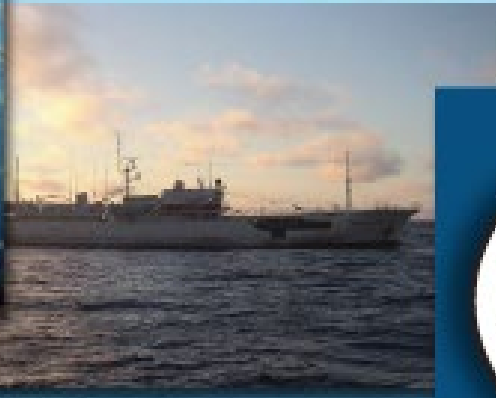


Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission



UPDATE ASSESSMENT OF YELLOWFIN TUNA IN THE EASTERN PACIFIC OCEAN
Carolina V. Minte-Vera, Haikun Xu, Mark N. Maunder, and Alexandre Aires-da-Silva

Outline

- Fishery data (new and updated)
- Update assessment: base case model and sensitivity model
 - Model assumptions
 - Results
- Issues
- Conclusions

Fishery data (new or updated)

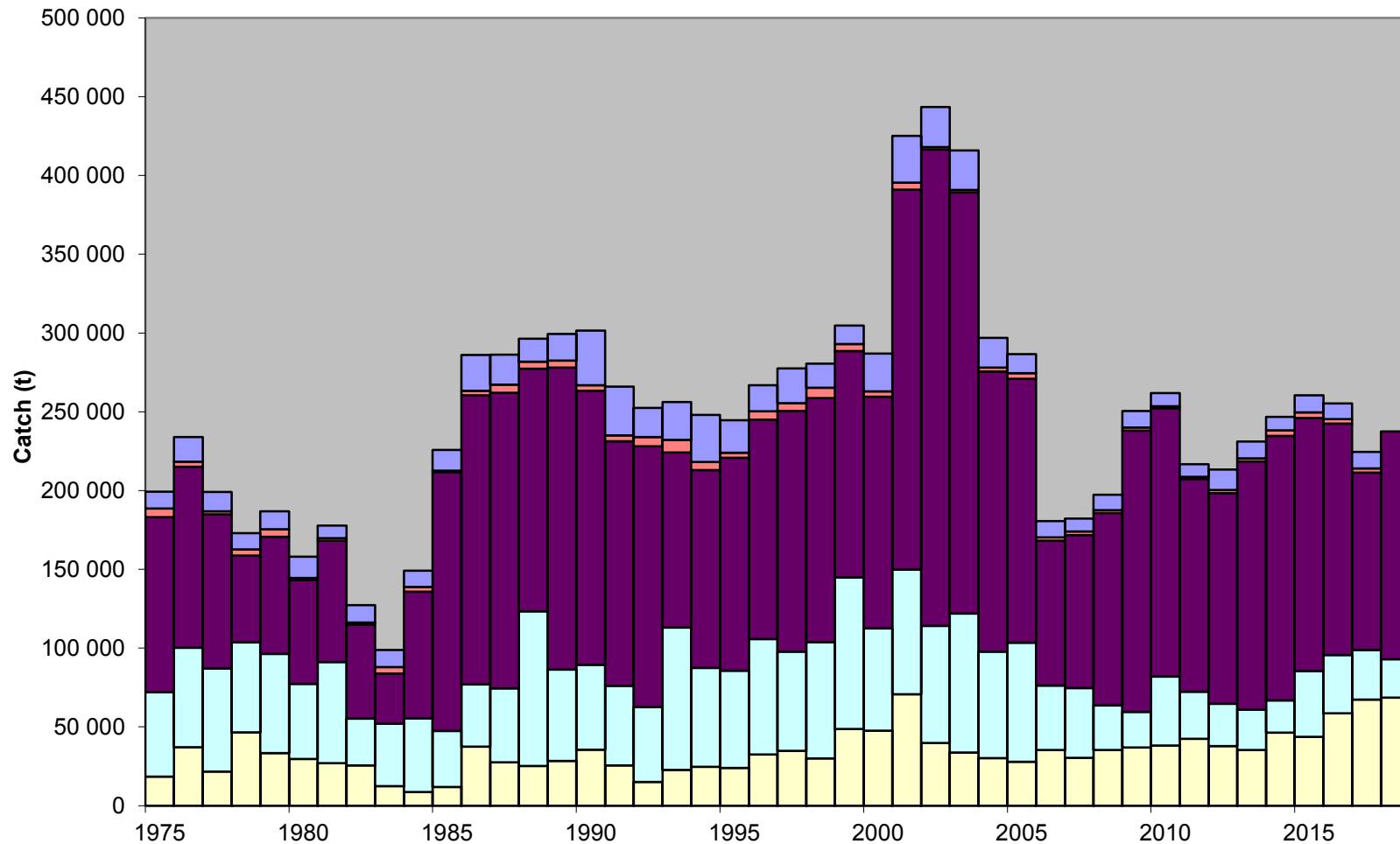
Surface fisheries

- Only purse-seine activity (no bait boat catches registered in 2018)
- **Catch, CPUE** and **size-frequency** data updated to include new data for 2018 and revised data for 2017

Longline fisheries

- **Catch data:**
 - China (2017)
 - Chinese Taipei (2015-2017)
 - French Polynesia (2017)
 - Japan (2017, 2018)
 - Korea (2017)
 - United States (2009,2017)
 - Vanuatu (2017)
 - other nations (2016-2017)
- Commercial **size-frequency**: Japan (2011-2017)
- **CPUE** (1 by 1 month with hooks-between-floats information): Japan (2017-2018)

Total catches



2018

- Longline catches \simeq 4% of total
- Purse-seine catches \simeq 240,000 t :
 - 60% DEL (↑ ~ 30% 2017)
 - 10% NOA (↓)
 - 30% OBJ (=)

Update assessment: model assumptions

Same model as in SAC7, SAC8 and SAC9:

