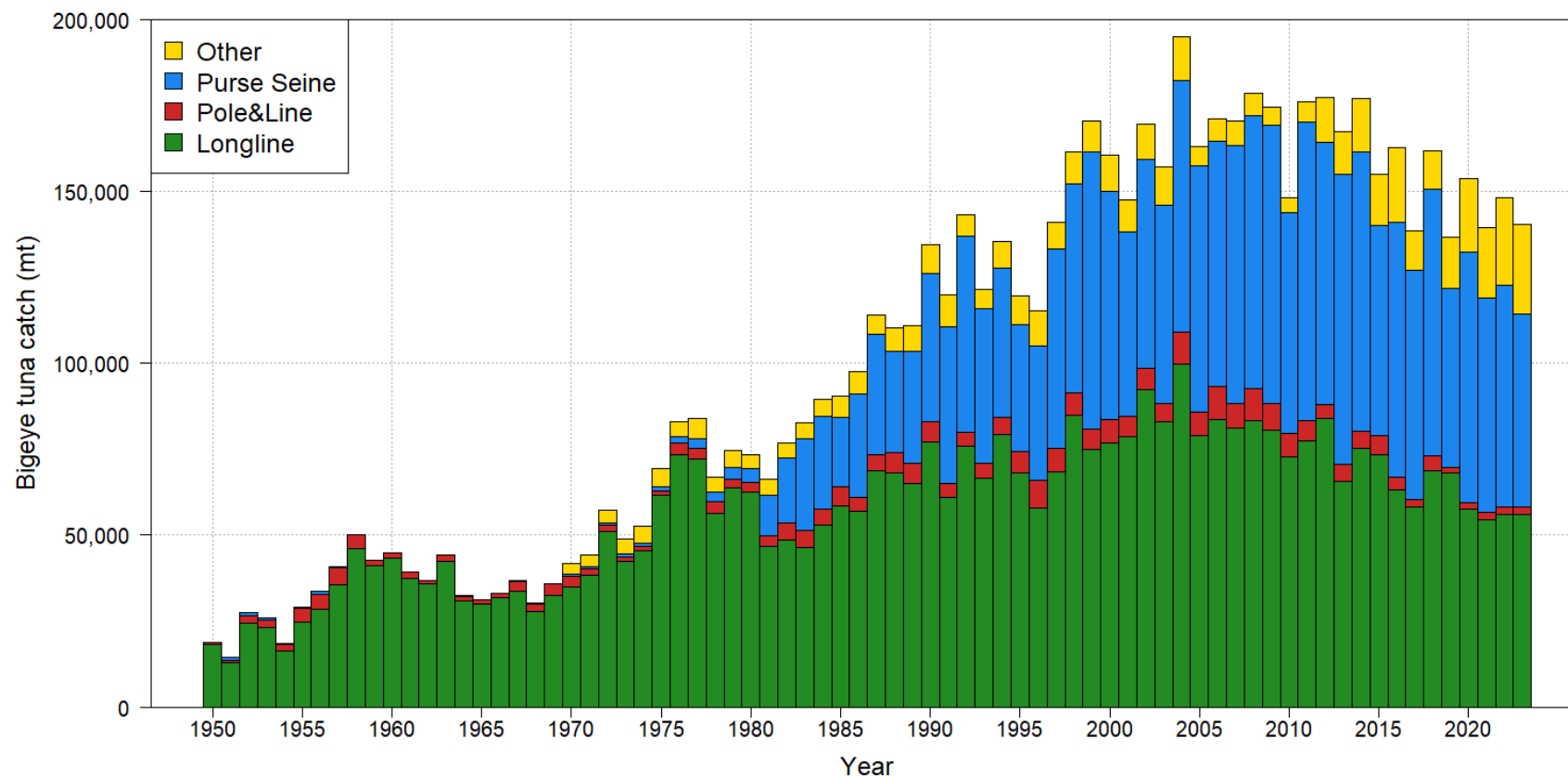
- Vertical line is last year of assessment
- Actual catch/effort through 2023, then 2023 levels used through 2025
- Future recruitment taken from 1982-2021 distribution
- Projections are 100 simulations from 18 grid models; three example trajectories shown
- Risk that recent (2022-2025) depletion

$$(SB_{2022-2025}/SB_{F=0}) < LRP = 0\%$$

# Bigeye – Total catch by gear

Gear	Prop.	Change from	
		2022	2018-22
PS	40%	- 13%	- 15%
LL	40%	0%	- 8%
PL	1%	- 1%	- 13%
Other	19%	+ 2%	+ 39%
All	100%	- 5%	- 5%

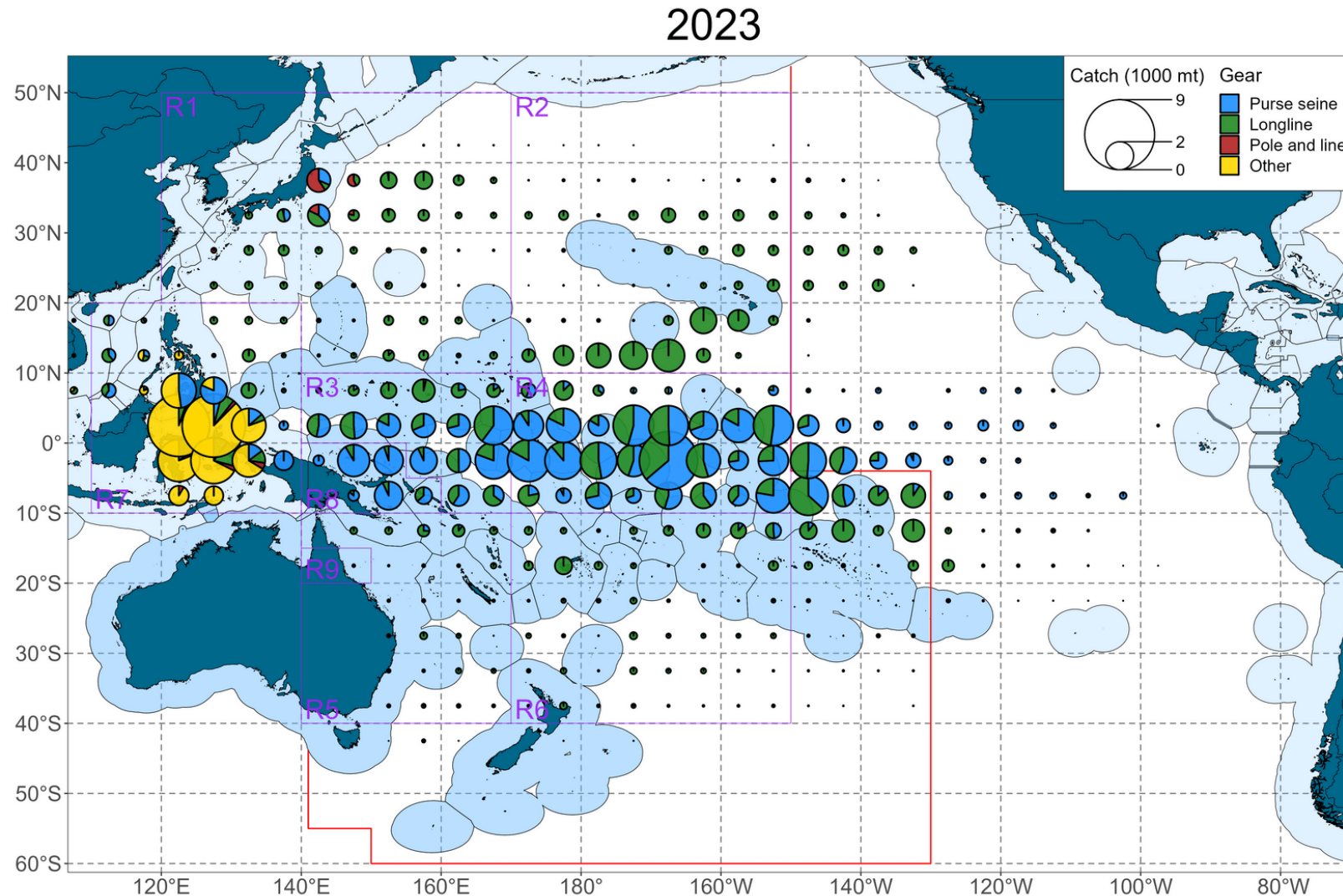
2023 catch – 140,309t (25<sup>th</sup> highest)



