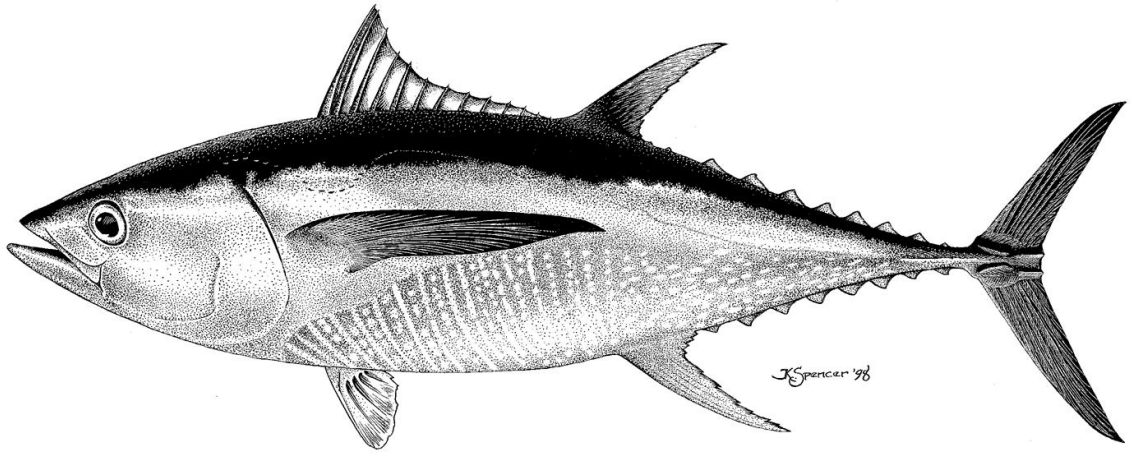
STATUS OF YELLOWFIN TUNA IN THE EASTERN PACIFIC OCEAN IN 2011

UPDATE OF 2011 STOCK ASSESSMENT

January 1975 – December 2011



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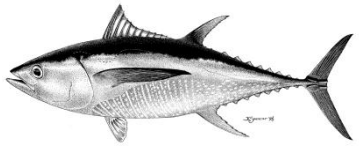
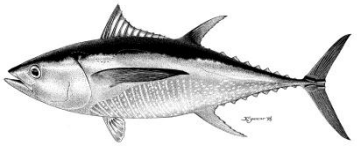
Outline



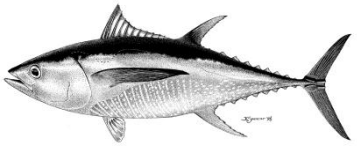
- Stock assessment (base case model)
  - Fishery data updates
  - Model assumptions
  - Results (fishing mortality, recruitment, biomasses)
  - Stock status (base case)
  - Population projections (*status quo* and F_{MSY})
- Stock-recruitment sensitivity analysis (steepness = 0.75)
- Summary conclusions

