Stock status indicators for tropical tunas in the eastern Pacific Ocean

Haikun Xu

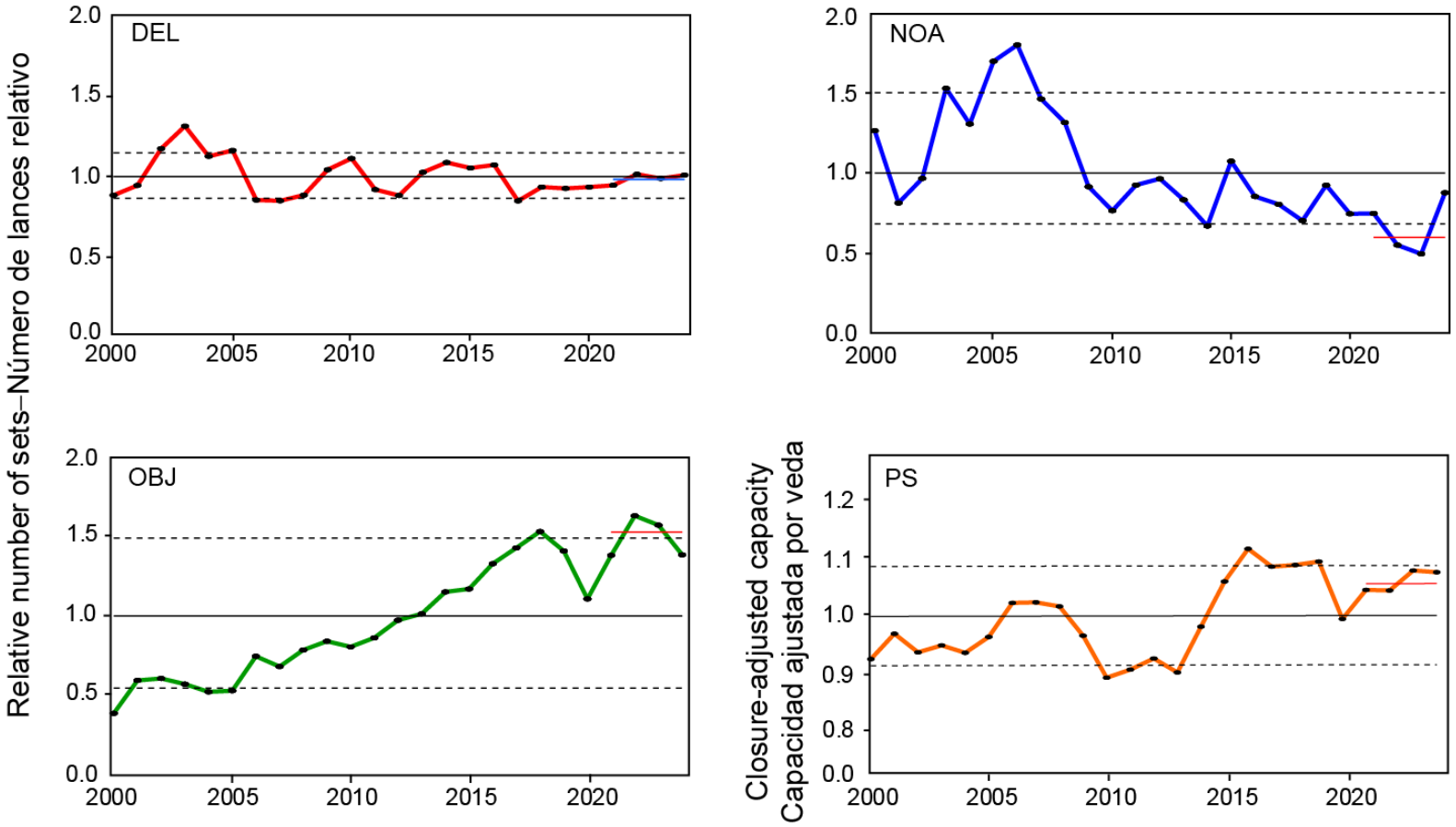
SAC-16-02

16ª Reunión del Comité Científico Asesor – 02-06 de junio de 2025
16th Meeting of the Scientific Advisory Committee – 02-06 de junio de 2025

Introduction

- Data: purse-seine and longline
- Species: bigeye, yellowfin, and skipjack
- Stock Status Indicators:
  - Catch, effort, CPUE, and average length
  - Start in 2000
    - First year of purse-seine species composition sampling
    - After the major offshore expansion of the floating-object fishery
  - Reference levels set at the 10% and 90% percentiles

