PERÚ Ministerio de la Producción

IMARPE
INSTITUTO DEL MAR DEL PERÚ

Lima, Peru | May 18 - 22, 2026

Jack Mackerel Benchmark Workshop (SCW16)

SPRFMO
South Pacific Regional Fisheries Management Organisation

Updated updated length-frequency data for the Peruvian jack mackerel stock (far-north stock) in Peruvian jurisdictional waters

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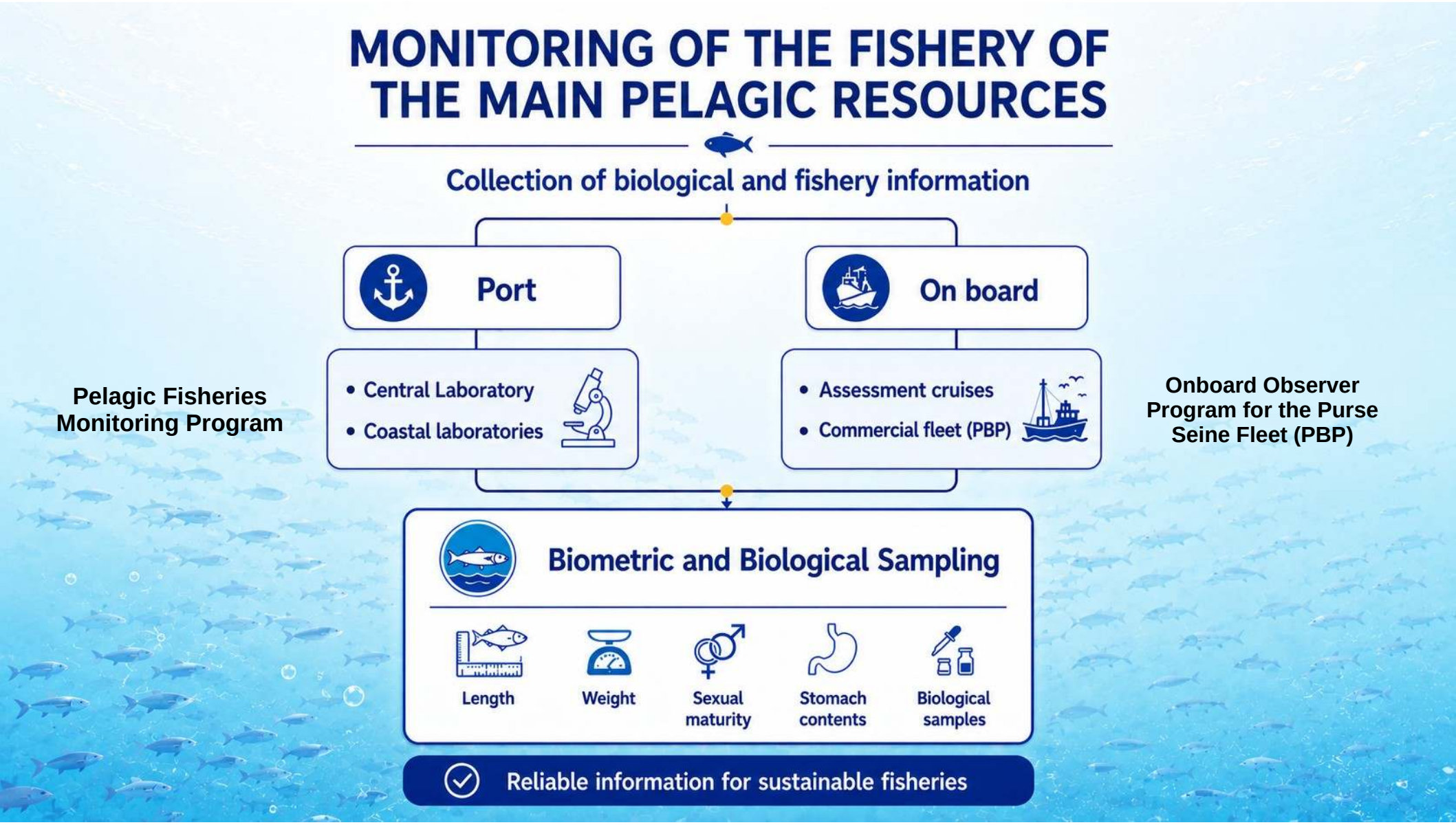
IMARPE