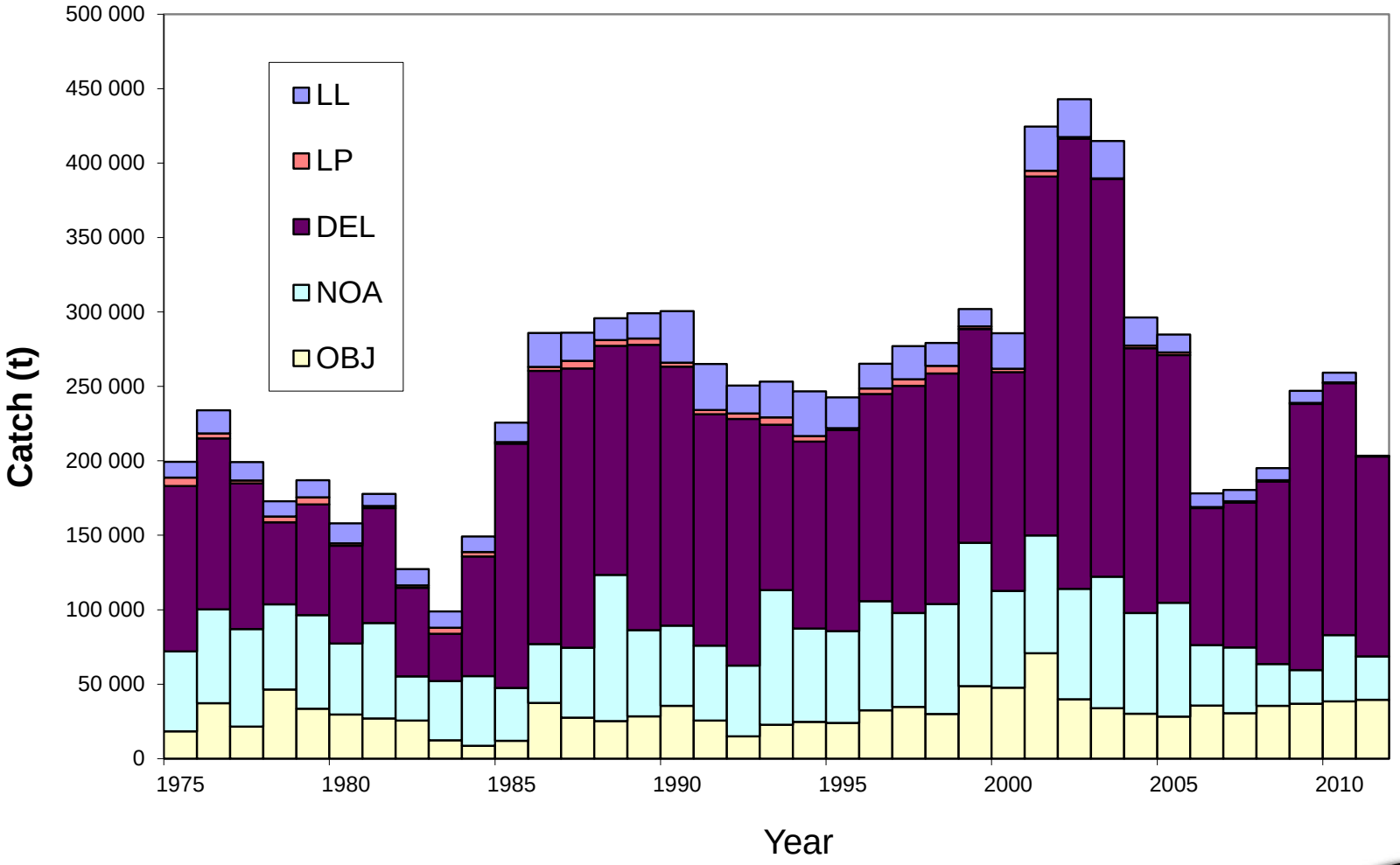
New or updated data



- Surface fisheries
  - Catch, CPUE and size-frequency data updated to include new data for 2011 and revised data for earlier years
- Longline fisheries
  - New or updated longline catch data: China (2010), Chinese Taipei (2008-2010), French Polynesia (2010), Japan (2007-2010), Republic of Korea (2009-2011) and US (2009-2010)
  - New or updated CPUE data available for Japan (2007-2010)
  - No new or updated longline size-frequency for Japan (data from 2011 submission used, 2007-2009)