- **Platform:** Stock Synthesis Version 3.23b
- **Stock structure:** One stock is assumed for the whole EPO
- **Fishery definitions:** 16 fisheries based on gear and area of operation
- **Growth:** Richards curve with fixed parameters
- **Natural mortality:** sex-specific
- **Selectivity:** logistic selectivity for LL-S and DEL-S, and dome-shaped for others
- **Stock-recruitment function:** Beverton-Holt function with steepness $h=1.0$ (base-case model) and $h=0.75$ (sensitivity)
- **Data-weighting:** LL-S is the main index of abundance ($CV=0.2$), extra variability estimated for the other 4 purse-seine indices, length-composition data with $\lambda=1$

Results

Stock Synthesis input and out files for the base case model available at

https://www.iattc.org/StockAssessments/2019/YFTWebsite/SS_output.html

[Home](#) [Bin](#) [Sel](#) [Timeseries](#) [RecDev](#) [S-R](#) [Catch](#) [SPR](#) [Index](#) [Numbers](#) [CompDat](#) [LenComp](#) [A@LComp](#) [Yield](#) [Data](#)
[DiagnosticTables](#)

EPO Yellowfin Tuna 2019 Base Case Assessment

The assessment was conducted using [Stock Synthesis](#) (SS). These web pages provide information created automatically by the [R4SS](#) program. They also provide the SS output files and files used to run the stock assessment. The information contained in these web pages and files, or any content derived from them, should not be publically redistributed without the permission of the IATTC.

[IATTC yellowfin tuna stock assessment document](#)

[The SS output is also available as a pdf](#)

[SS model files in zip archive](#)

[SS output files in zip archive](#)

Home

SS version: SS-V3.23b-safe-win64;_11/05/2011;_Stock_Synthesis_by_Richard_Methot_(NOAA)
_using_ADMB_10

r4ss info:

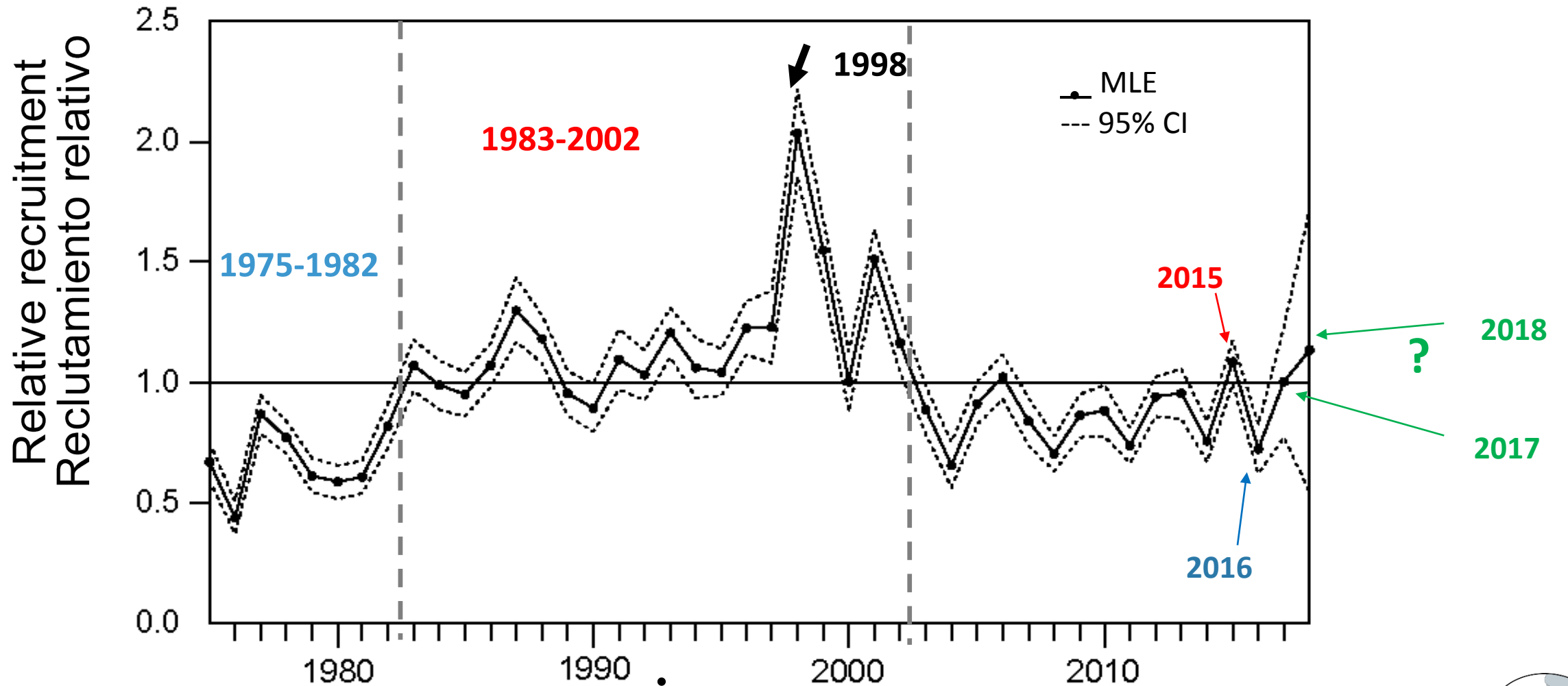
Version: 1.34.1
Date: 2019-04-01
Built: R 3.5.1; ; 2019-04-10 18:35:58 UTC; windows
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RemoteHost: https://api.github.com
RemoteRepo: r4ss
RemoteUsername: r4ss
RemoteRef: development
RemoteSha: a374d8eddcfe2aff3d9f98363f8530b690e11917