Introduction

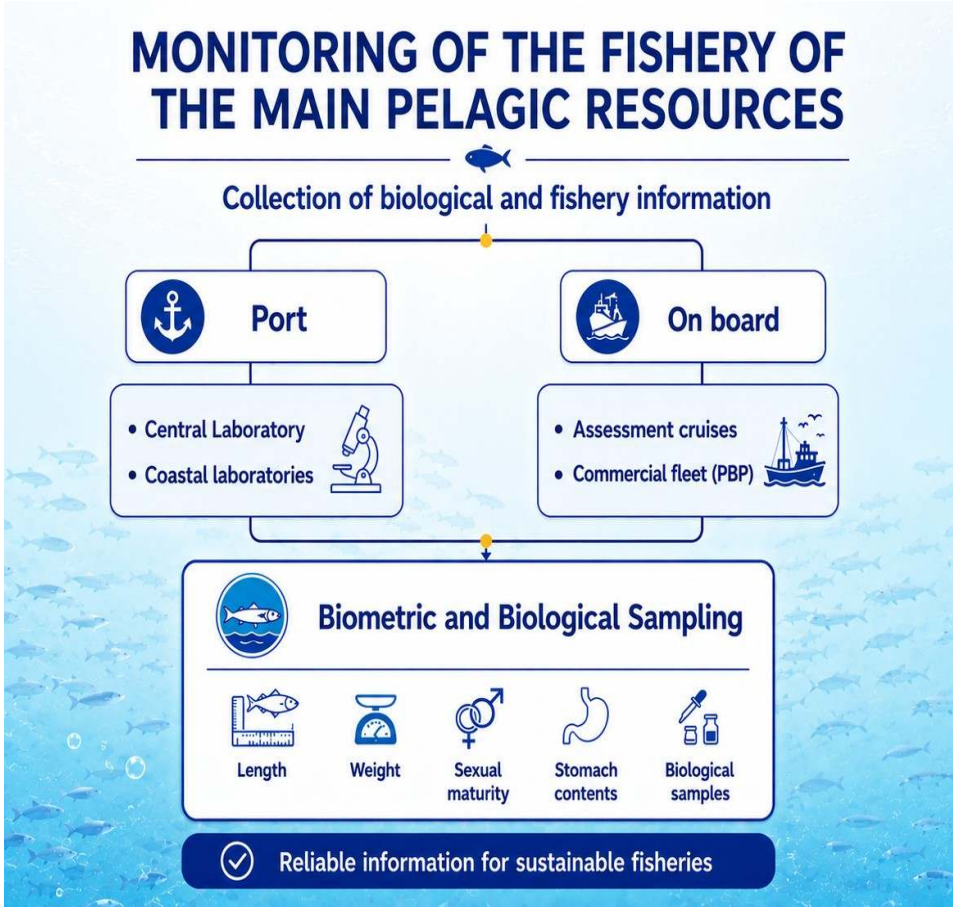


Pelagic Fisheries Monitoring Program

Onboard Observer Program for the Purse Seine Fleet (PBP)

Introduction

- IMARPE monitors Peru’s pelagic fisheries resources
- Historical data stored in IMARSIS (Scientific and Technological Information System of IMARPE)
- IMARPE has developed processes for reviewing, retrieving, integrating, and consolidating historical records from various sources and storage formats.



Objectives

OBJECTIVE 1

Describe the primary data sources used to generate the updated biometric database for the Peruvian jack mackerel stock (the far-north stock).

- Port sampling programs

- Commercial fishery records

- Historical biometric databases

OBJECTIVE 2

Present the weighting process applied to derive jack mackerel length-composition data from the updated information.

- Data standardization and quality control
- Stratification by area, fleet, and time period
- Sample weighting by catch proportions
- Construction of weighted length-frequency data

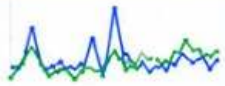
OBJECTIVE 3

Assess the impact of the updated information on stock assessment within Peruvian jurisdictional waters using the JJM model.

- Run scenarios: JJM model (baseline vs updated)