Purse-seine: number of sets by set type



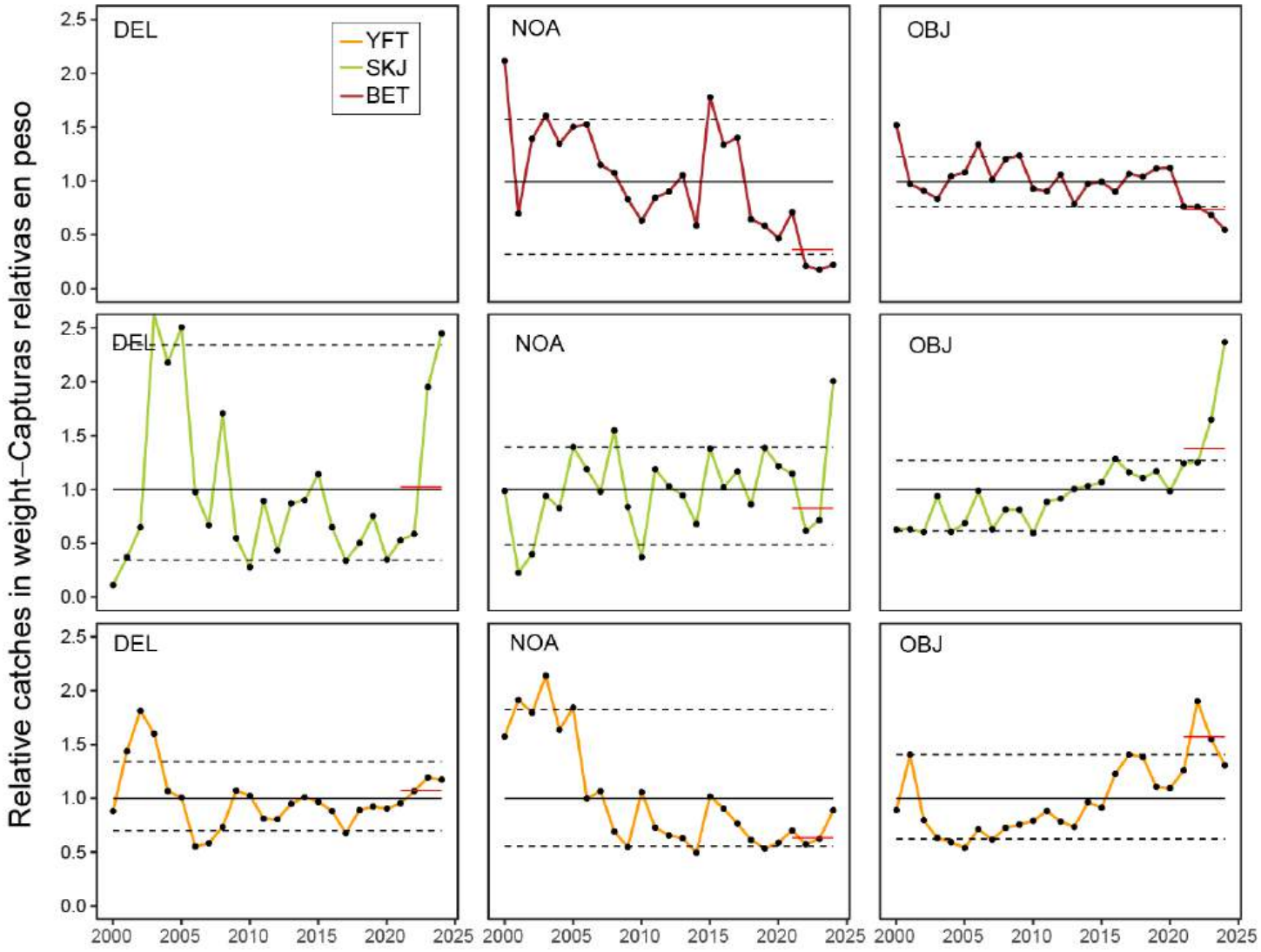
Black dashed lines: 10% and 90% percentiles

Red solid lines: benchmark reference level (average in 2021-2023), the terminal period used to calculate management quantities in the most recent benchmark assessments

In 2024:

- The number of OBJ sets was 9% below the benchmark reference level
- The number of NOA sets was 47% above the benchmark reference level
- The number of DEL sets was close to the benchmark reference level
- The closure-adjusted fishing capacity was 2% above the benchmark reference level

Purse-seine: catch in weight by species and set type



For the floating-object fishery in 2024:

- Yellowfin catch dropped from the high levels in 2022 and 2023
- Skipjack catch reached the highest level since 2000
- Bigeye catch reached the lowest level since 2000