## Info of note:

- Bigeye catches have declined steadily for a decade, down > 25% since early 2000s
- Other catch proportion highest on record

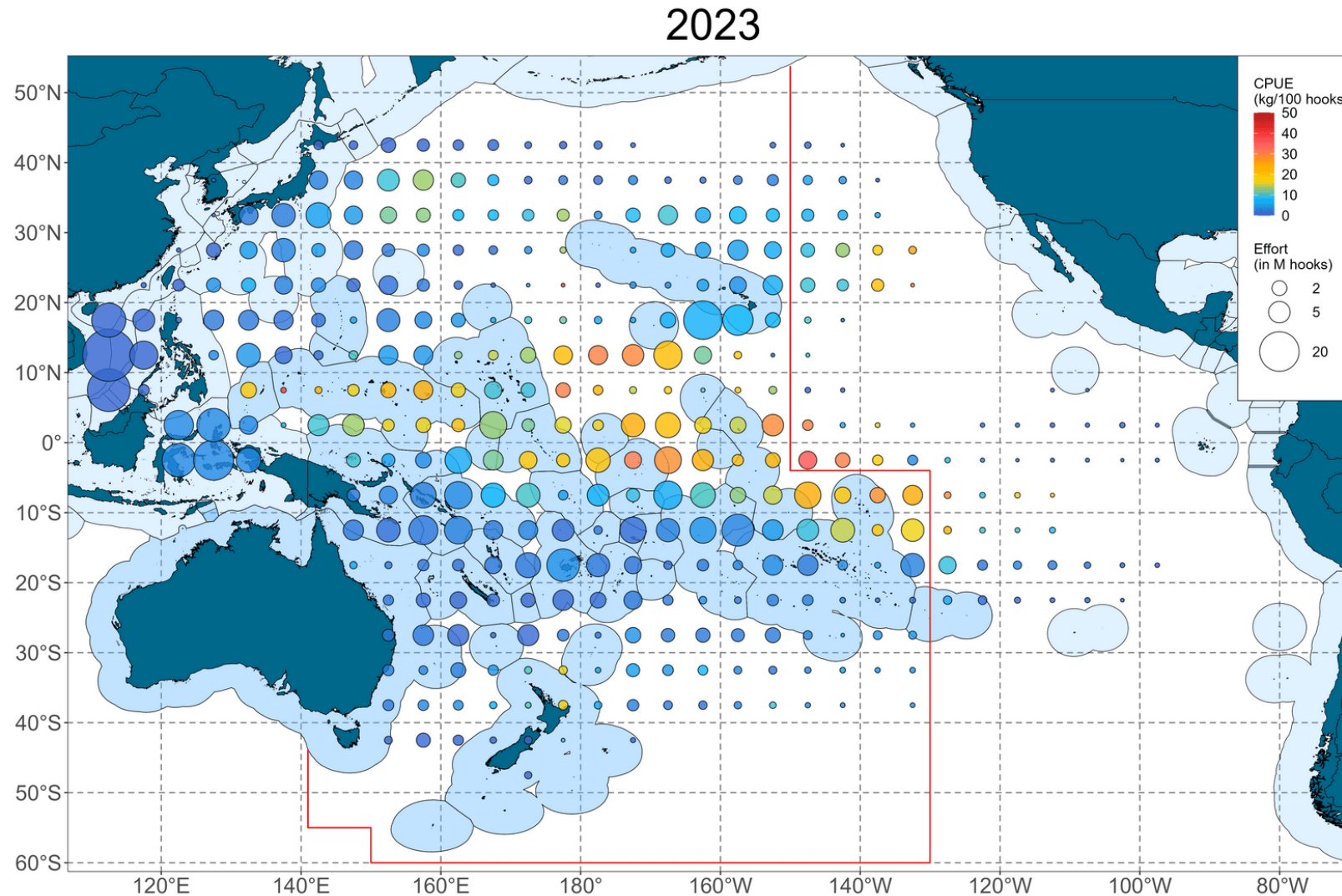
# Bigeye – distribution of catch



## Catch map details:

- Increasing amount of catch in Other fisheries (ID/VN/PH)
- Pole and line proportion continues decline
- 2023 EPO catches incomplete

# Bigeye – distribution of LL CPUE

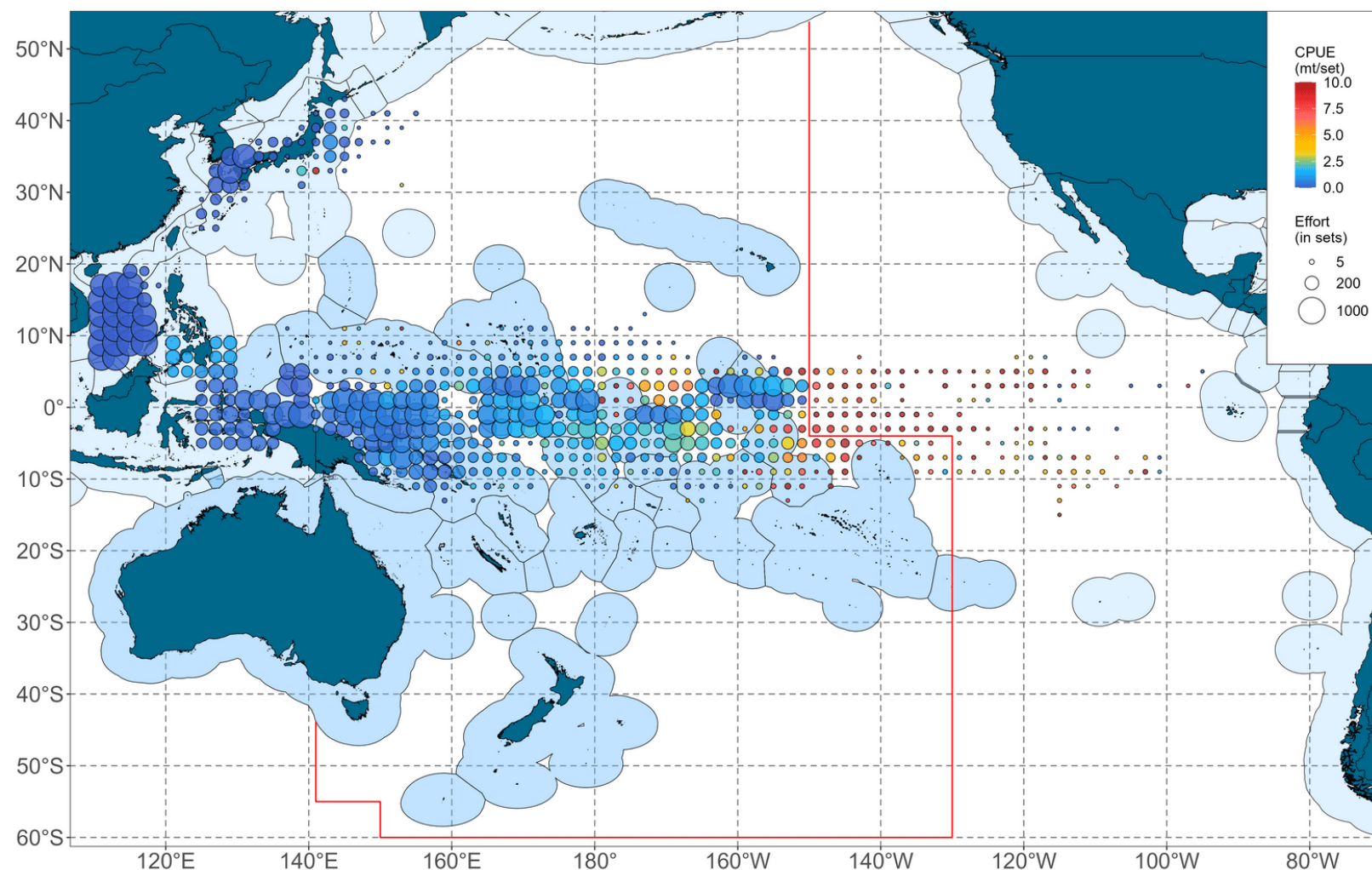


## CPUE map details:

- High catch rates now restricted to equatorial eastern region and mostly east of 170°W
- 2023 EPO data incomplete