Starting time of model: Mon Apr 15 15:02:59 2019

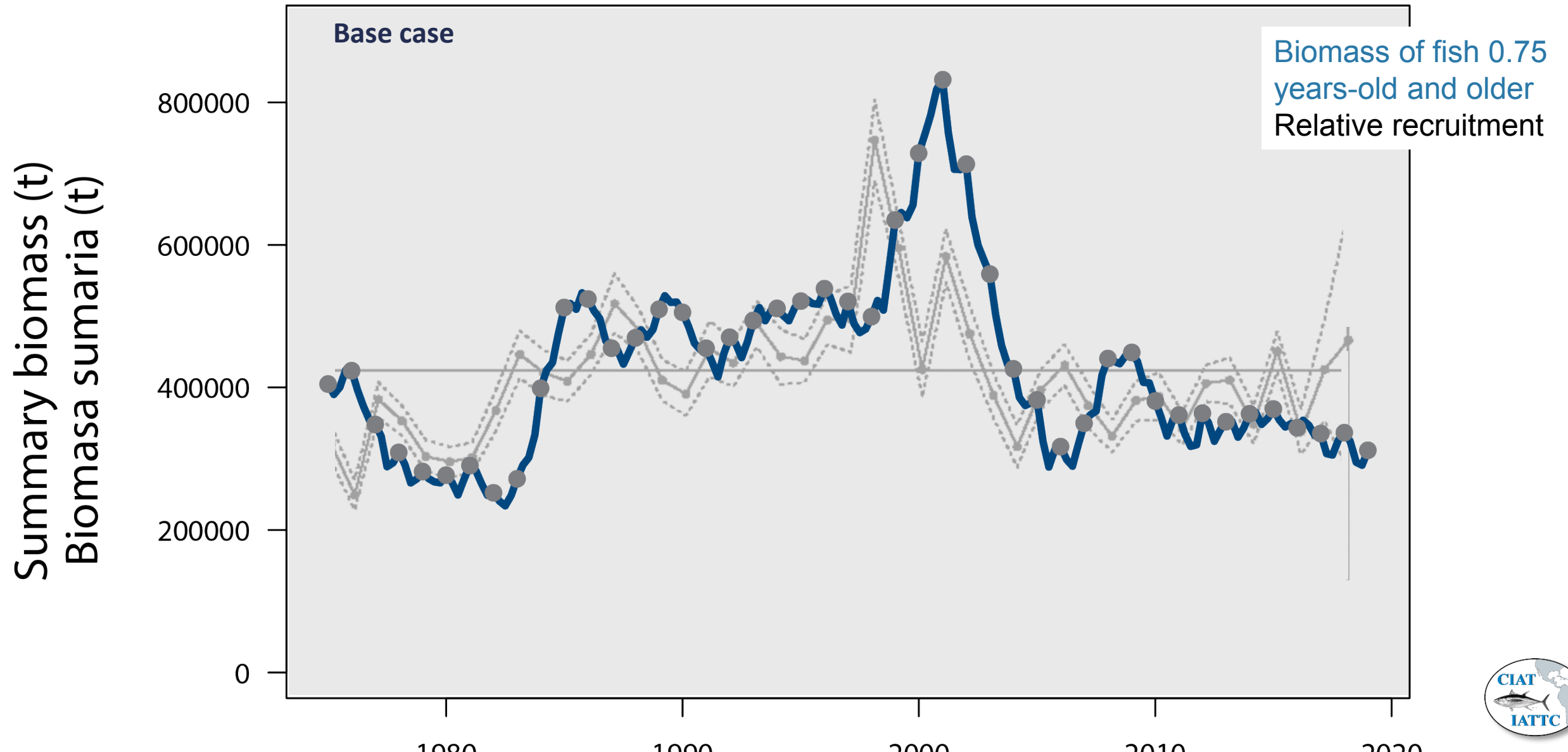


Annual recruitment

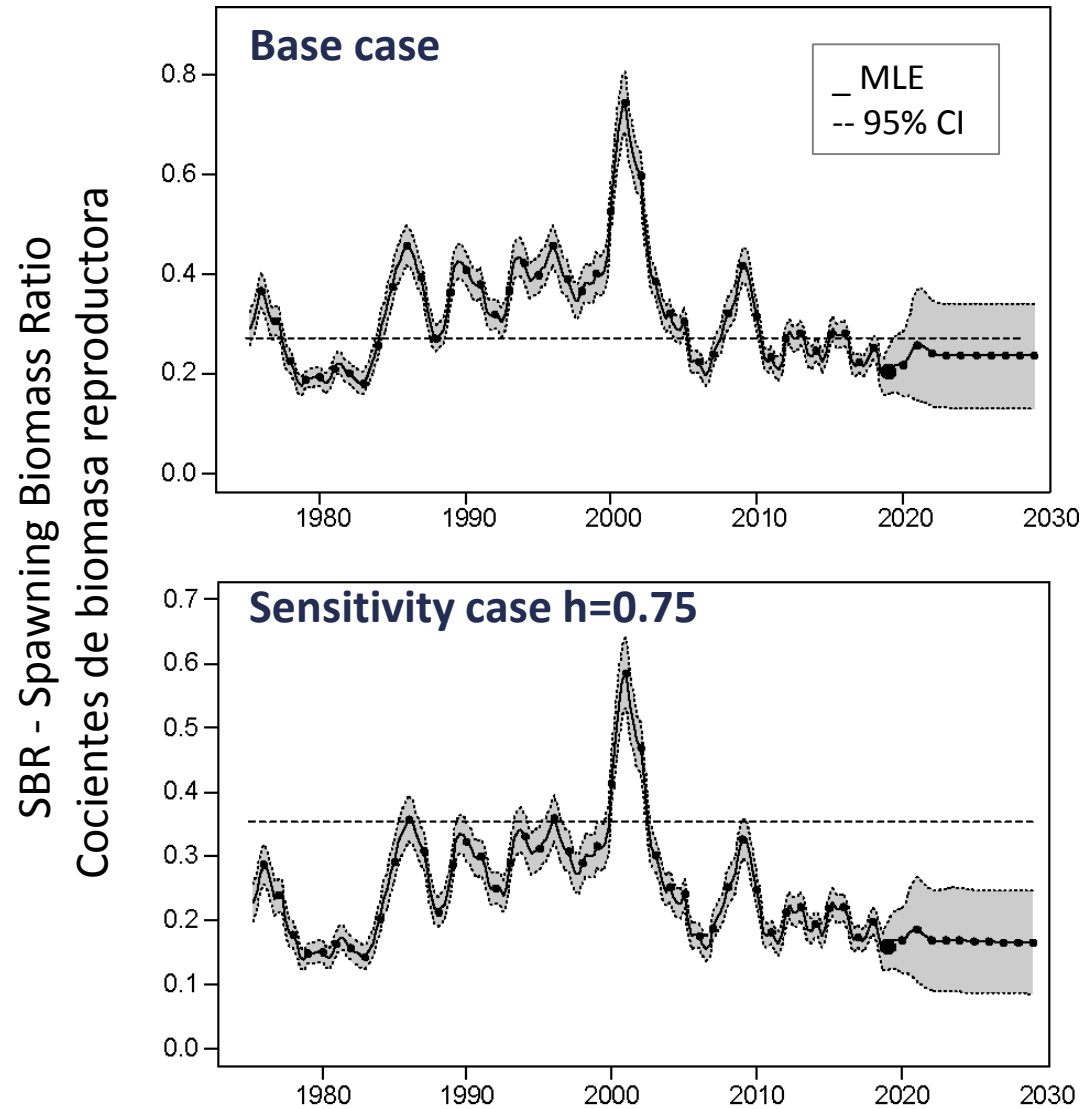
Base case



Summary biomass