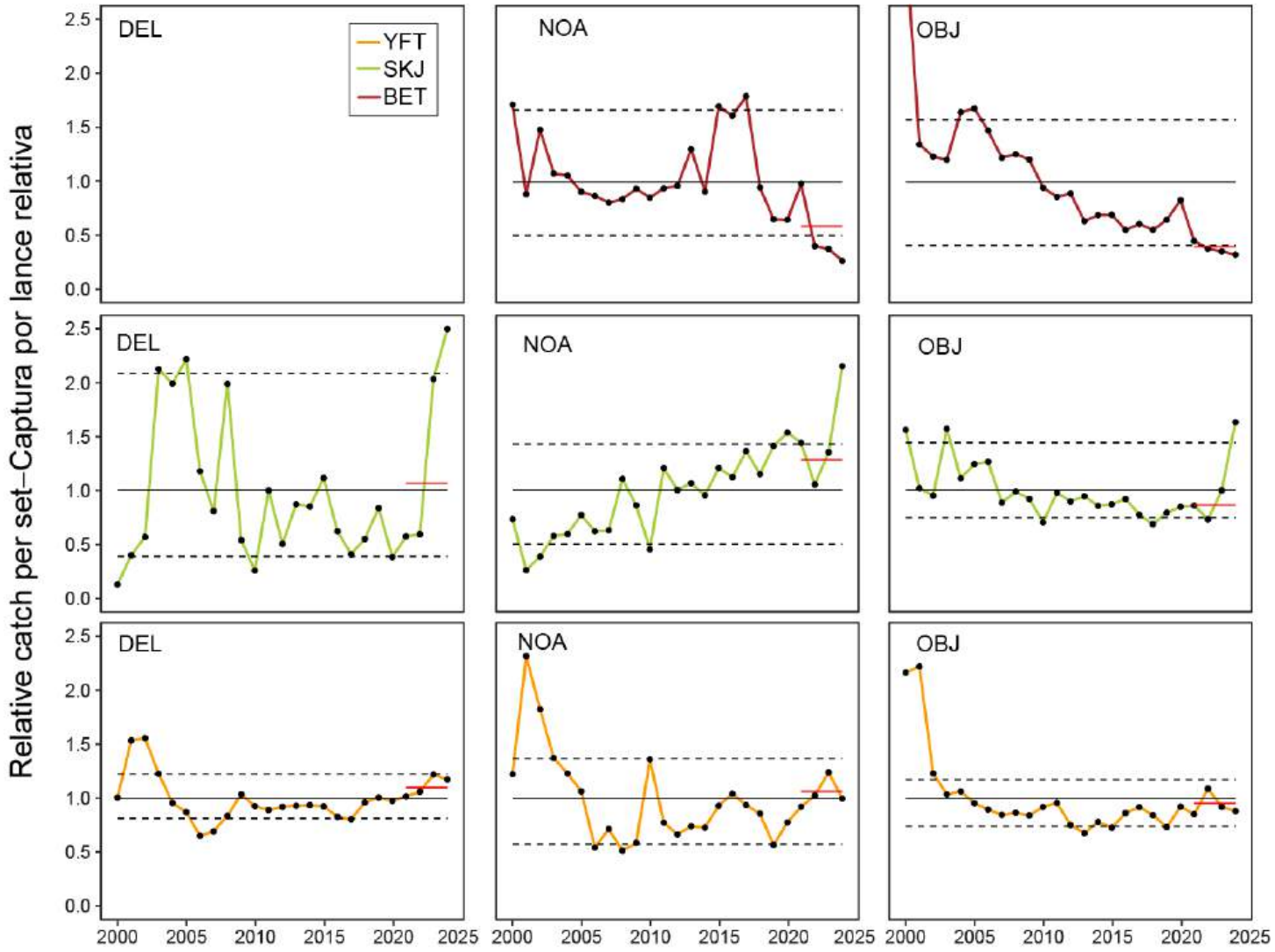
For the unassociated fishery in 2024:

- Skipjack catch also reached the highest level since 2000

For the dolphin-associated fishery in 2024:

- Yellowfin catch remained high and reduced slightly from 2023

Purse-seine: catch per set by species and set type



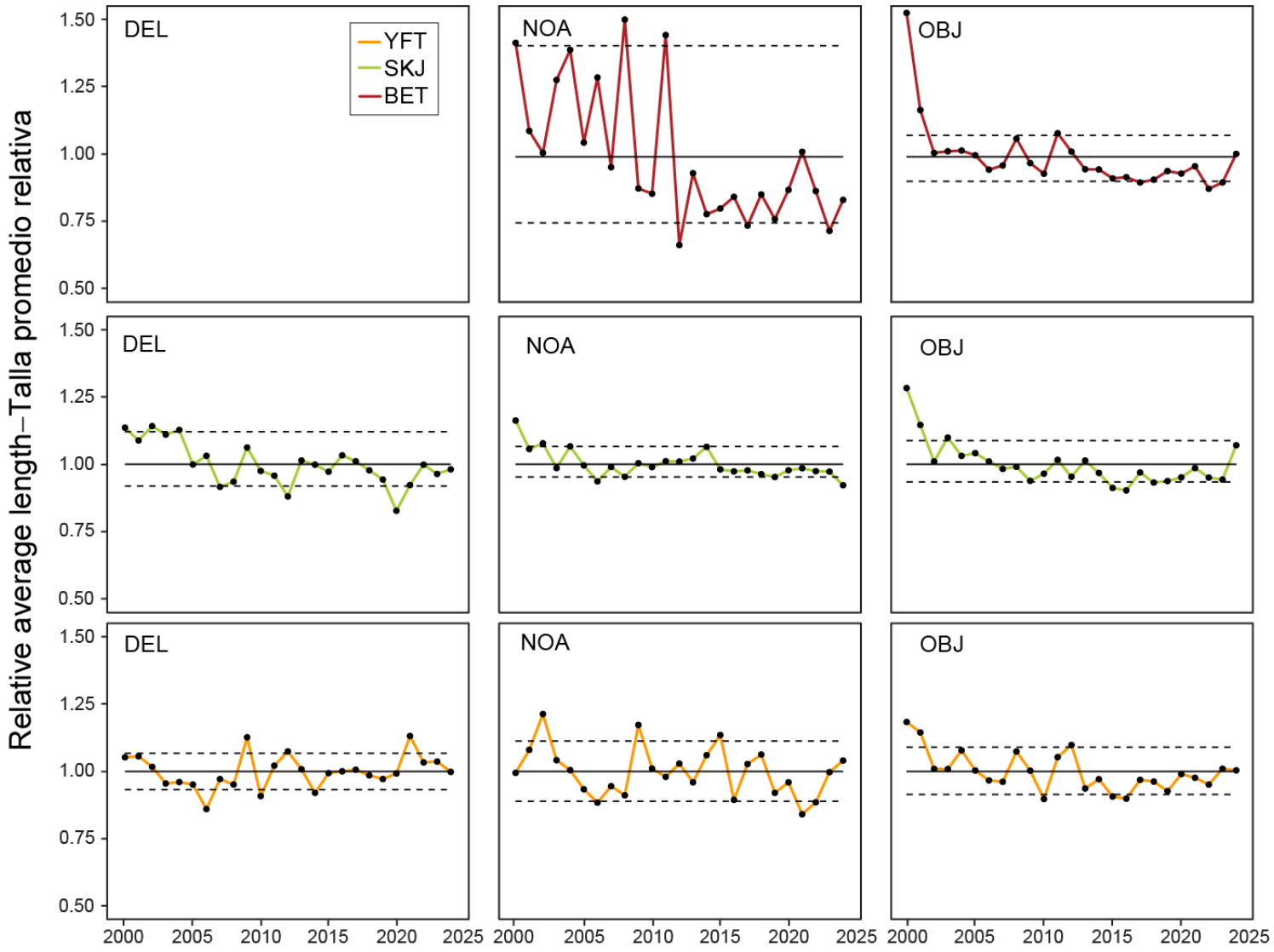
Yellowfin in OBJ: catch per set did not have an obvious trend since 2010

Skipjack in OBJ: catch per set did not have an obvious trend since 2010; the value for 2024 was the highest since 2000

Skipjack in NOA: catch per set continued to increase since 2000; the value for 2024 was the highest since 2000

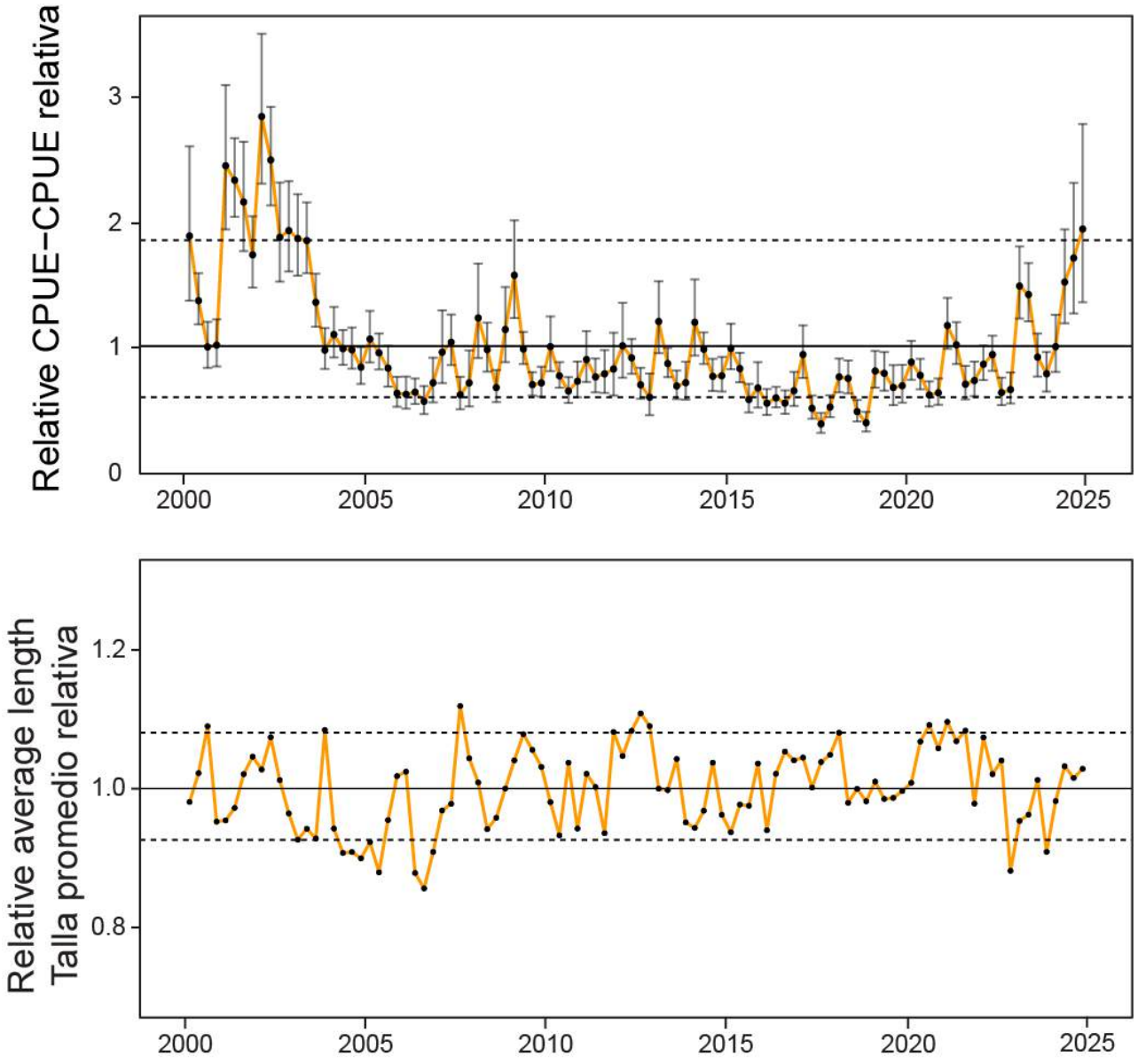
Bigeye in OBJ: catch per set continued to decline since 2010; the values for 2022-2024 continued to decline and were the lowest since 2000