# Bigeye – distribution of PS CPUE

2023

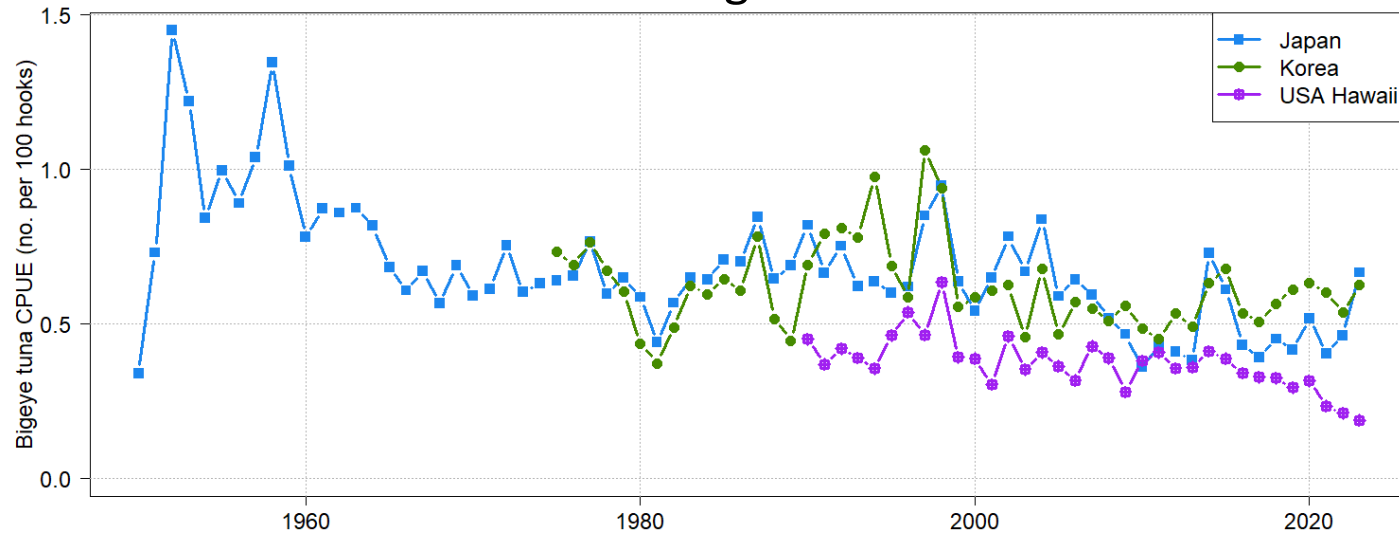


## CPUE map details:

- Region between 155°W and 180° have been a bigeye “hotspot” last few years (HS area between KI-PX and KI-LI)
- 2023 EPO data incomplete

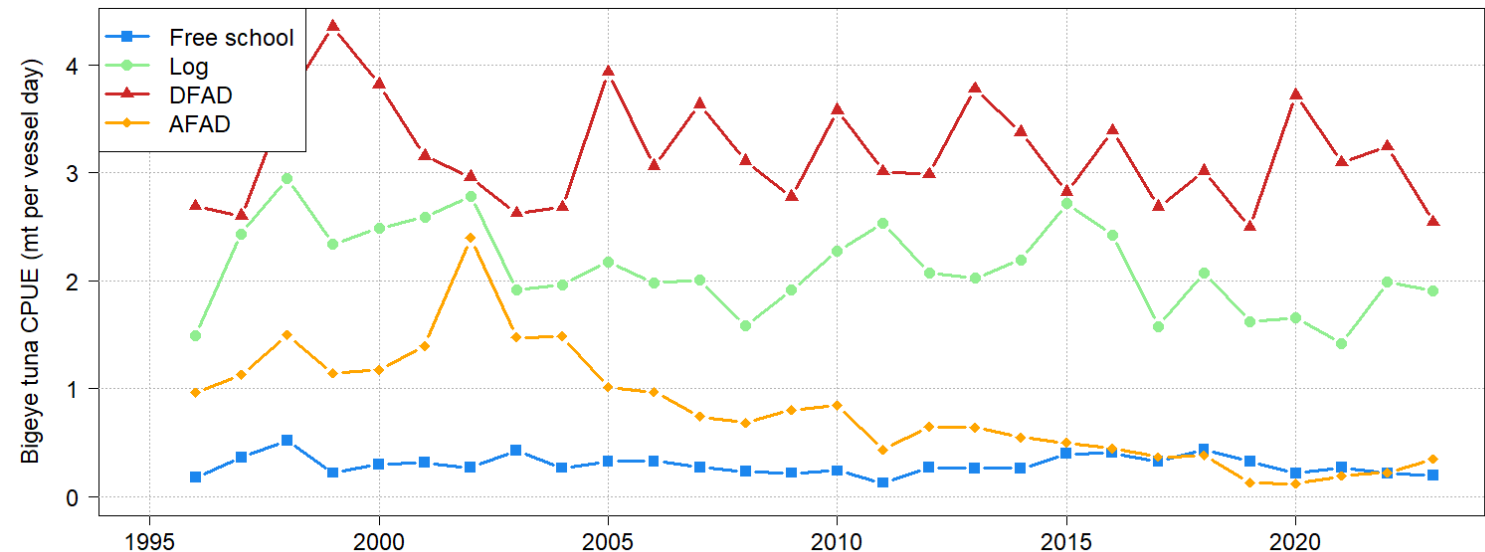
# Bigeye – CPUE indices (nominal)