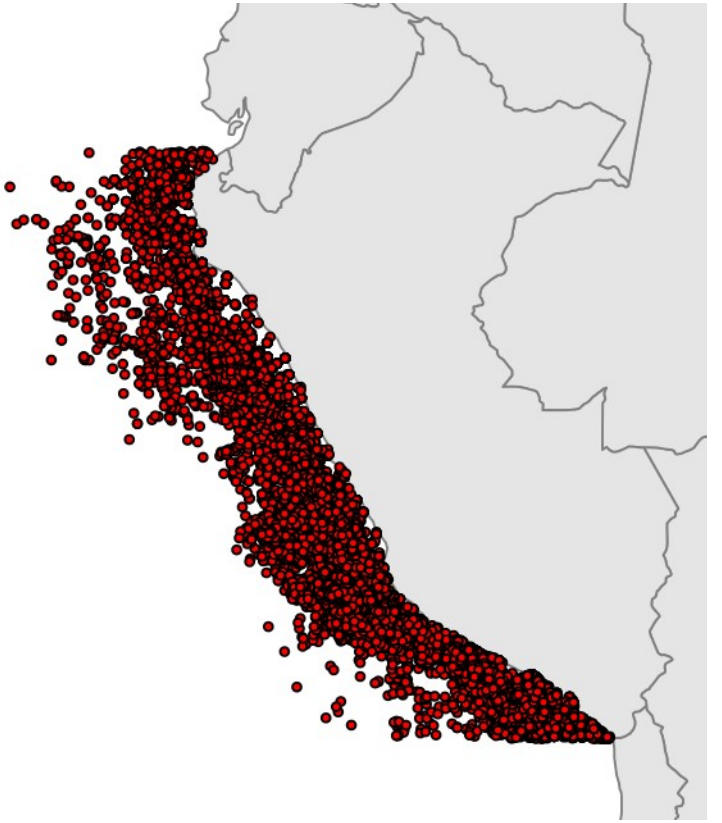
- Compare biomass estimates

- Evaluate recruitment patterns



- Implications for fishery management and recommendations

Materials and methods



1. Data sources:

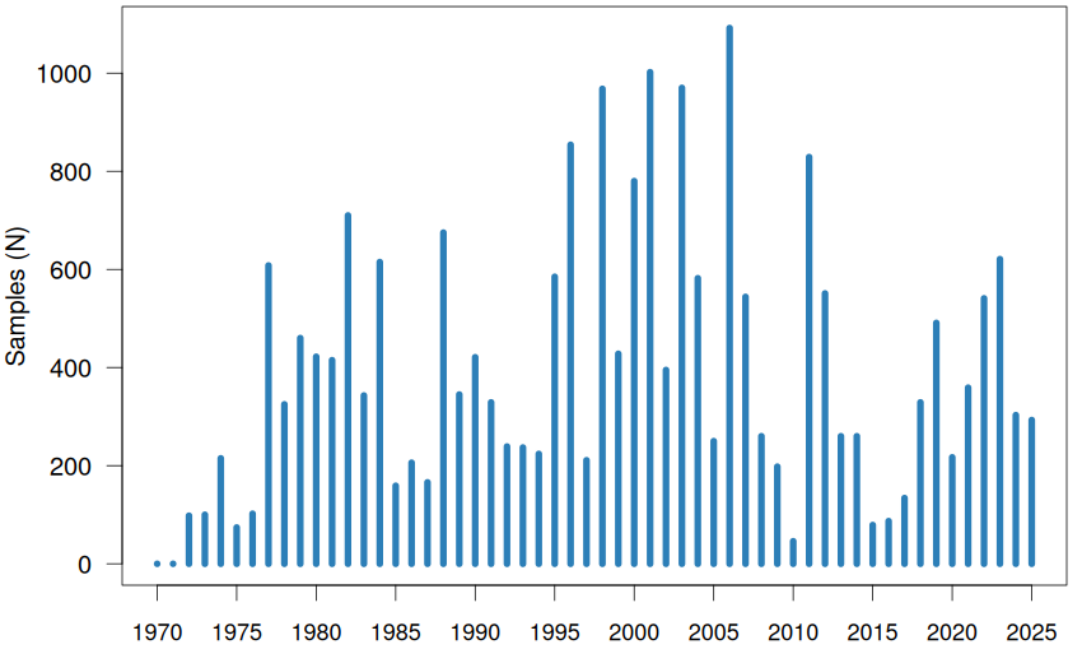
- Length-frequency database (IMARSIS)

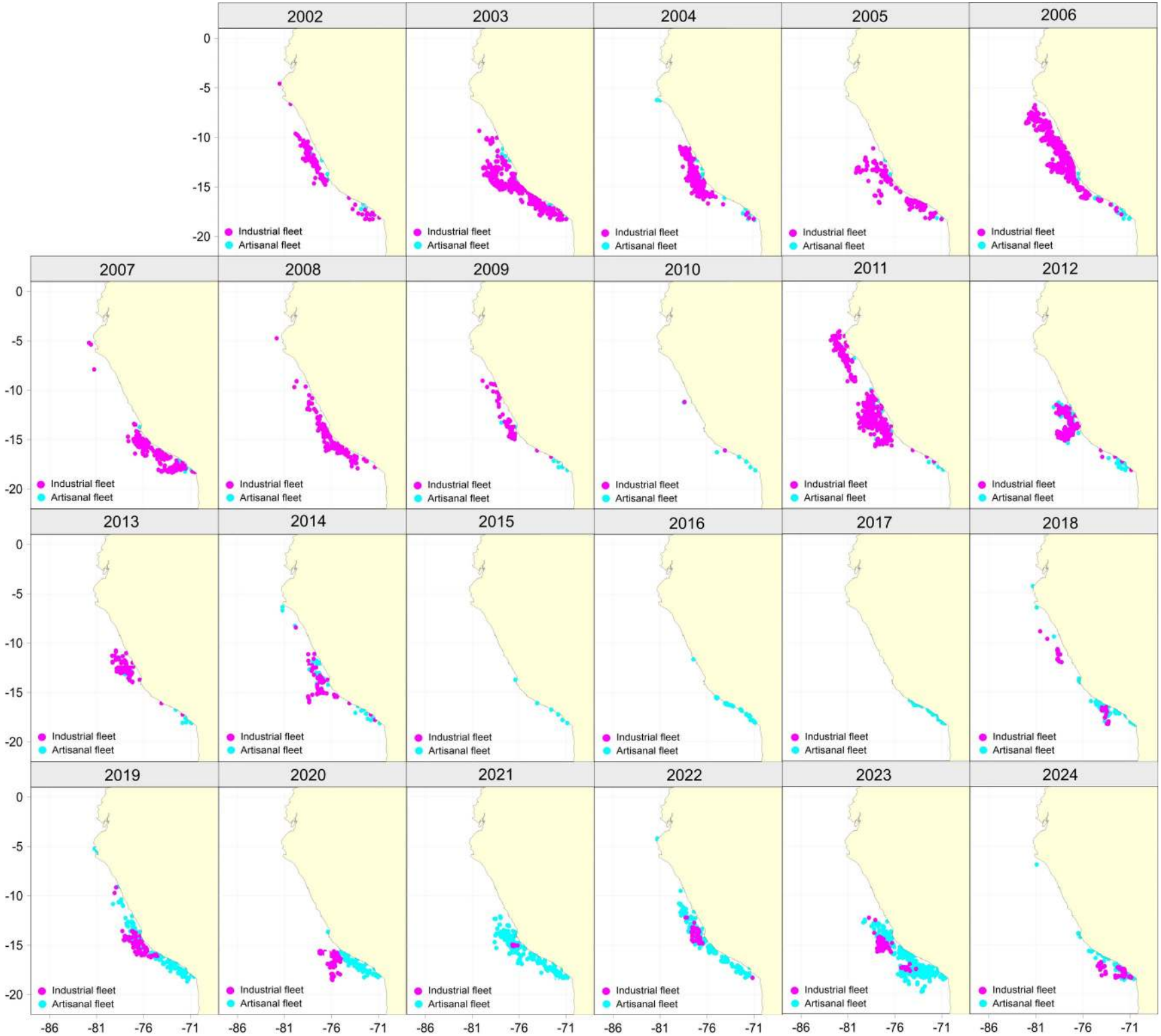
- Additional information obtained for a review, validation and retrieval of records.