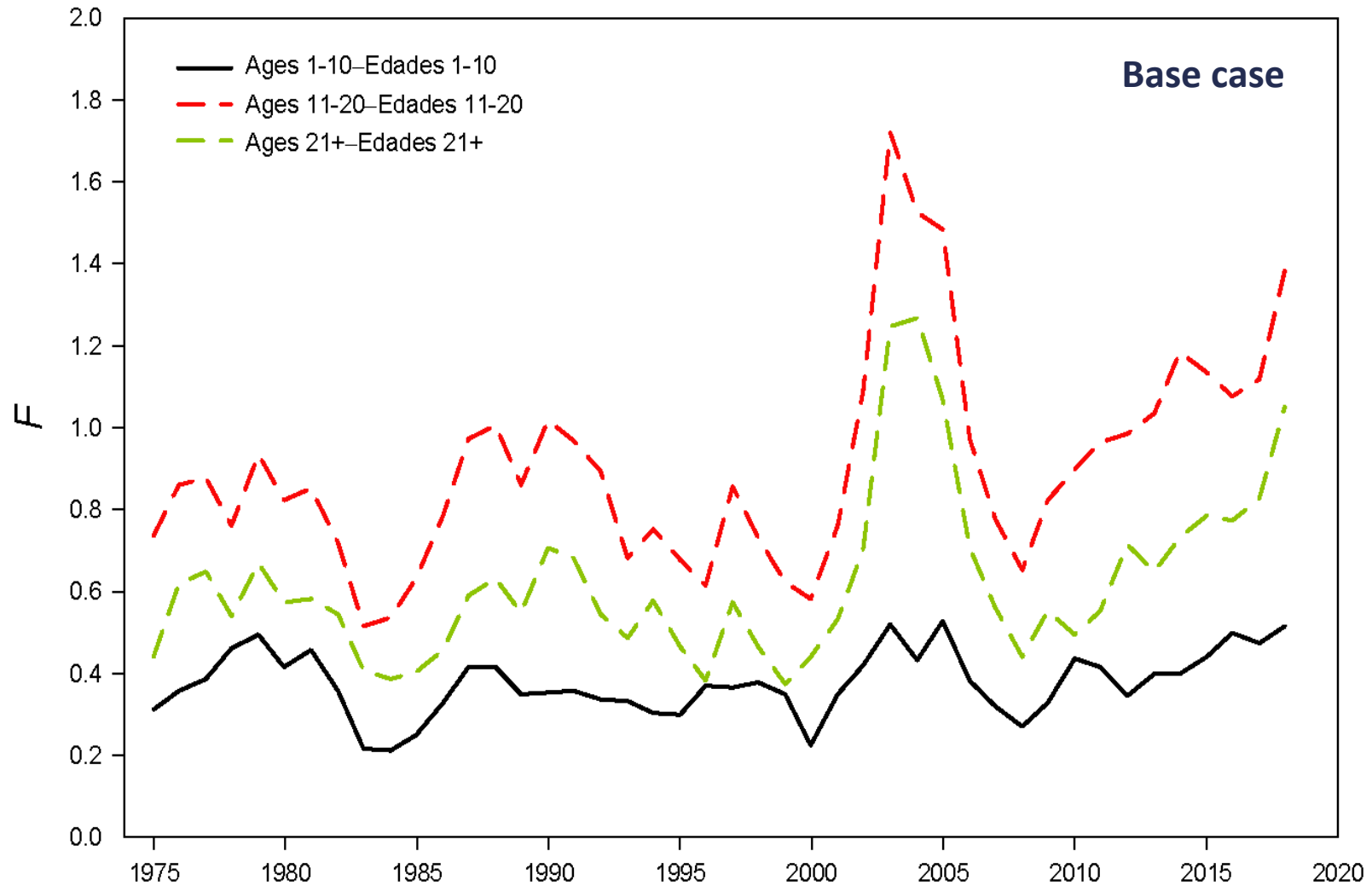


Spawning biomass

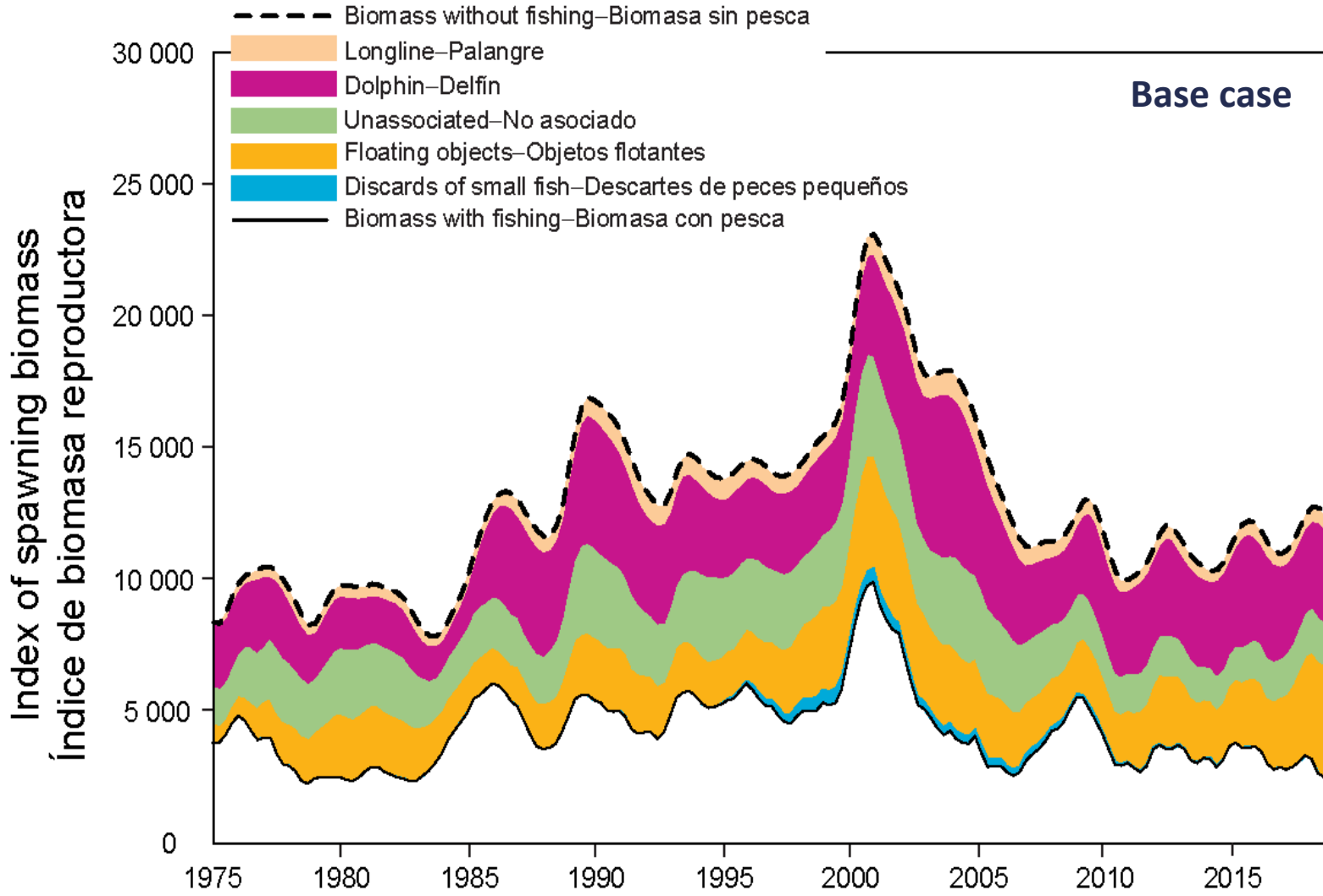


Spawning biomass ratio (SBR):
current spawning biomass /
unfished spawning biomass