## Longline



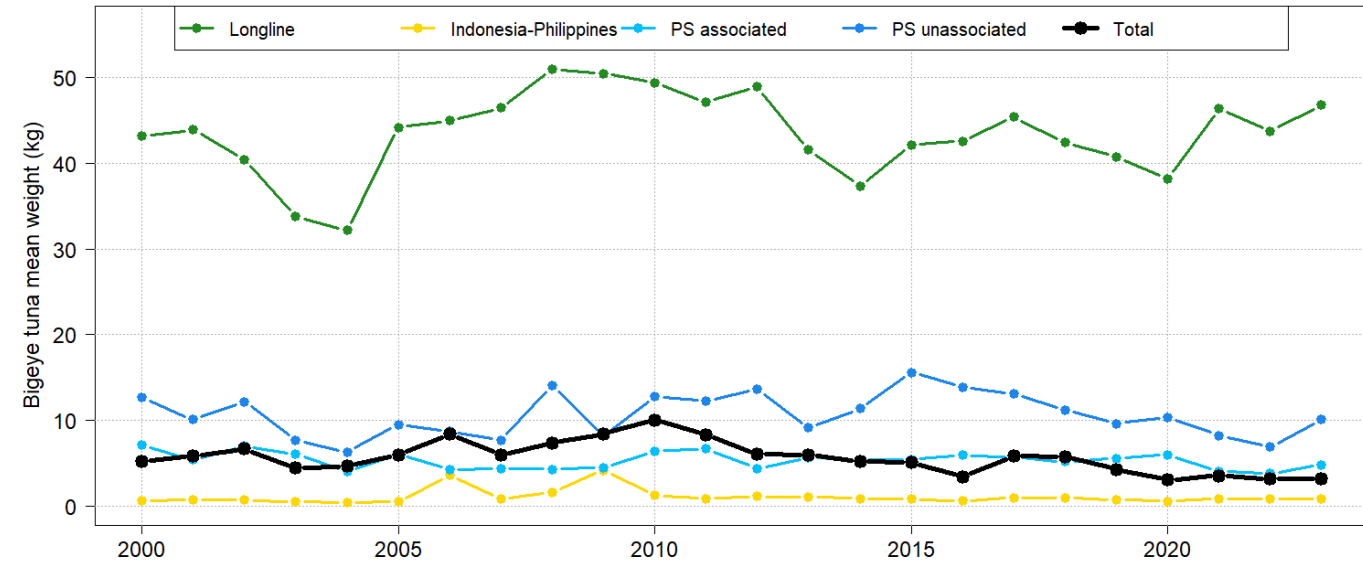
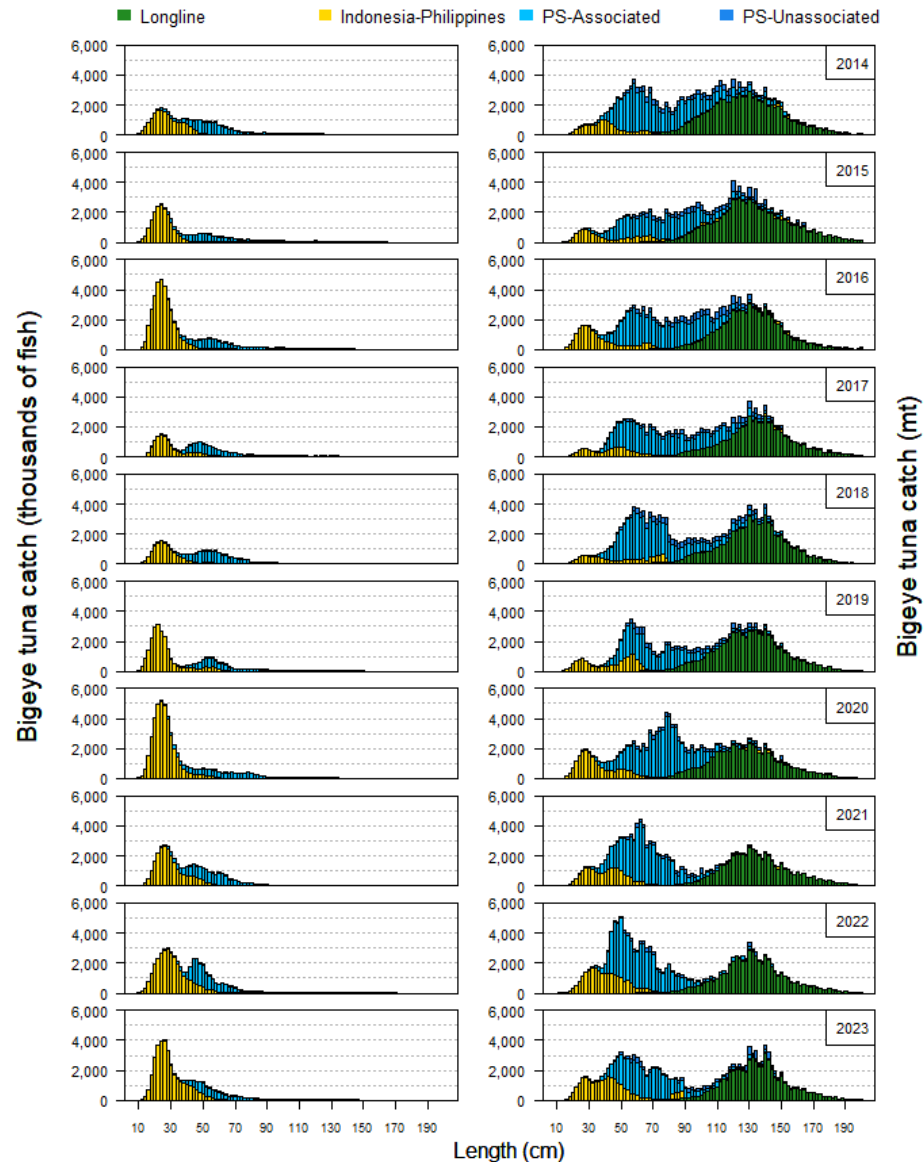
Japan (+44%) and Korea (+16%) both increased; US index continues decline, 2023 is lowest on record

## Purse seine



dFAD index dropped 22%, others stable.

# Bigeye – size distribution in catches

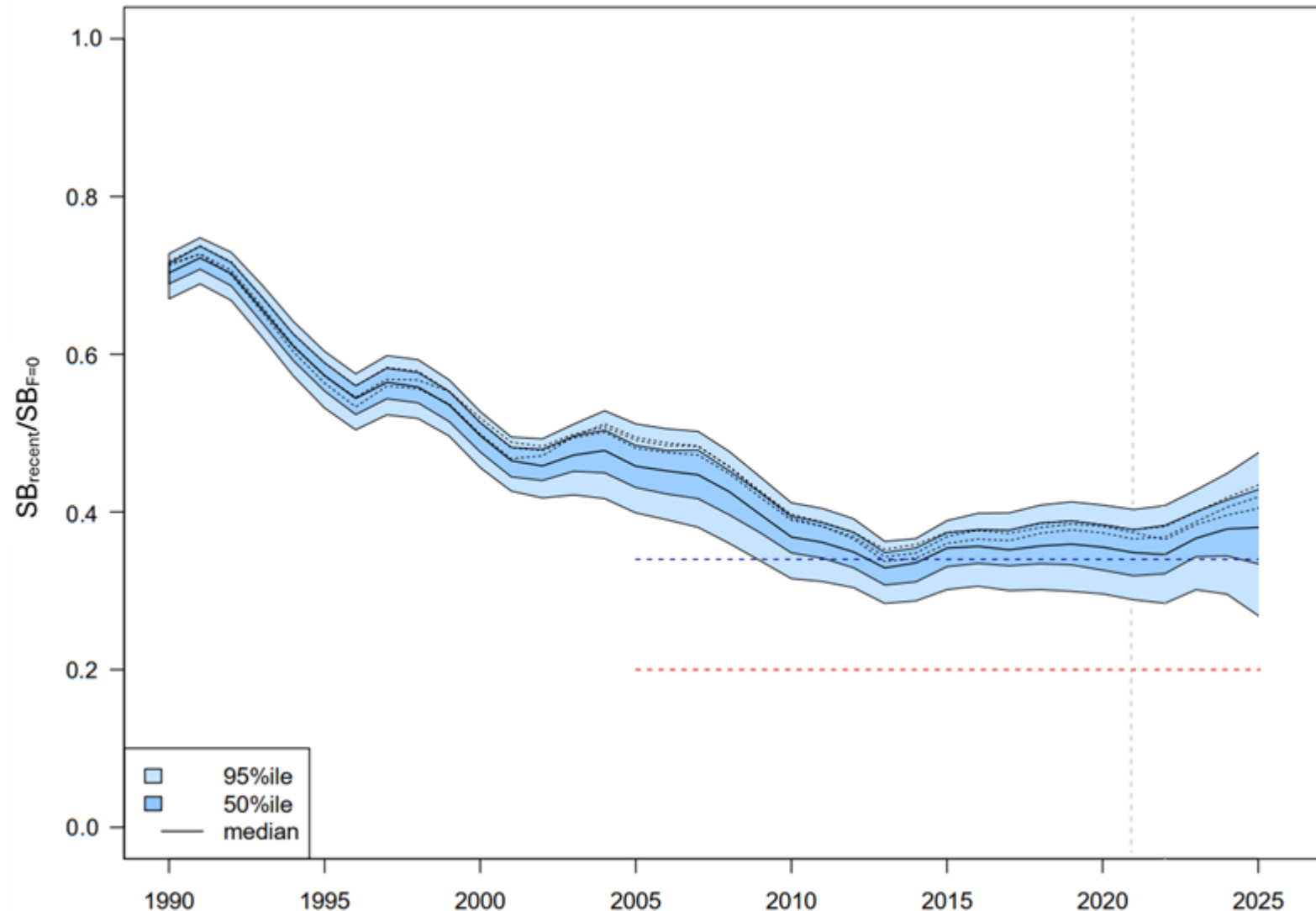


## Info of note:

- Overwhelming numbers of small fish taken in IN/PH and FAD PS sets
- By weight, relatively similar amounts of small/large fish comprise catch

Decrease in mean size of PS fish in 2021-22 may be biased observer sampling as most samples come from PNG, Solomon Islands AW and HSP 1.