Purse-seine: average length by species and set type



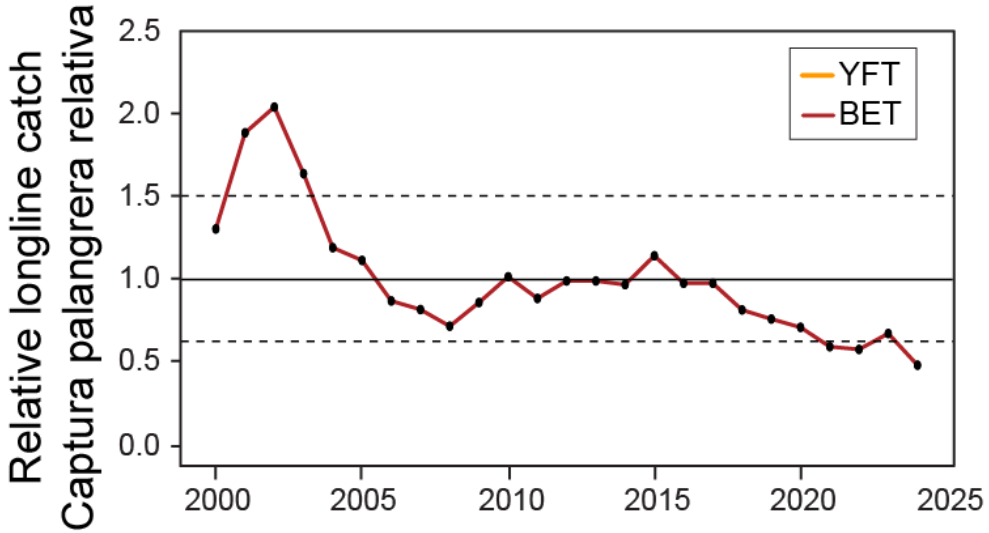
- The average length of all three tropical tunas in floating-object sets declined between 2000 and 2015 and remained relatively stable thereafter

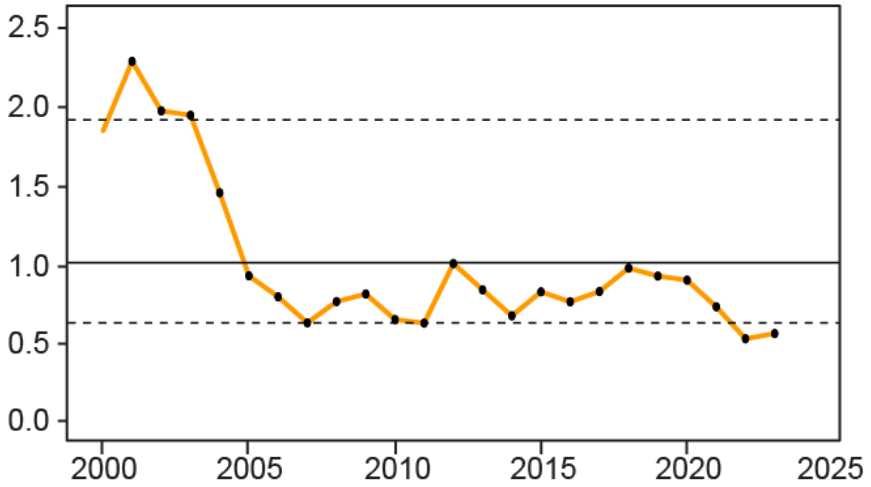
Standardized DEL CPUE and average length for yellowfin