Fishing mortality



Fisheries impact



Average impact during 2018:

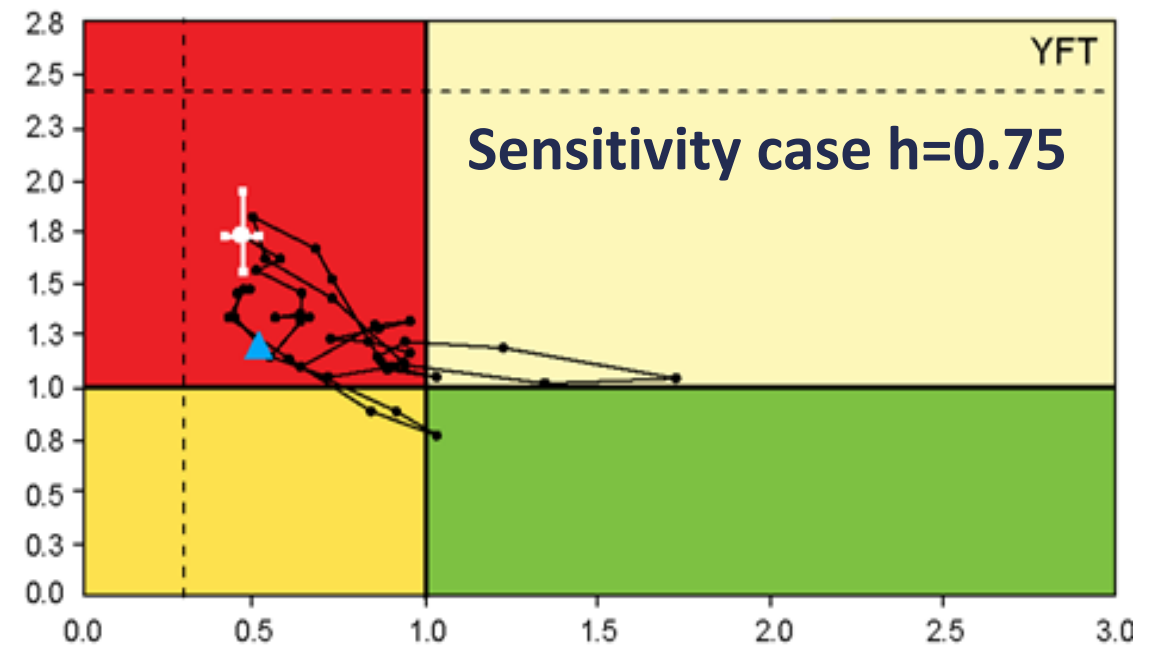
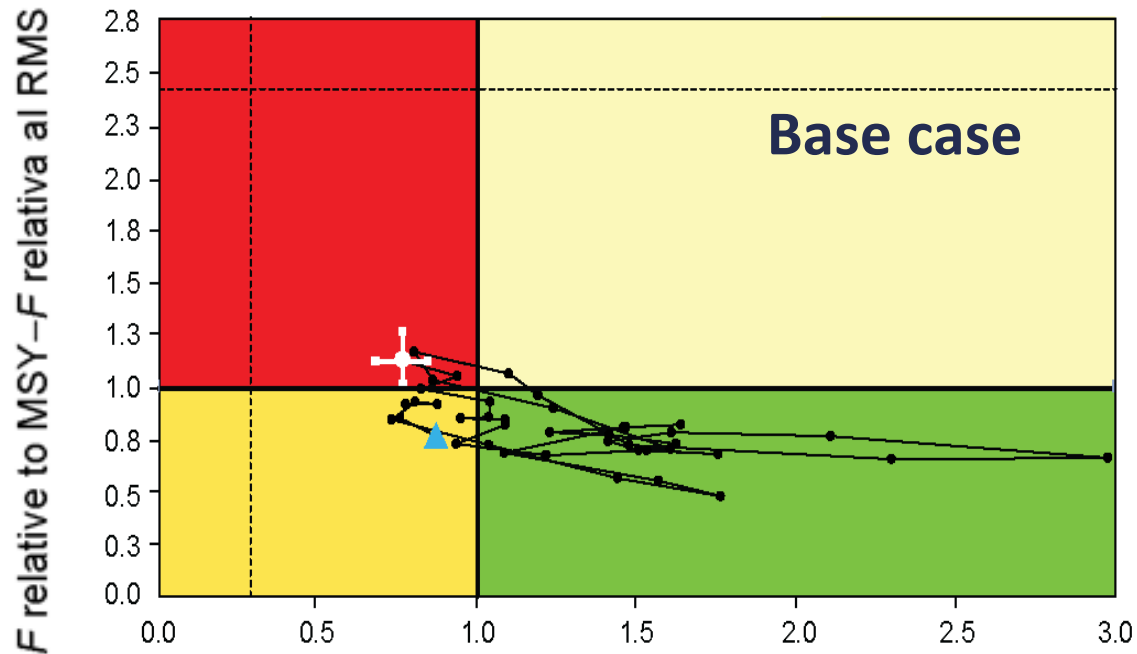
OBJ ~ 40%
DEL ~ 35%
NOA ~ 17%
LL ~ 5%