# Bigeye – short term projections



## Projection details:

- Vertical line is last year of data used in assessment
- Actual catch/effort through 2023, then 2023 levels used through 2025
- Future recruitment taken from 1982-2021 distribution
- Projections are 100 simulations from 54 grid models; three example trajectories shown
- Risk that recent (2022-2025) depletion

$$(SB_{2022-2025}/SB_{F=0}) < LRP = 0\%$$



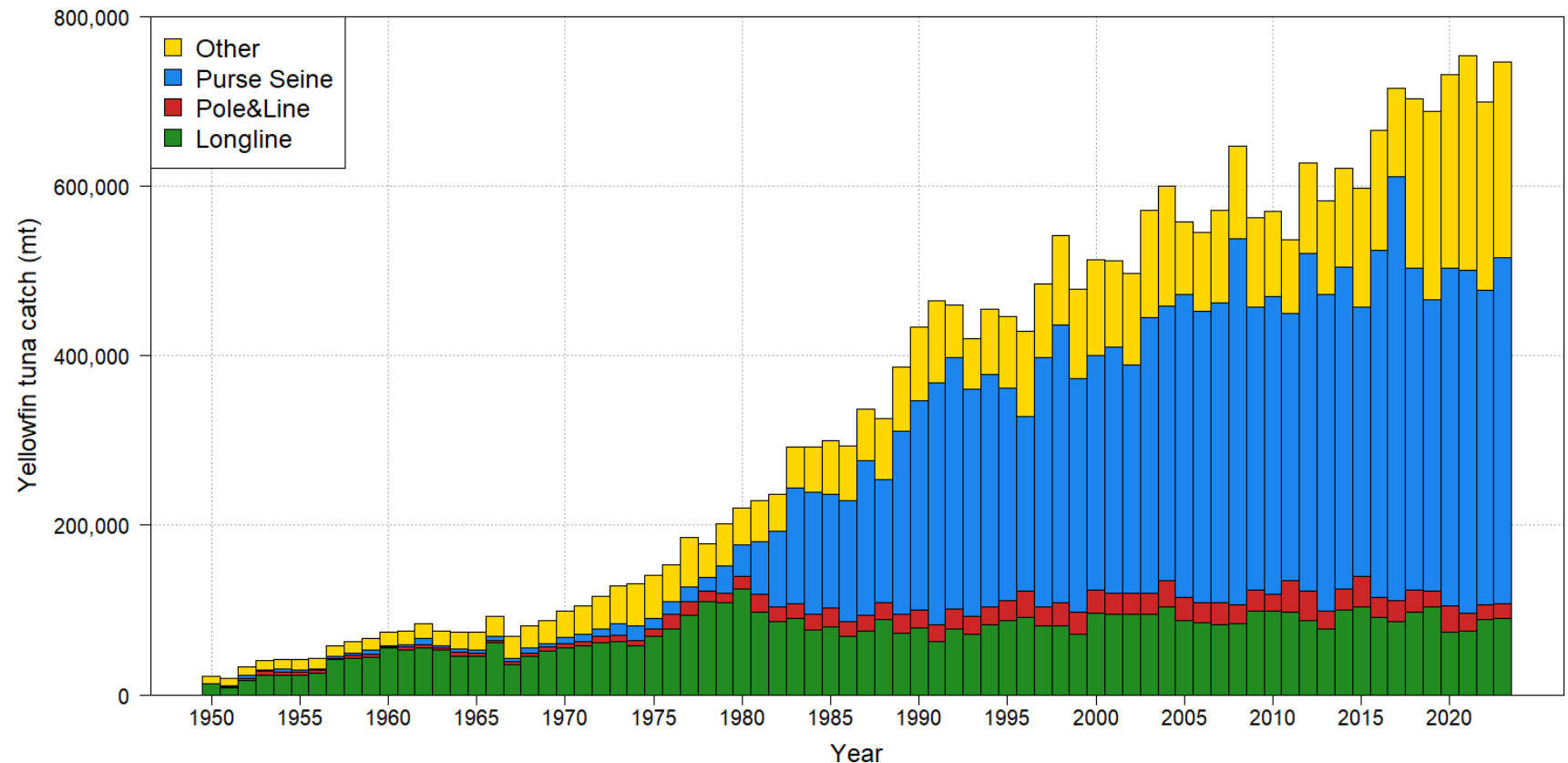
# Yellowfin – Total catch by gear

Gear	Prop.	Change from	
		2022	2018-22
PS	55%	+ 10%	+ 8%
LL	12%	+ 1%	+ 2%
PL	2%	0%	- 22%
Other	31%	+ 4%	+ 3%
All	100%	+ 7%	+ 4%

2023 catch – 746,913t (2<sup>nd</sup> highest)

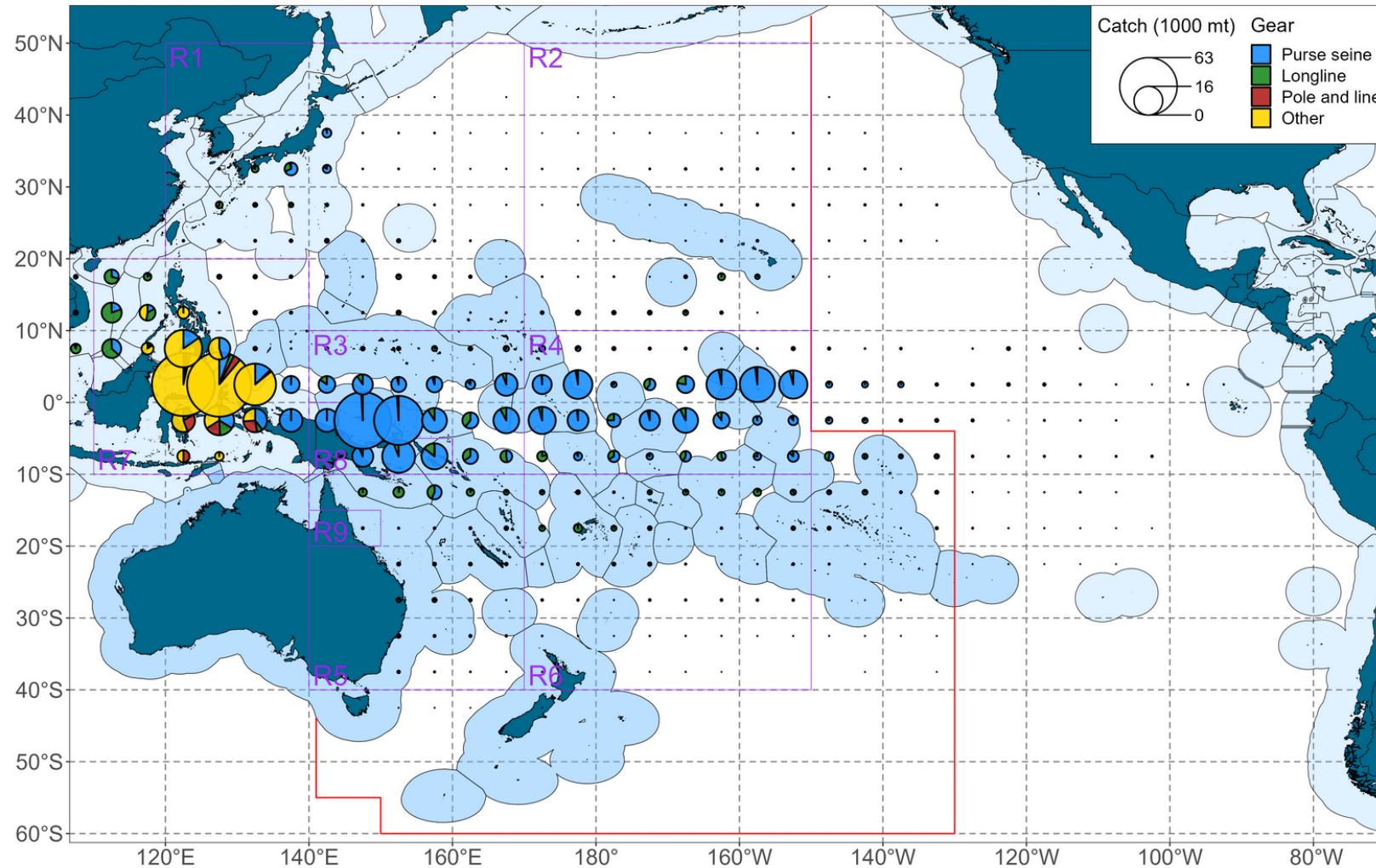
## Info of note:

- After decades of increase, recent stability in catches
- Proportion taken in Other fisheries has declined from the recent high of 35%



# Yellowfin – distribution of catch

2023

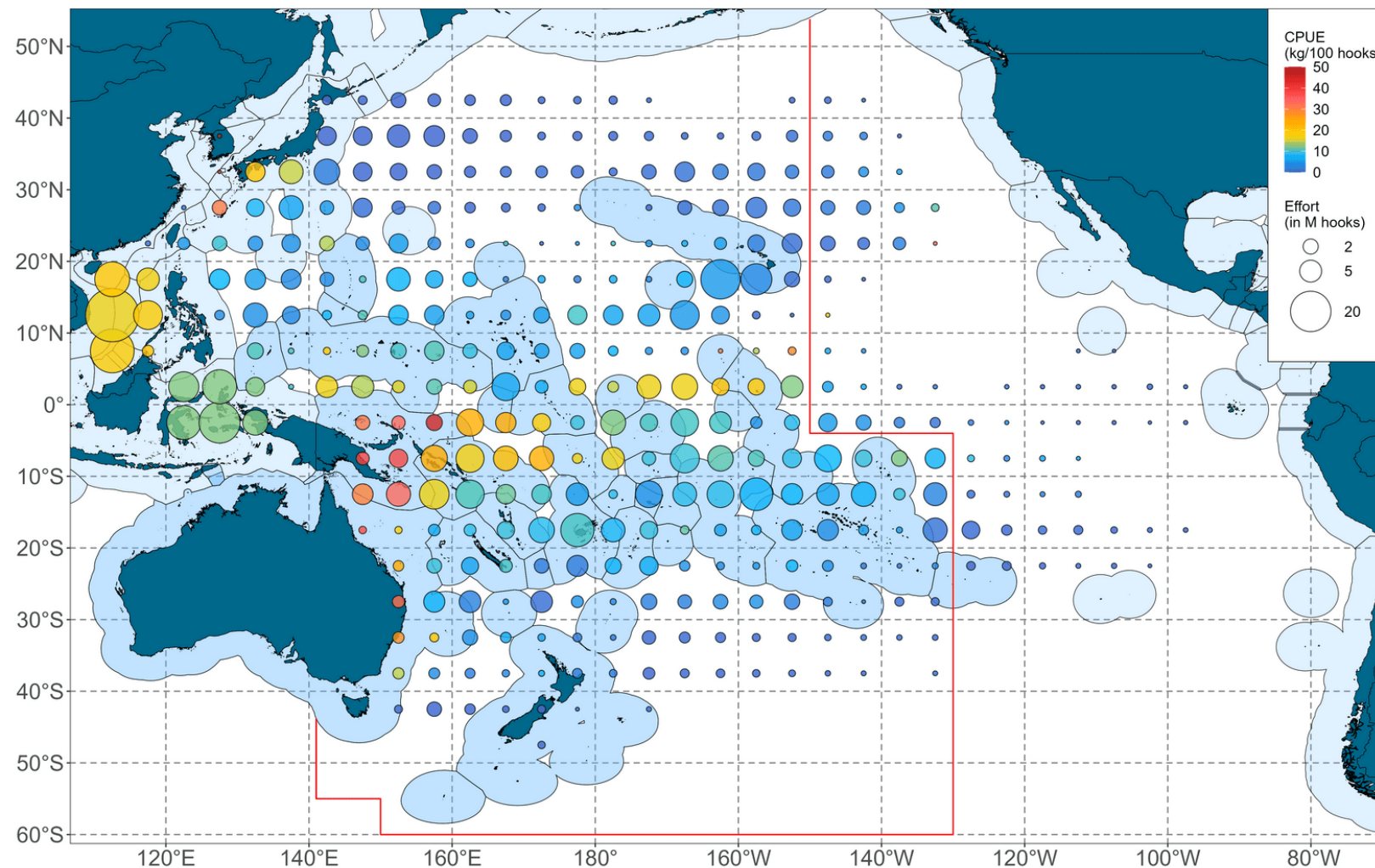


## Catch map details:

- Note westward distribution of catches relative to bigeye
- 2023 EPO catches incomplete