Total catches

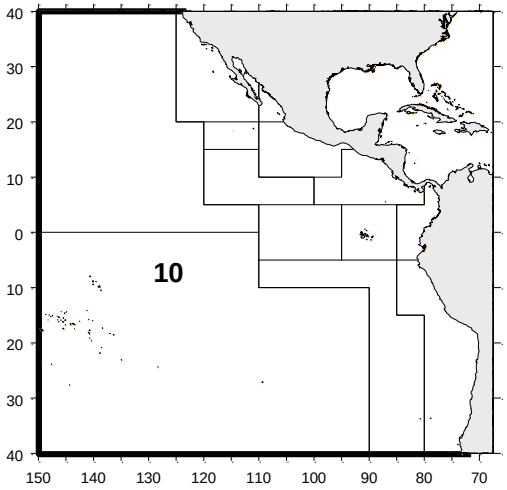




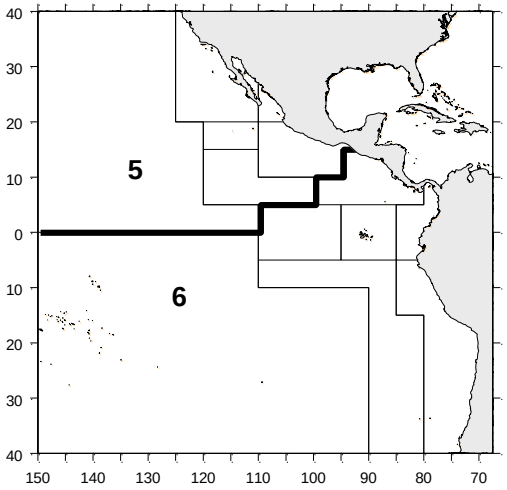
Fishery data

YFT fishery definitions

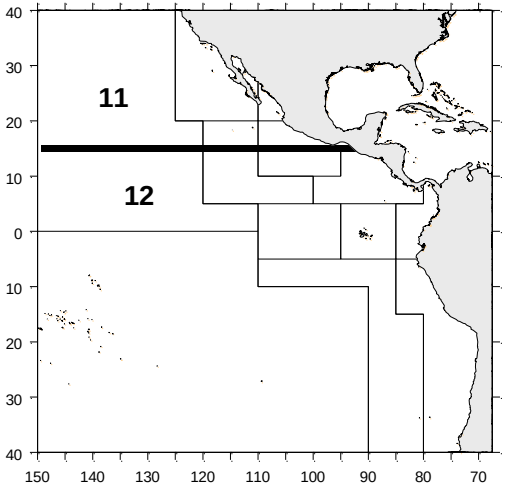
Baitboat



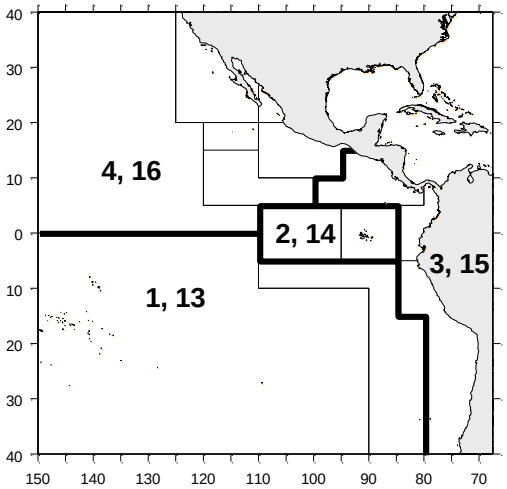
Unassociated



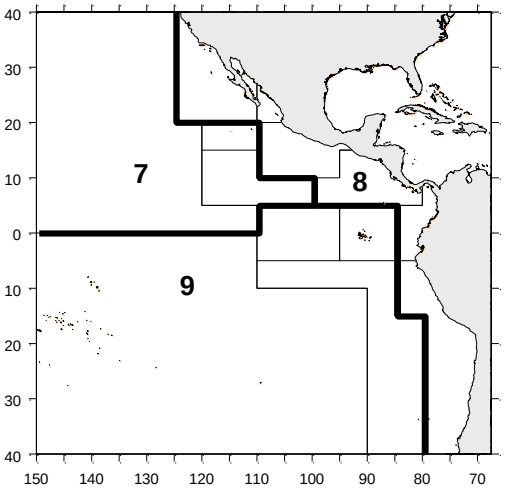
Longline

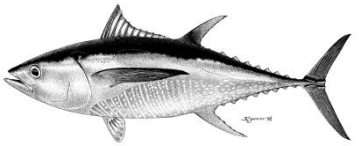


Floating Objects



Dolphin





Model assumptions

- Same model as in SAC2
- Fishery definitions: 16 fisheries
- Data weighting: the CV of the southern LL fishery was fixed (0.2), others estimated (NOA, DEL)
- Growth modeling: Richards curve, L2 and variance of length-at-age are fixed
- Modeling of catchability and selectivity:
  - Catchability coefficients for 5 CPUE time series are estimated (NOA-N, NOA-S, DEL-N, DEL-I, LL-S)
  - Selectivity curves for 11 of the 16 fisheries are estimated (F9 DEL-S mirrors F12 LL-S)
  - Logistic selectivity for LL-S and DEL-S, and dome-shape for other fisheries (except discards)