Dynamic quantities:

$$S_{2019} / S_{F=0} = 0.22$$

$$S_{2019} / S_{MSY} = 0.82$$

Kobe plots



Spawning stock size relative to MSY
Tamaño de la población reproductora relativo al RMS

In both scenarios :

- Targets **exceeded**: $S < S_{MSY}$ $F > F_{MSY}$
- Limits **not exceeded**: $S > S_{lim}$ $F < F_{lim}$
- Even with uncertainty

MSY and related quantities

YFT	Base case Caso base	$h = 0.75$
MSY-RMS	254,975	268,782
$B_{MSY} - B_{RMS}$	371,787	552,161
$S_{MSY} - S_{RMS}$	3,638	6,022
$B_{MSY}/B_0 - B_{RMS}/B_0$	0.31	0.37
$S_{MSY}/S_0 - S_{RMS}/S_0$	0.27	0.35
$C_{recent}/MSY - C_{reciente}/RMS$	1.00	0.95
$B_{recent}/B_{MSY} - B_{reciente}/B_{RMS}$	0.84	0.55
$S_{recent}/S_{MSY} - S_{reciente}/S_{RMS}$	0.76	0.45
F multiplier-Multiplicador de F	0.89	0.58

MSY and related quantities

YFT	SAC 9 Base case Caso base	SAC 10 Base case Caso base
MSY-RMS	264,283	254,975
$B_{MSY} - B_{RMS}$	376,696	371,787
$S_{MSY} - S_{RMS}$	3,634	3,638
$B_{MSY}/B_0 - B_{RMS}/B_0$	0.31	0.31
$S_{MSY}/S_0 - S_{RMS}/S_0$	0.27	0.27
$C_{recent}/MSY - C_{reciente}/RMS$	0.85	1.00
$B_{recent}/B_{MSY} - B_{reciente}/B_{RMS}$	1.35	0.84
$S_{recent}/S_{MSY} - S_{reciente}/S_{RMS}$	1.08	0.76
F multiplier-Multiplicador de F	0.99	0.89

- Considerable change in relation to 2018
- This sensitivity is similar to what happen with the bigeye tuna assessment in 2018
- What are the drivers?

MSY and related quantities

YFT	SAC 9 Base case Caso base	SAC 10 Base case Caso base	SAC 10 Base case except update LL_S
MSY-RMS	264,283	254,975	254,872
$B_{MSY} - B_{RMS}$	376,696	371,787	372,247
$S_{MSY} - S_{RMS}$	3,634	3,638	3,642
$B_{MSY}/B_0 - B_{RMS}/B_0$	0.31	0.31	0.31
$S_{MSY}/S_0 - S_{RMS}/S_0$	0.27	0.27	0.27
$C_{recent}/MSY - C_{reciente}/RMS$	0.85	1.00	1.00
$B_{recent}/B_{MSY} - B_{reciente}/B_{RMS}$	1.35	0.84	1.03
$S_{recent}/S_{MSY} - S_{reciente}/S_{RMS}$	1.08	0.76	0.99
F multiplier-Multiplicador de F	0.99	0.89	1.00

- Results driven by the **update in the longline-based index of abundance**
- The rest of the new (or updated) data:
 - ✓ Do not show indication of increase in fishing mortality
 - ✓ Decline in biomass not so strong

Conclusions

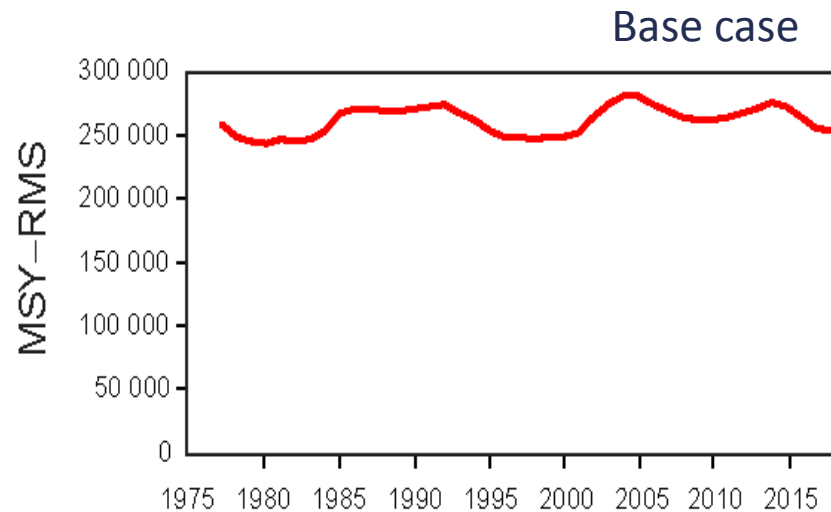
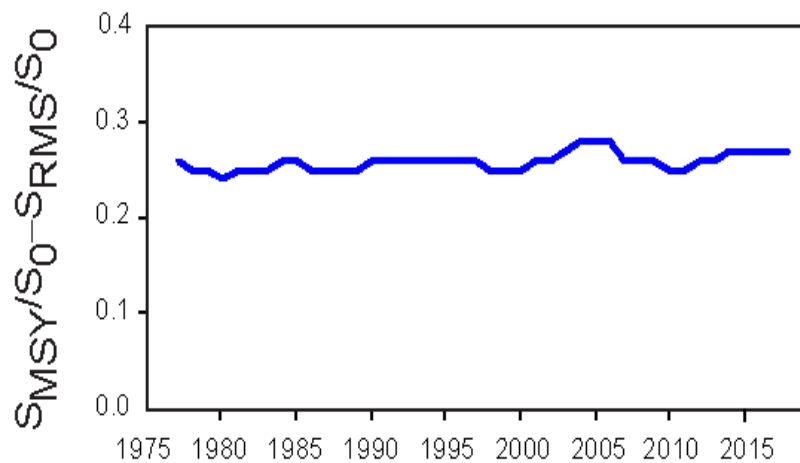
- The base-case model results indicate that $S < S_{msy}$ and $F > F_{msy}$
- Both the base-case model and the sensitivity indicate that the stock are within the limits $S > S_{lim}$ and $F < F_{lim}$
- The driver of results is the longline-derived index of abundance
- The bigeye tuna assessment showed similar issues in 2018
- Potential problems with the longline-derived indices will be explained in the next presentation