# Yellowfin – distribution of LL CPUE

2023

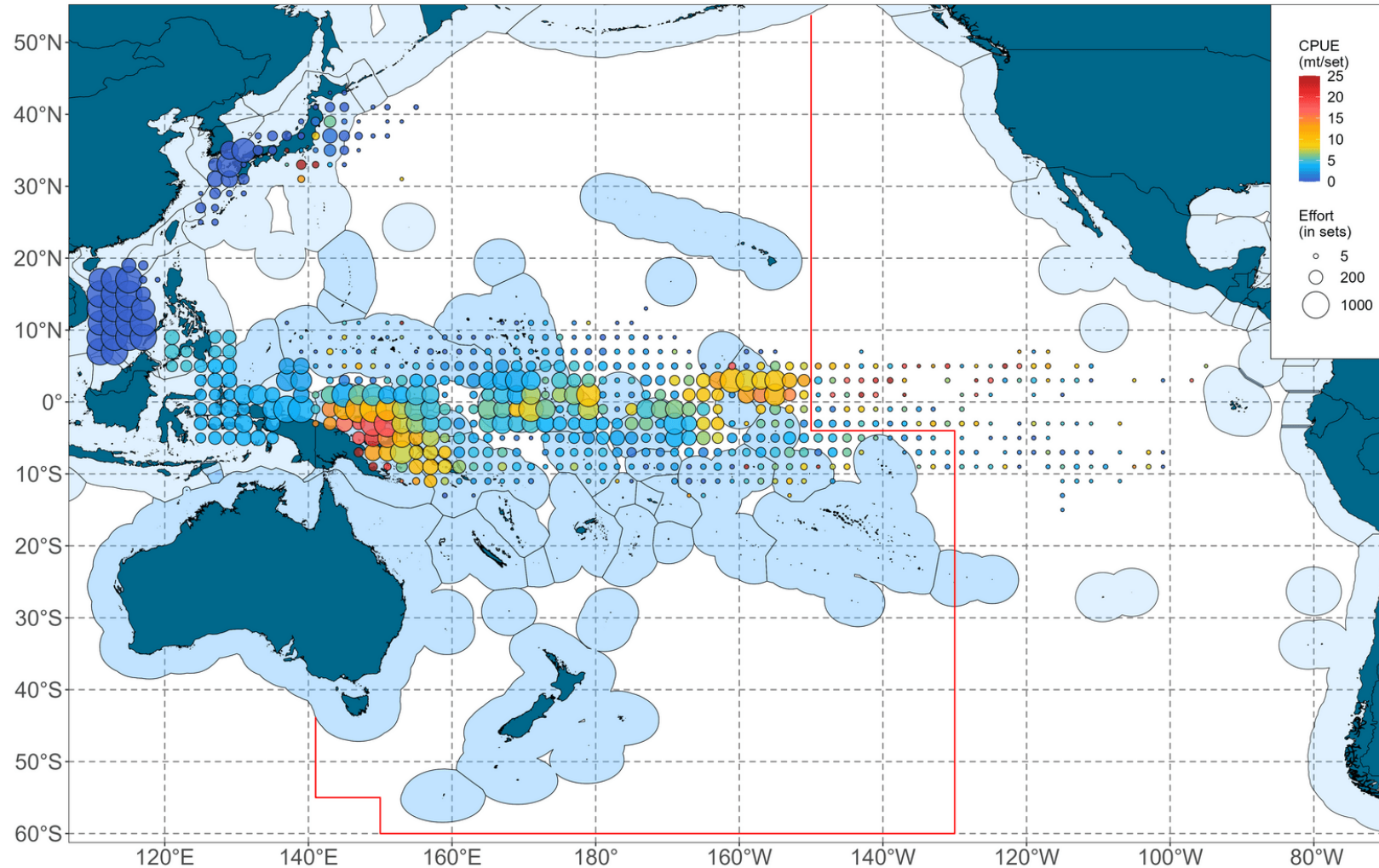


## CPUE map details:

- High CPUE region mostly just off PNG and Solomons
- 2023 EPO data incomplete

# Yellowfin – distribution of PS CPUE

2023

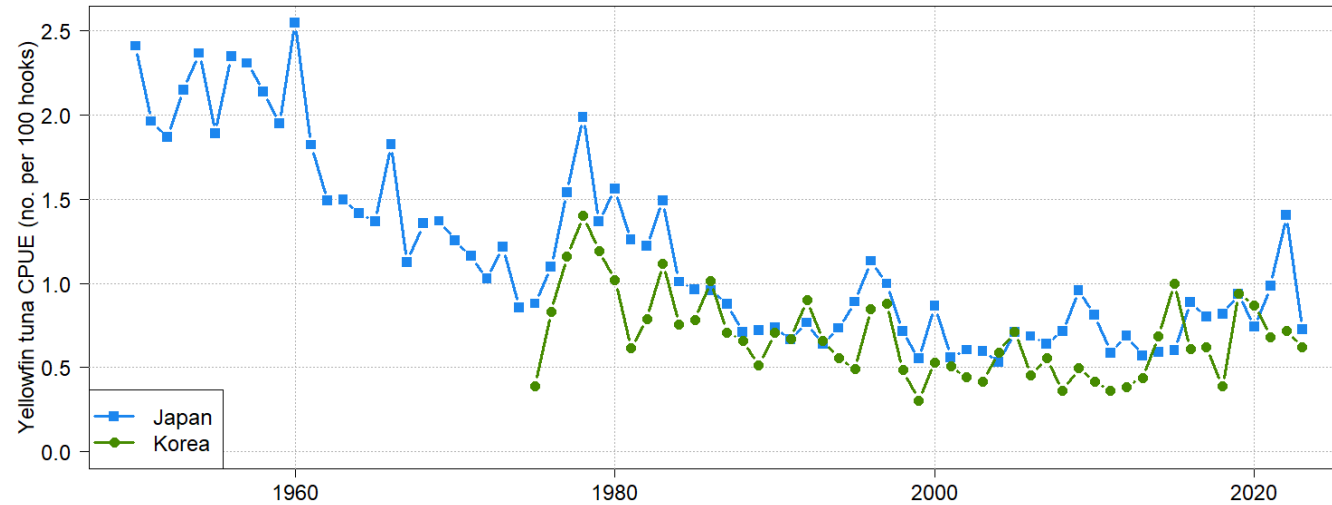


## CPUE map details:

- Fragmented locations of high CPUE, mostly now concentrated to west and in HS pocket between TV and KI
- 2022 EPO data incomplete