- Period: 1972-2025

- Purse seine fleet (artisanal, small scale and industrial fleet)

N° 22 007 (sampling events)




2002
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2008
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2021
2022
2023
2024
Industrial fleet
Artisanal fleet
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-10
-15
-20
-86
-81
-76
-71

Materials and methods

2. Weighting procedure:

- W at the catch of fishing trip.

Monthly “a” and “b” (SCW16 – Doc13)

- W at the monthly landings by fleet

Two main vessel groups [hold capacity < 36.2 and hc >= 36.2]

Monthly landings: Pelagic Fisheries Monitoring Programme (IMARPE)

[1970 industrial landing & 1997 artisanal fleet]

- W at the annual landings

Statistical yearbooks of PRODUCE

Materials and methods

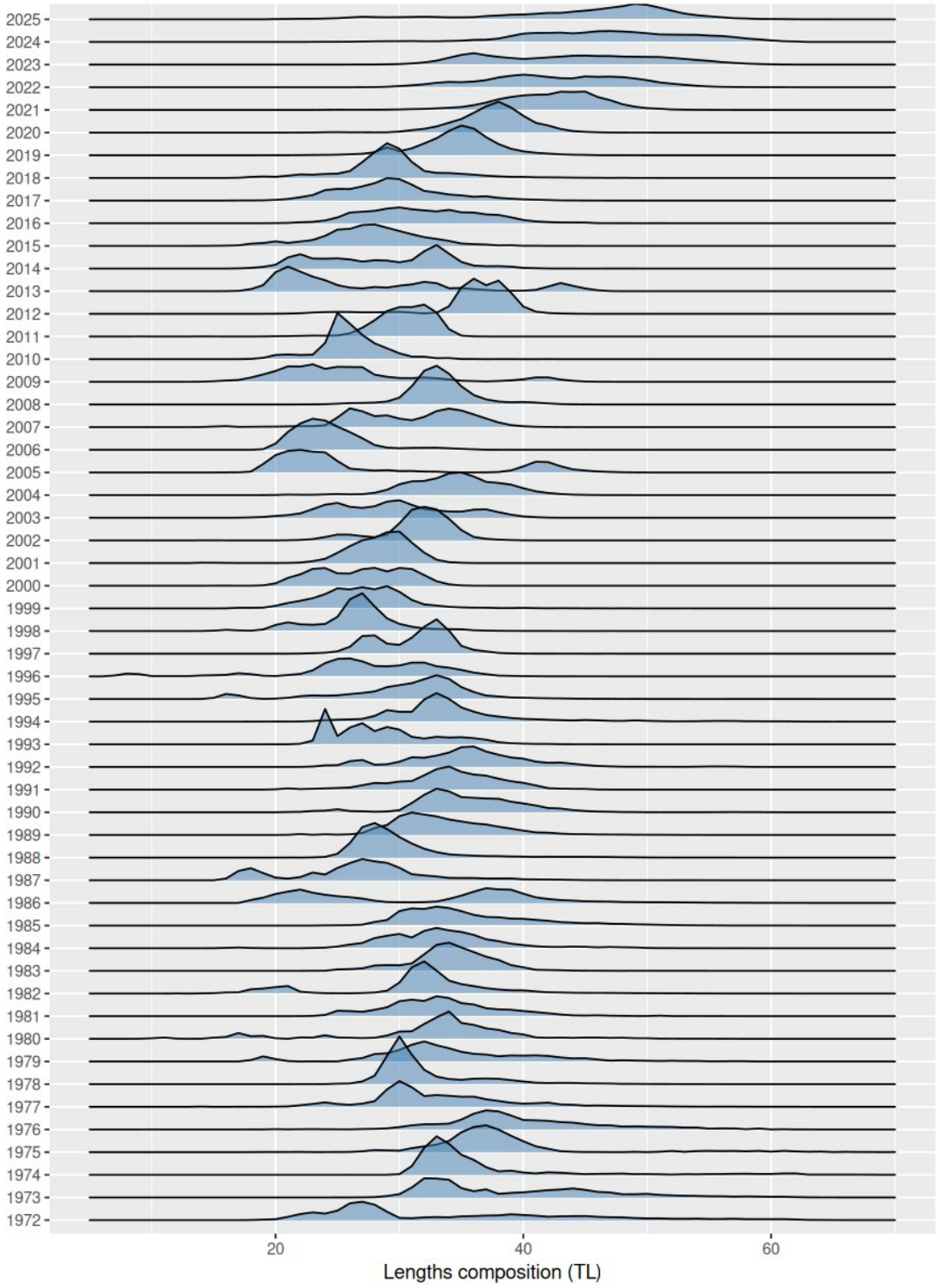
3. Use of the updated length-frequency data on the SA