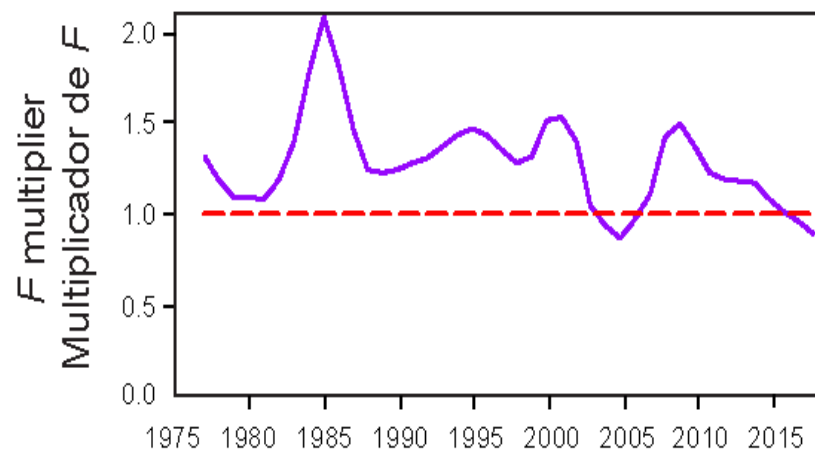
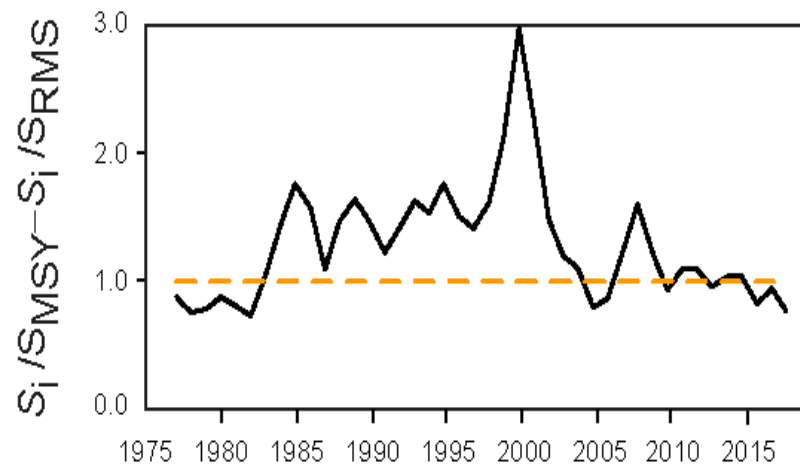
MSY and related quantities – SAC 9

YFT	Base case Caso base	$h = 0.75$
MSY-RMS	264,283	278,584
$B_{\text{MSY}} - B_{\text{RMS}}$	376,696	560,713
$S_{\text{MSY}} - S_{\text{RMS}}$	3,634	6,080
$B_{\text{MSY}}/B_0 - B_{\text{RMS}}/B_0$	0.31	0.37
$S_{\text{MSY}}/S_0 - S_{\text{RMS}}/S_0$	0.27	0.35
$C_{\text{recent}}/\text{MSY} - C_{\text{reciente}}/\text{RMS}$	0.85	0.81
$B_{\text{recent}}/B_{\text{MSY}} - B_{\text{reciente}}/B_{\text{RMS}}$	1.35	0.89
$S_{\text{recent}}/S_{\text{MSY}} - S_{\text{reciente}}/S_{\text{RMS}}$	1.08	0.64
F multiplier-Multiplicador de F	0.99	0.64