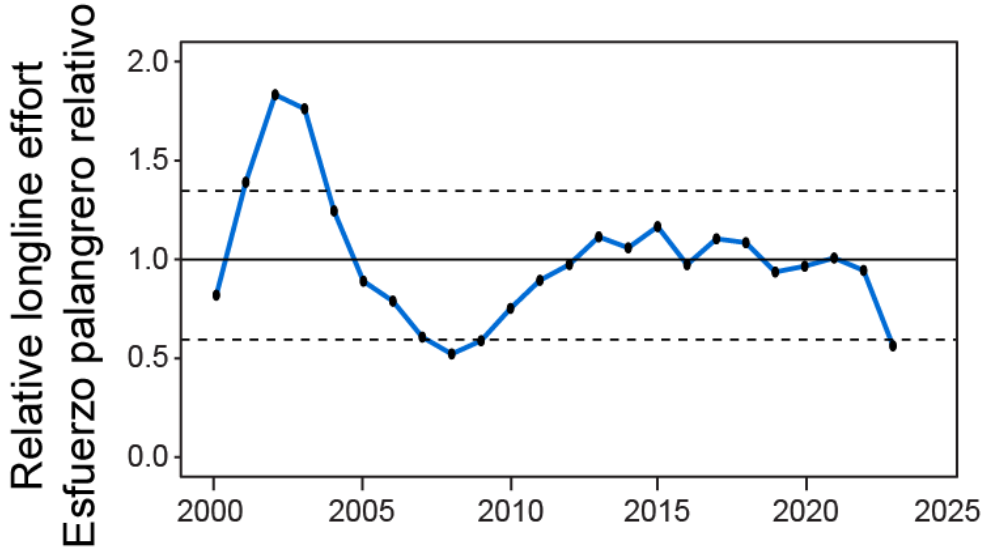


- The index of relative abundance for yellowfin in the dolphin-associated purse-seine fishery shows an increasing trend since 2018
- The average length of yellowfin in dolphin sets has been relatively stable since 2010 without an obvious trend

Longline (all CPCs): catch and effort







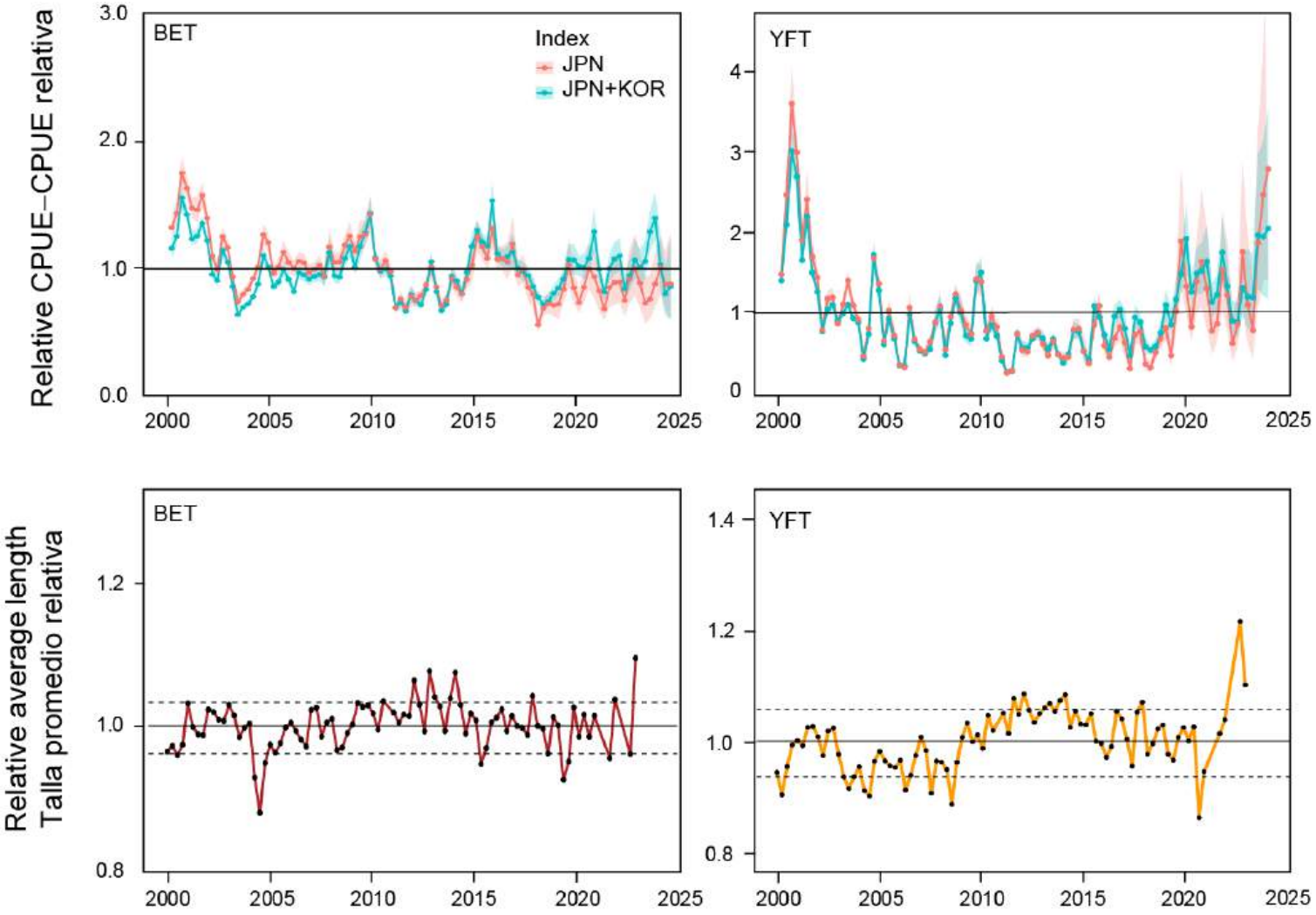
In the last decade (2014-2023):