Model	Description
Data update	
model 0.0	As 2025 assessment (information up to November 2025, catch-at-length data for 1980-2025, length bins 10-70, data and parameters on TL)
model 0.1	As in model 0.0 but with updated catch and catch at length (up to December 2025)
Effect of updated length-frequency	
mod 1.0	As model 0.1
mod 1.1	As model 1.0 but with the updated length composition data (catch-at-length data for 1972-2025, length bins 5-90, data and parameters on TL)
Comparison of metrics	
mod 2.0	As model 1.1
mod 2.1	As model 2.0 but using the metric of FL for configuration and data

$$TL_{cm} = 0.514 + 1.091\ FL_{cm}$$

(Cubillos and Arancibia 2005)

Results


2025
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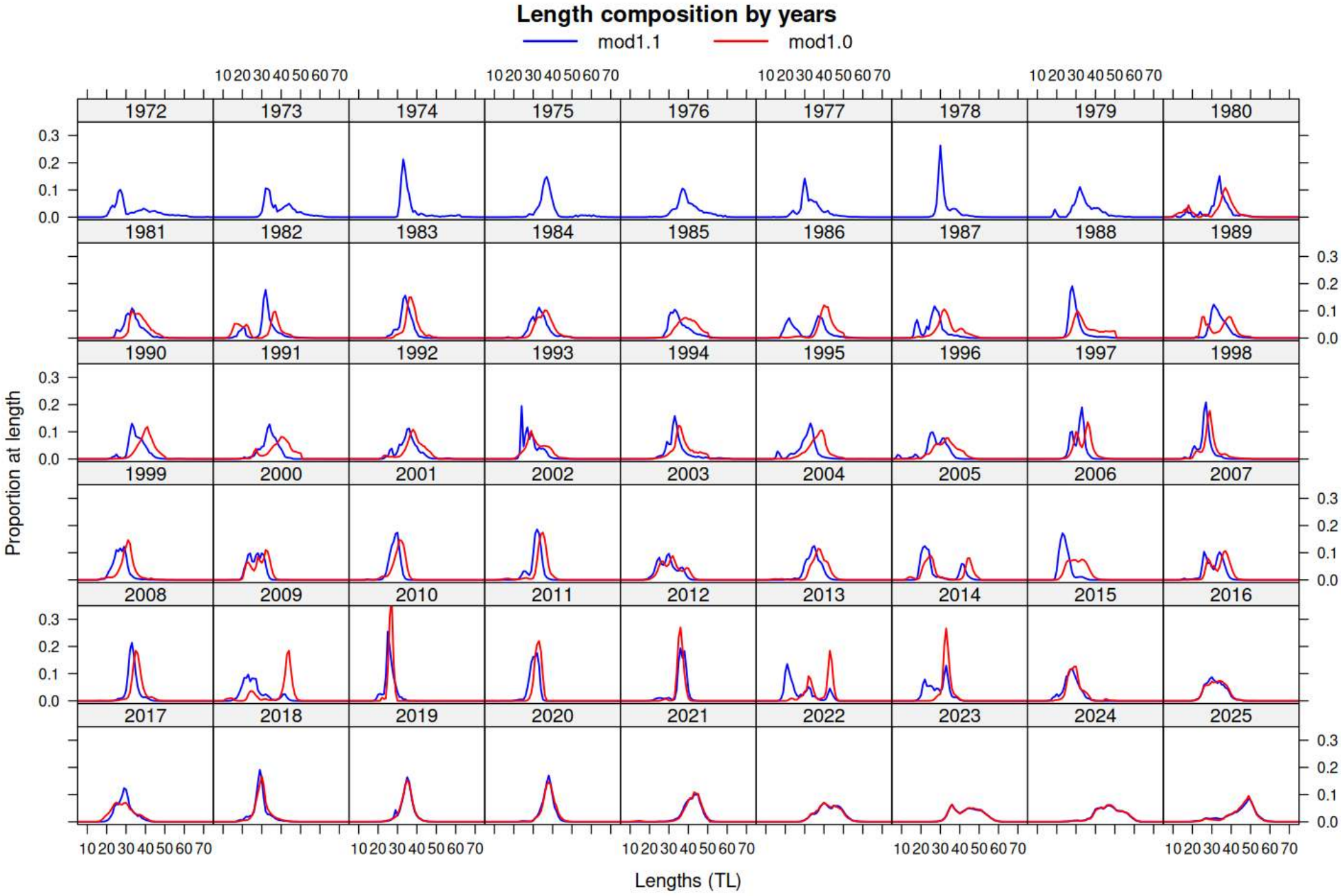
40
60
Lengths composition (TL)