Time-varying indicators

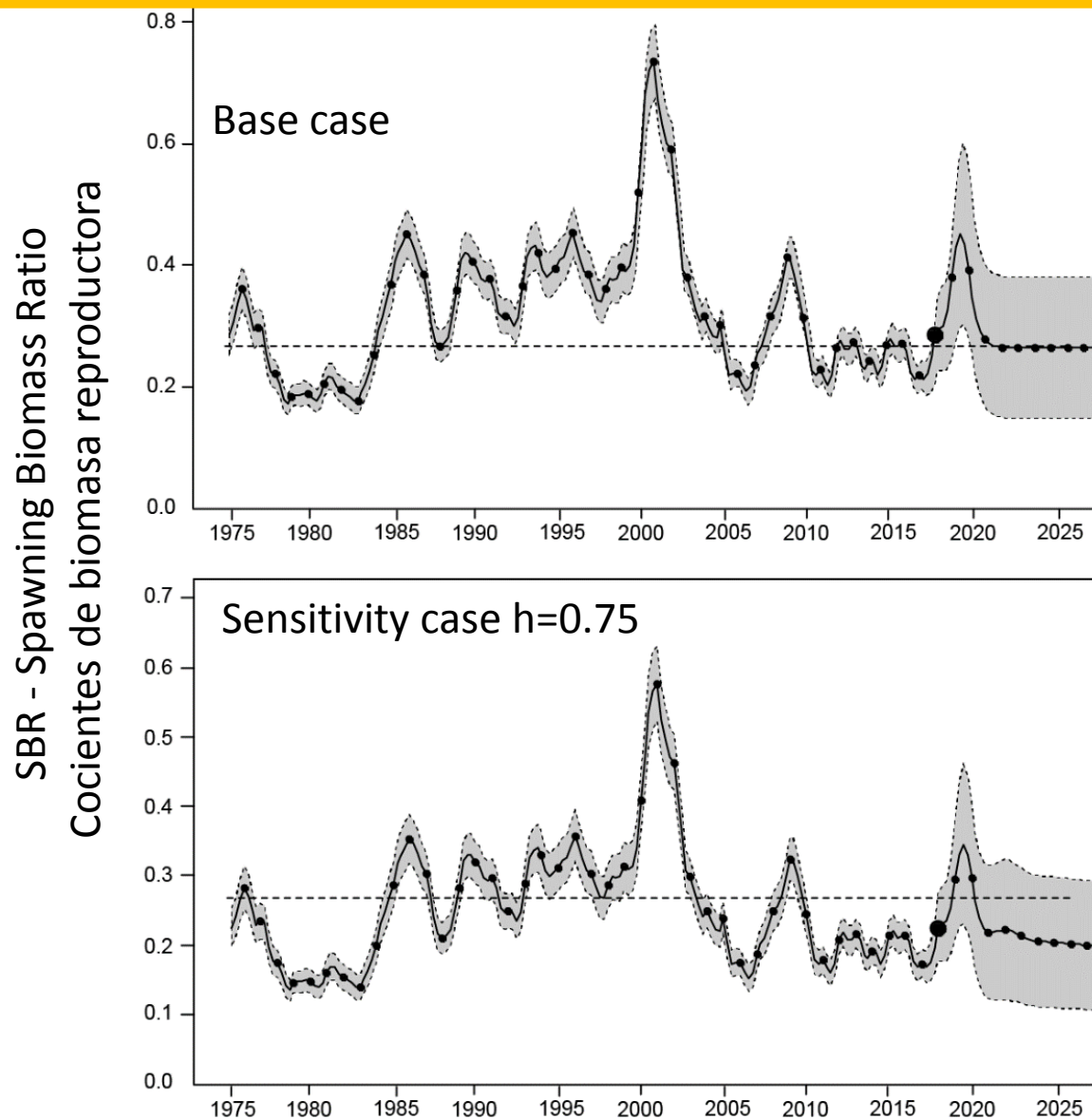


SAC 10



Spawning biomass

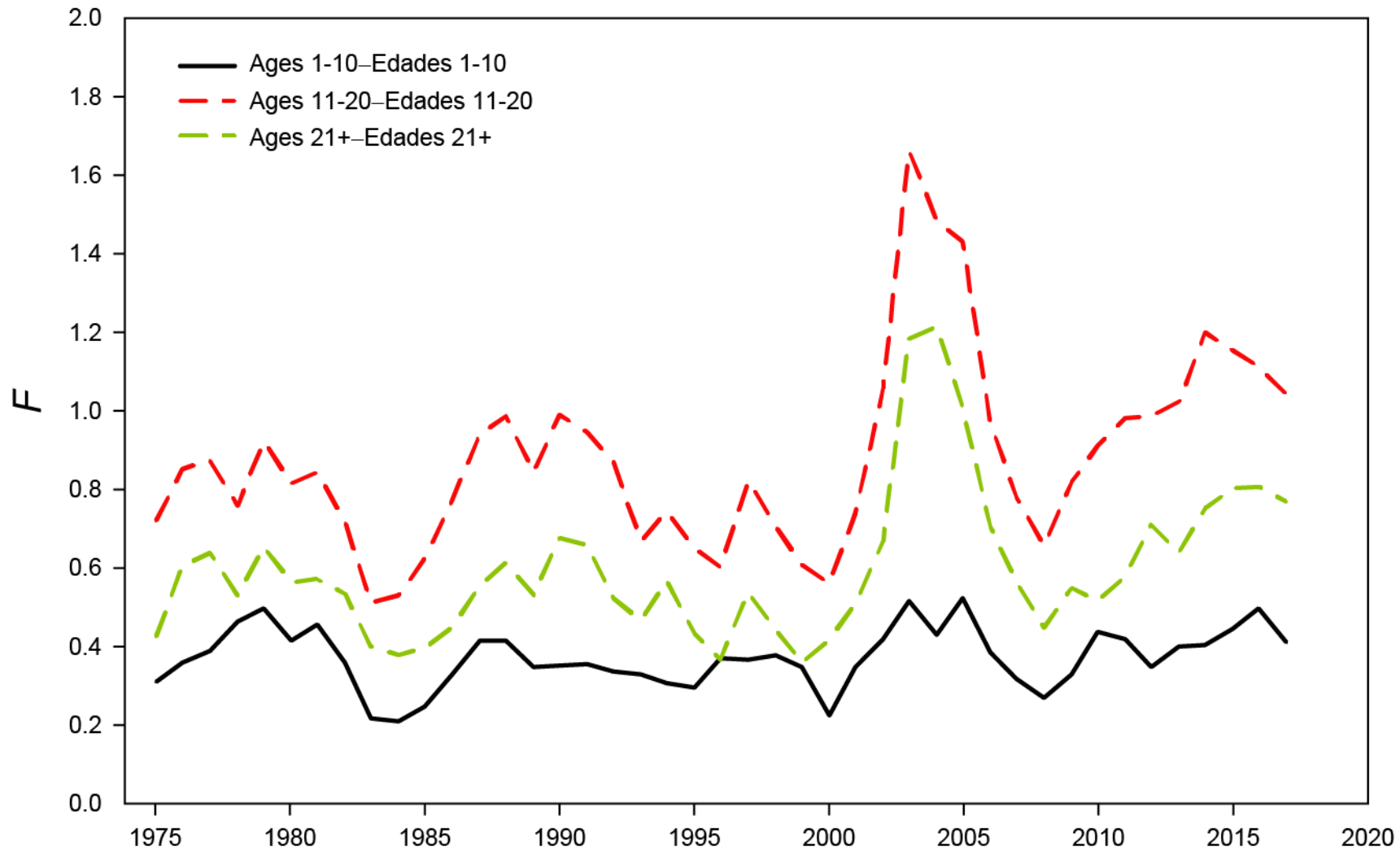
SAC 09



_ MLE
-- 95% CI

Fishing mortality

SAC 09



Fisheries impact

SAC 09