- Longline effort decreased slightly
- Bigeye catch decreased greatly to about 60% of the average level since 2000
- The terminal values in this figure are considered preliminary and are likely underestimated

Standardized longline CPUE

- Thanks to Japan, China, Korea, and Chinese Taipei who provide the staff with high-quality CPUE data during the same period, a joint longline index of abundance has been developed for both bigeye and yellowfin in the EPO (SAC-16 INF-U)
- As this document focuses on developing a joint longline index of abundance for use in the benchmark assessment of yellowfin tuna, the joint index of abundance for bigeye is considered preliminary and requires further investigation.
- The chosen joint indices of abundance for bigeye and yellowfin in the EPO includes CPUE data from both Japan and Korea

Standardized longline CPUE

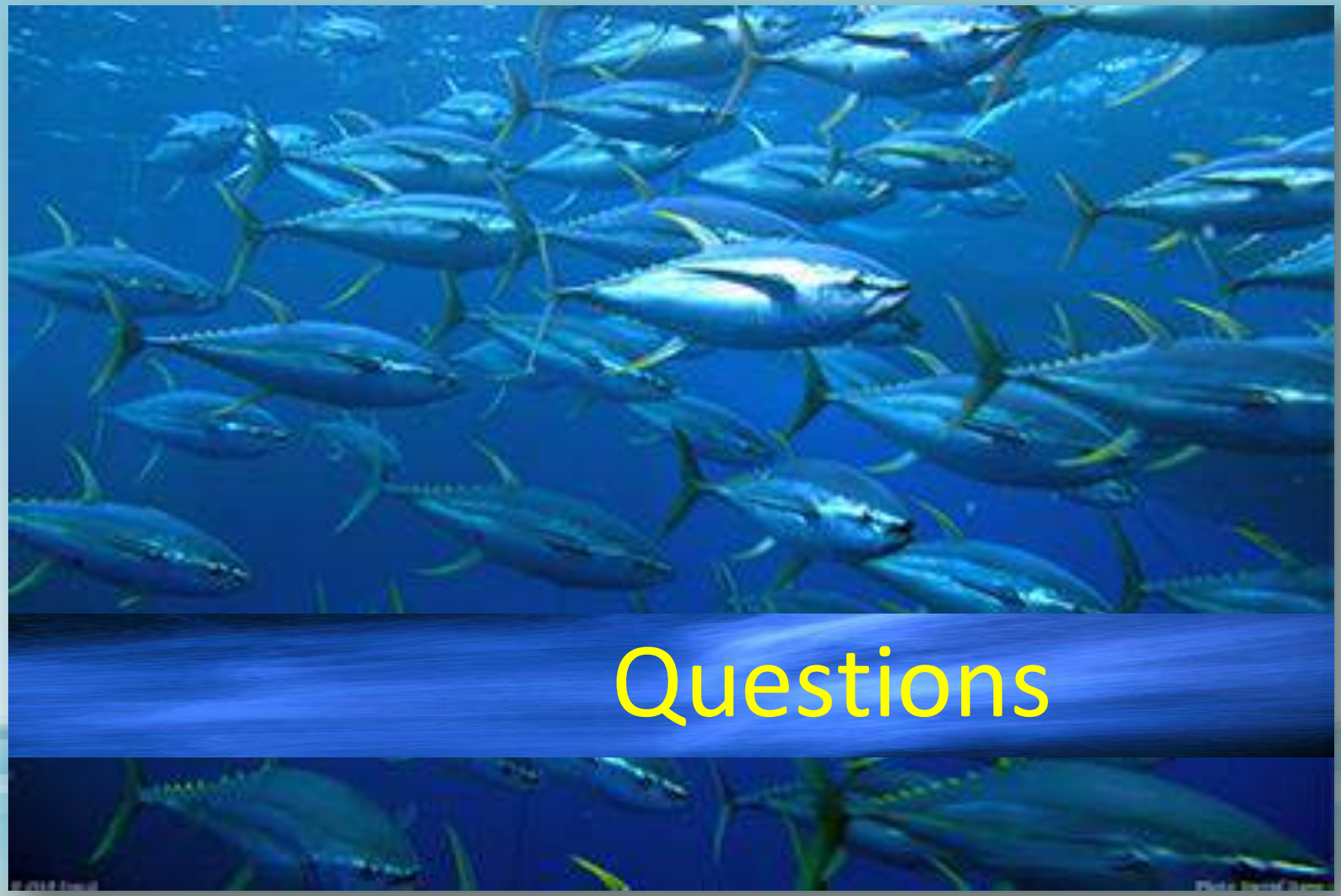


Yellowfin:

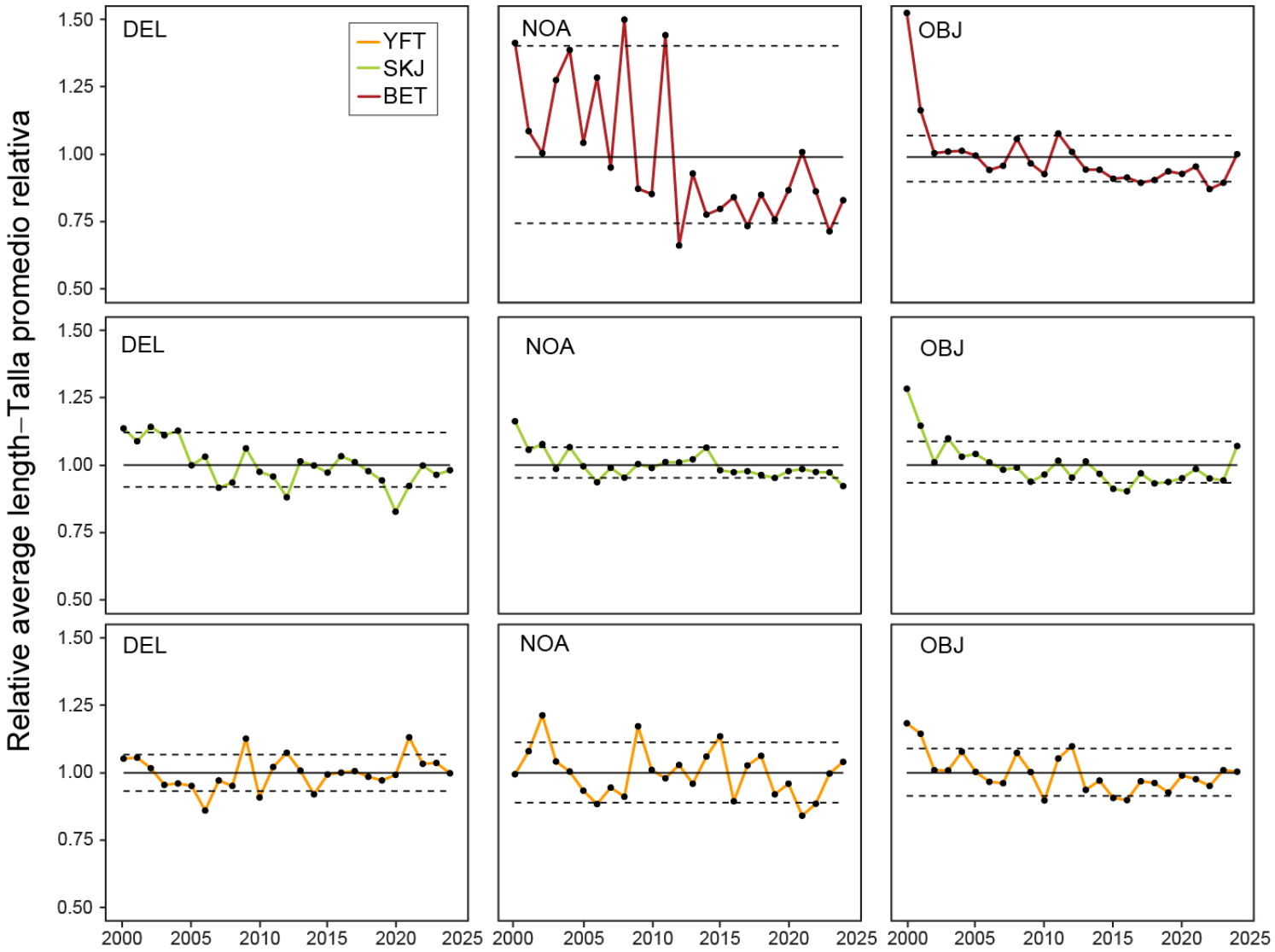
- The joint index is consistent with the Japanese index and has substantially lower uncertainty, indicating the joint index has higher precision.
- The joint index shows an increasing trend since 2018, which is consistent with the DEL index.

Bigeye:

- The preliminary joint index shows a notably different trend from the Japanese index, suggesting divergent catchability trends between the two fleets.
- The preliminary joint index shows a stable CPUE since 2020 without an obvious pattern.


Questions

Purse-seine: average length by species and set type



Hypotheses for high average bigeye length in 2024:

1. Fishing strategy (e.g., fishing location) for OBJ sets was significantly different due to high SKJ catch
2. Recruitment variations in 2022-2024