Results


Length composition by years
mod1.1
mod1.0
Proportion at length
Lengths (TL)
1972
1973
1974
1975
1976
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1981
1982
1983
1984
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1986
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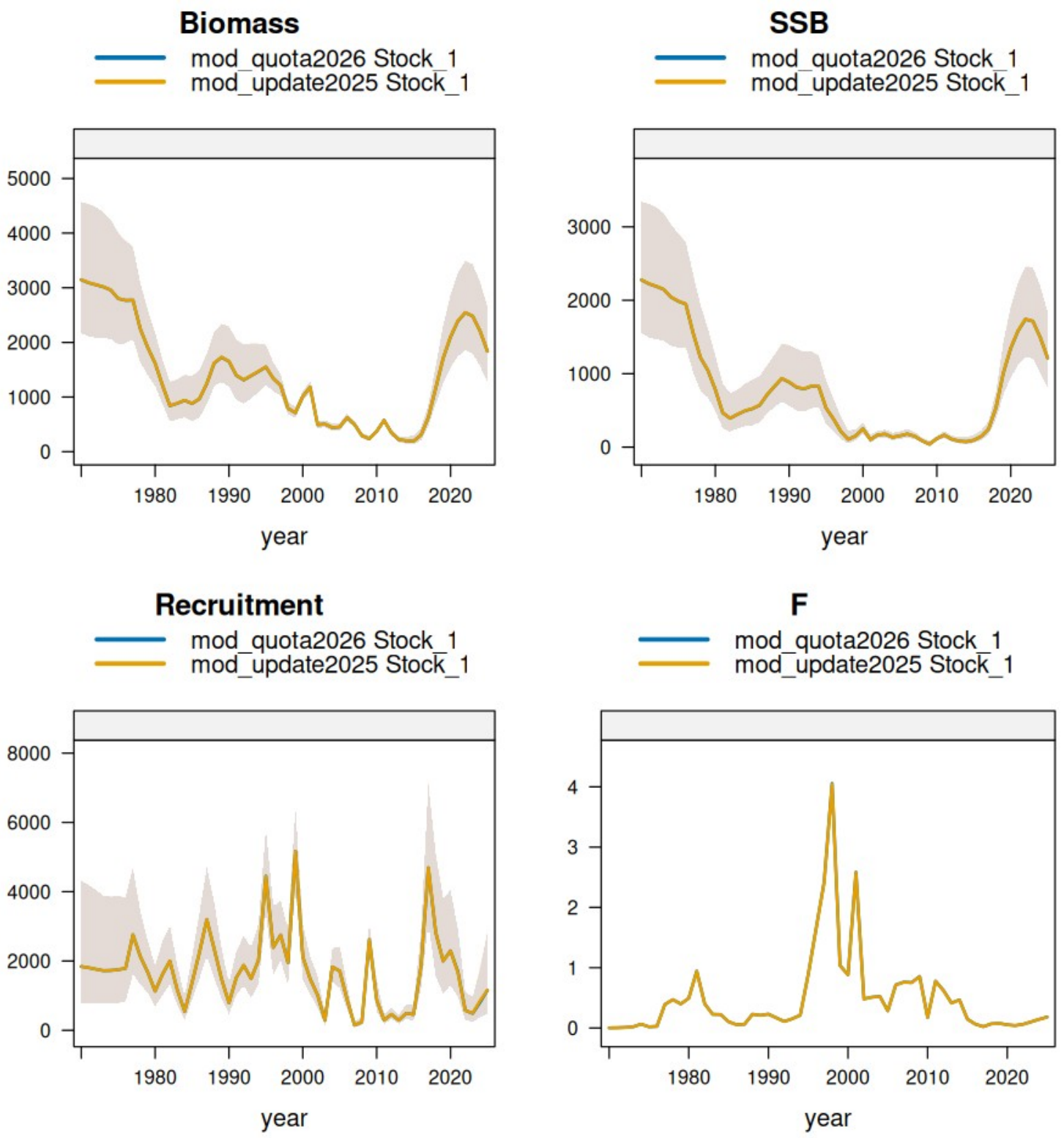
Biomass
mod_quota2026 Stock_1
mod_update2025 Stock_1
5000
4000
3000
2000
1000
0
1980
1990
2000
2010
2020
year
SSB
mod_quota2026 Stock_1
mod_update2025 Stock_1
3000
2000
1000
0
1980
1990
2000
2010
2020
year
Recruitment
mod_quota2026 Stock_1
mod_update2025 Stock_1
8000
6000
4000
2000
0
1980
1990
2000
2010
2020
year
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mod_quota2026 Stock_1
mod_update2025 Stock_1
4
3
2
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0
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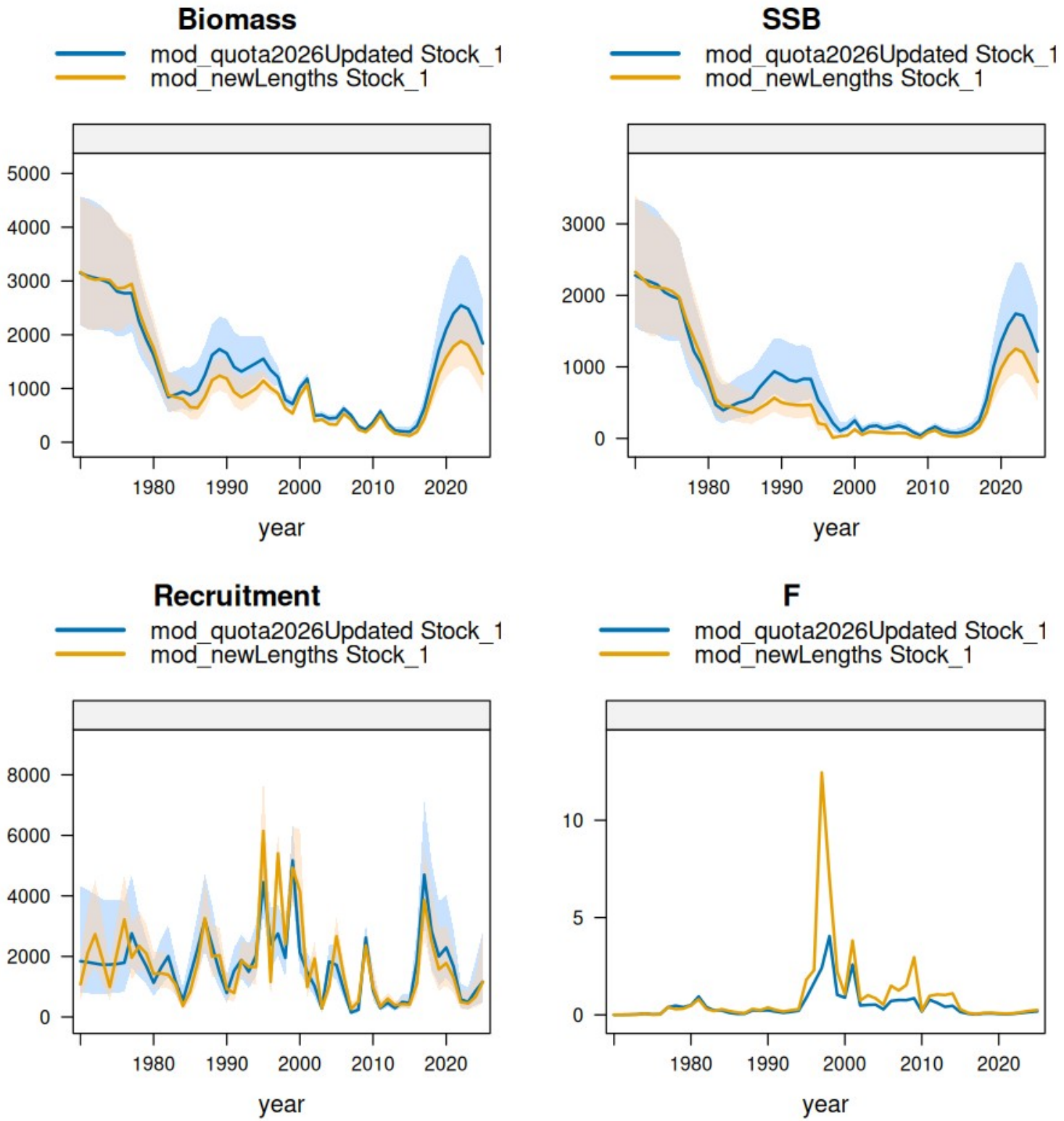
2000
2010
2020
year