# Yellowfin – CPUE indices (nominal)

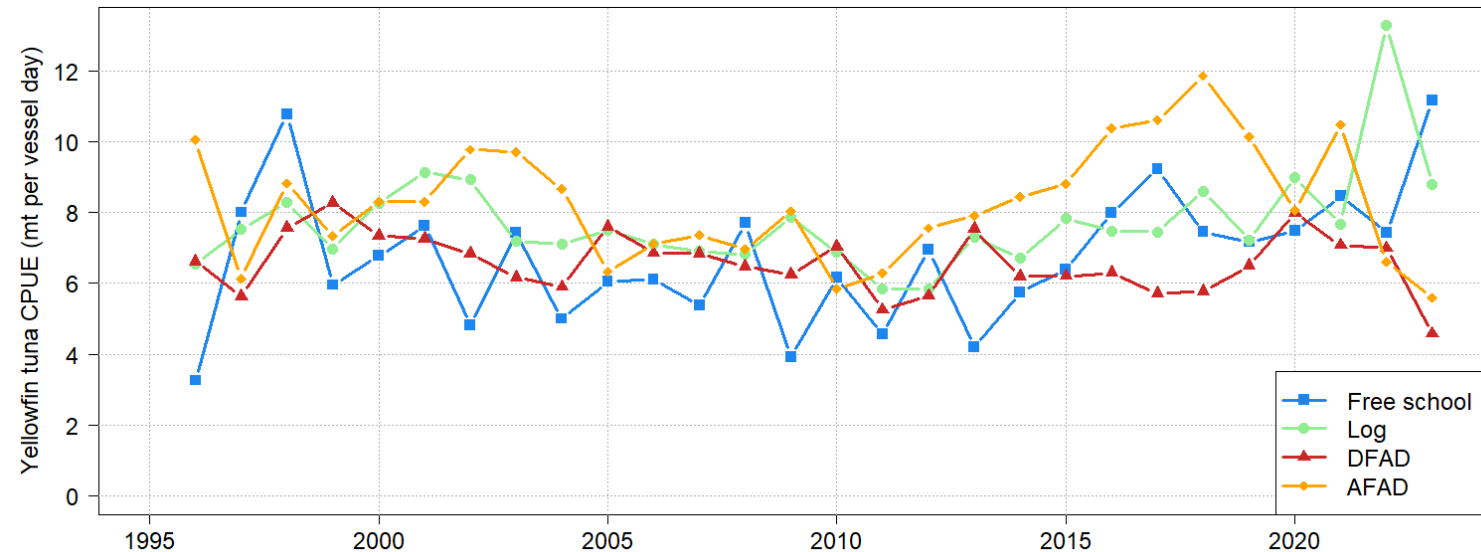
## Longline



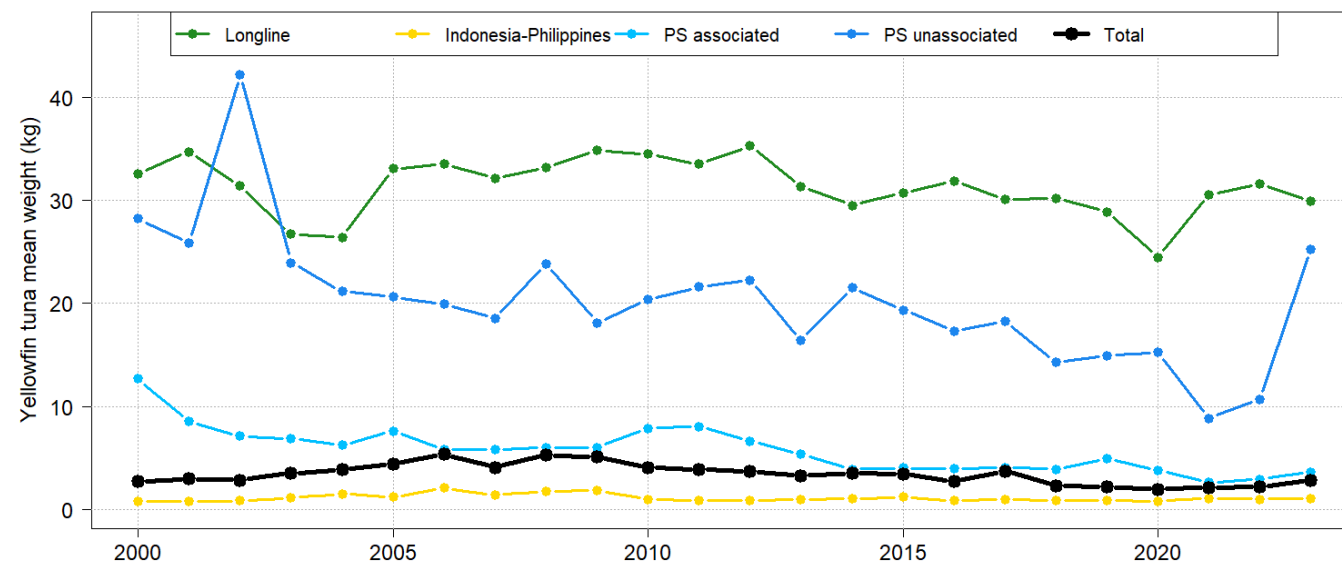
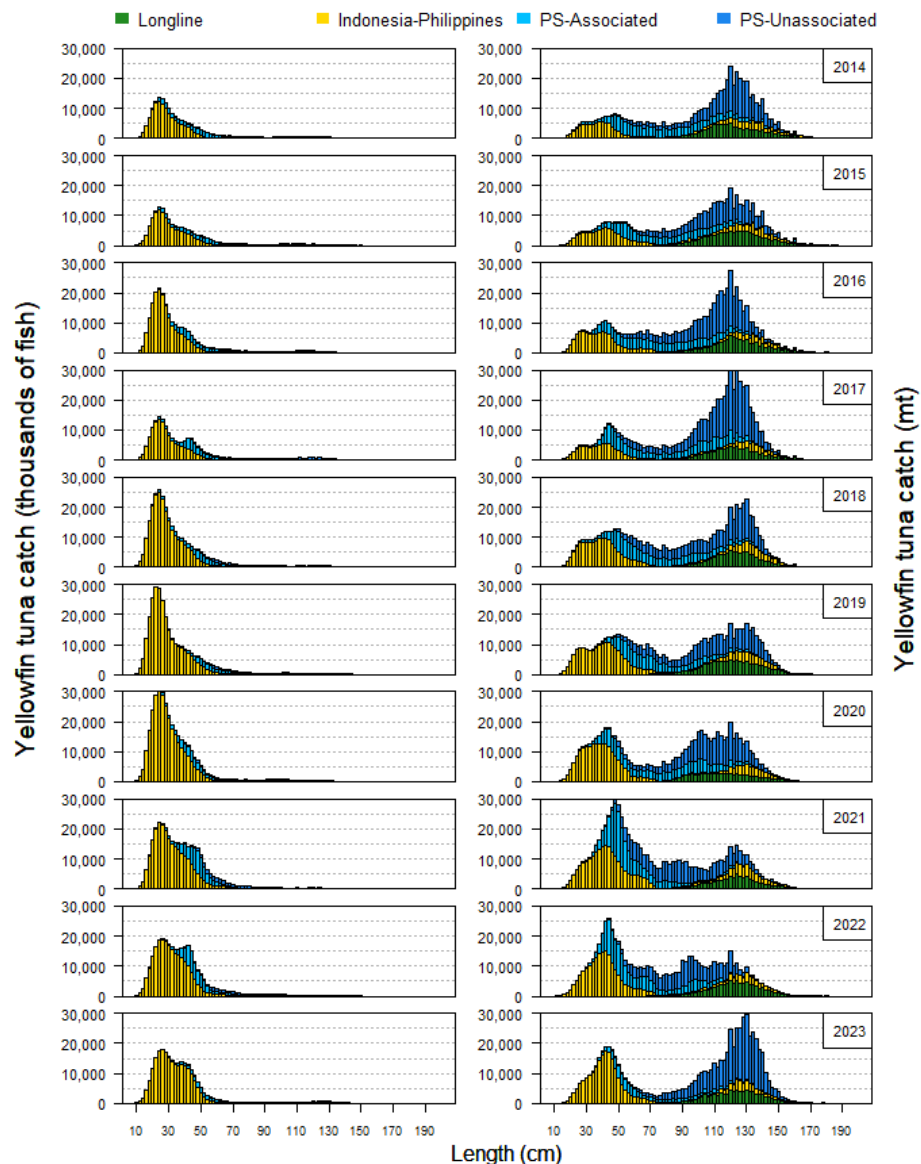
Large 2023 decrease in Japan CPUE (-48%)  
after large 2022 increase

## Purse seine

Some large changes in 2023: free school +50%, dFAD -35%



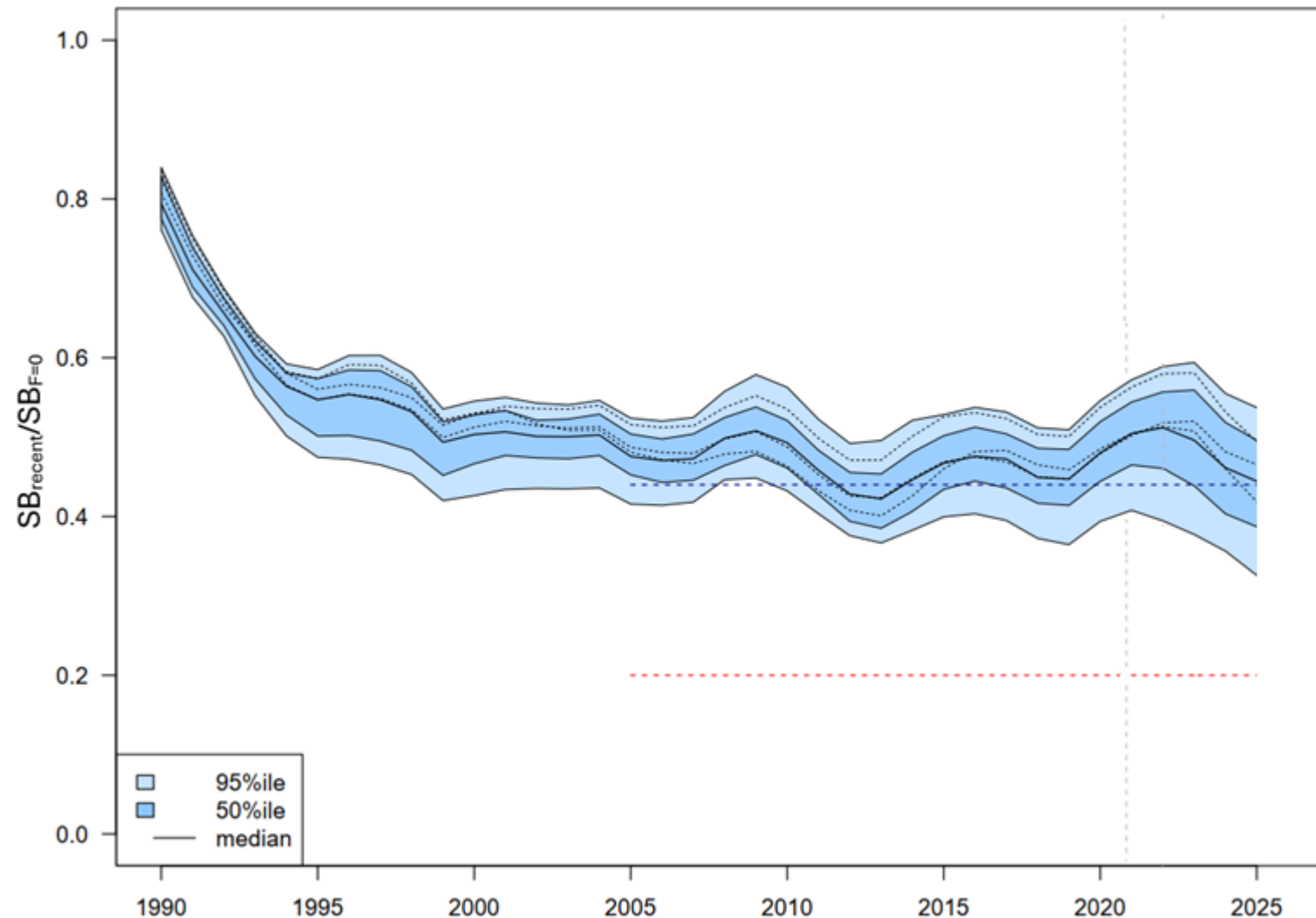
# Yellowfin – size distribution in catches



## Info of note:

- Overwhelming numbers of small fish taken in IN/PH and FAD PS sets
  - By weight, relatively similar amounts of small/large fish comprise catch
- Decrease in mean size of PS fish in 2021-22 may be biased observer sampling as most samples come from PNG, Solomon Islands AW and HSP 1. Long term decline in mean weight of free school yellowfin.

# Yellowfin – short term projections



## Projection details:

- Vertical line is last year of data used in assessment  
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