Biomass
mod_quota2026Updated Stock_1
mod_newLengths Stock_1
5000
4000
3000
2000
1000
0
1980
1990
2000
2010
2020
year
SSB
mod_quota2026Updated Stock_1
mod_newLengths Stock_1
3000
2000
1000
0
1980
1990
2000
2010
2020
year
Recruitment
mod_quota2026Updated Stock_1
mod_newLengths Stock_1
8000
6000
4000
2000
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year
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mod_quota2026Updated Stock_1
mod_newLengths Stock_1
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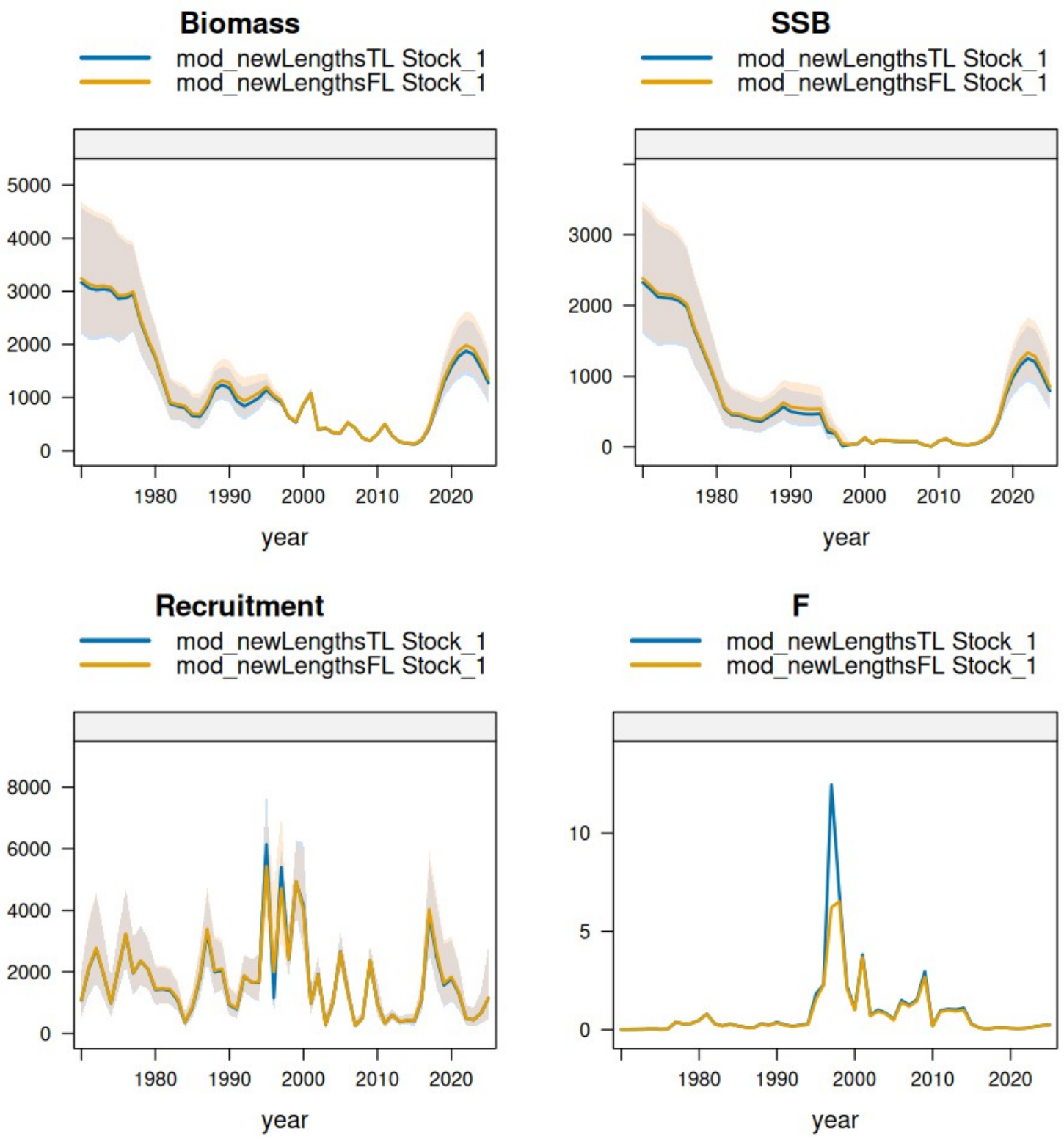
2020
year


Biomass
mod_newLengthsTL Stock_1
mod_newLengthsFL Stock_1
5000
4000
3000
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2020
year
SSB
mod_newLengthsTL Stock_1
mod_newLengthsFL Stock_1
3000
2000
1000
0
1980
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year
Recruitment
mod_newLengthsTL Stock_1
mod_newLengthsFL Stock_1
8000
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2020
year
F
mod_newLengthsTL Stock_1
mod_newLengthsFL Stock_1
10
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0
1980
1990
2000
2010
2020
year

Likelihoods

	mod0.0	mod0.1	mod1.0	mod1.1	mod2.0	mod2.1
catch_like	0.93	0.93	0.93	1.99	1.99	2.13
age_like_fsh	0	0	0	0	0	0
length_like_fsh	452.32	451.74	451.74	514.38	514.38	500.69
sel_like_fsh	11.6	11.6	11.6	17.04	17.04	16.12
ind_like	58.07	58.09	58.09	73.95	73.95	76.38
age_like_ind	0	0	0	0	0	0
length_like_ind	0	0	0	0	0	0
sel_like_ind	0	0	0	0	0	0
rec_like	26.75	26.56	26.56	30.33	30.33	28.36
fpen	0.06	0.06	0.06	0.35	0.35	0.17
post_priors_indq	0.04	0.04	0.04	0.06	0.06	0.05
post_priors	0	0	0	0	0	0
residual	0.17	0.17	0.17	0.13	0.13	0.13
total	549.96	549.2	549.2	638.22	638.22	624.02

Concluding remarks:

- This work presents the progress made in retrieving and reviewing jack mackerel data, with ongoing validation efforts aimed at improving data consistency and supporting the use of the best available scientific information.

- The new standardized length-frequency database extended the time series and improved data consistency.

- Lower population indicator estimates (B and SSB for the current period), although the apparent overestimation of fishing mortality (F) when using FL instead of TL still requires further investigation.

- We recommend using total length (TL) as the official metric for jack mackerel assessments in the SPRFMO far-north fleet to ensure consistency with Peru's original size data and growth estimates, thereby reducing potential biases from metric conversions.

Acknowledgements:

IMARPE staff, Humboldt Tipping Point Phase2 project

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