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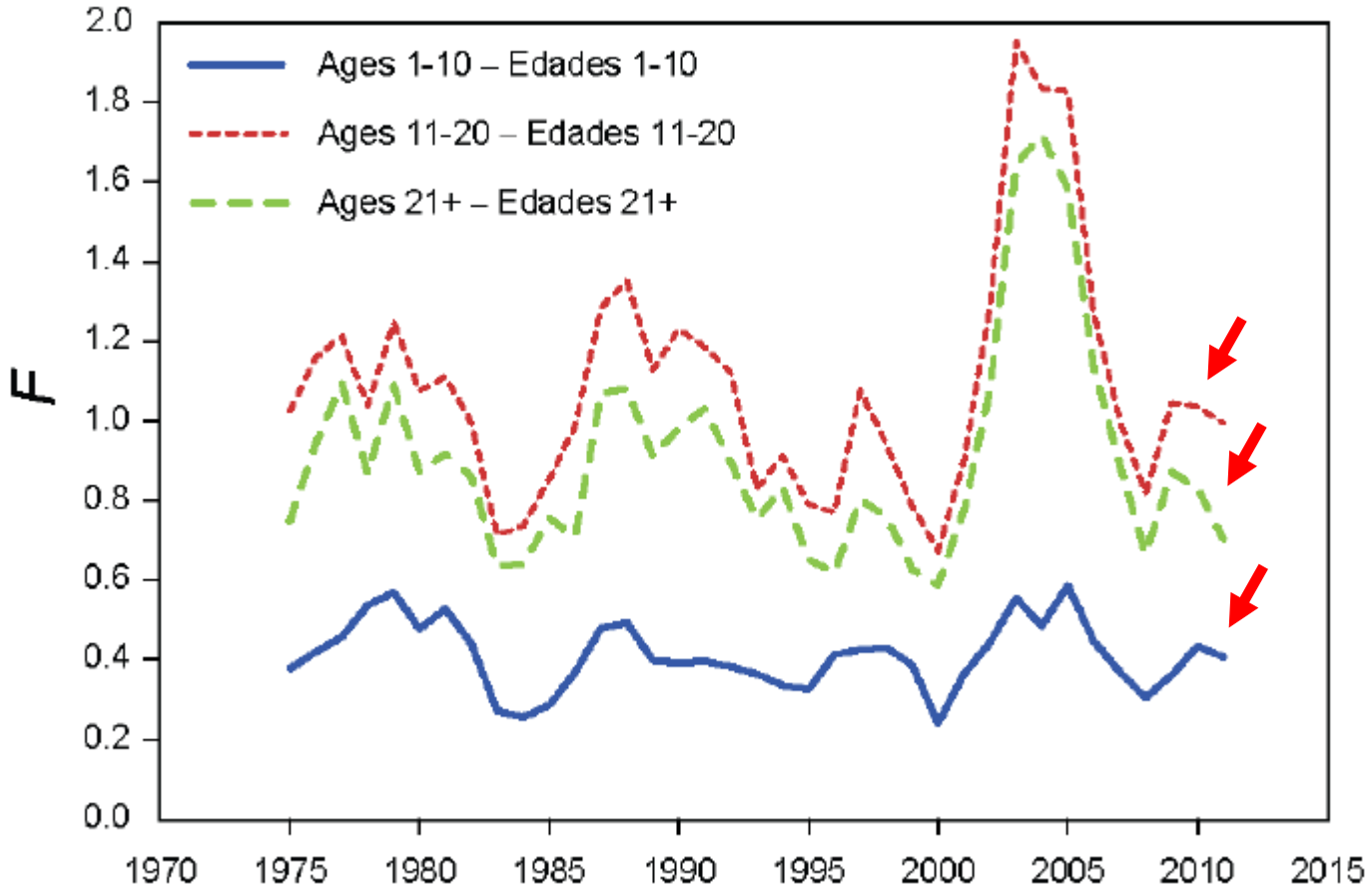
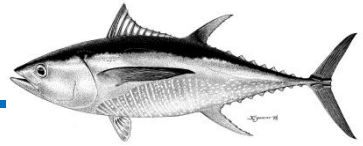
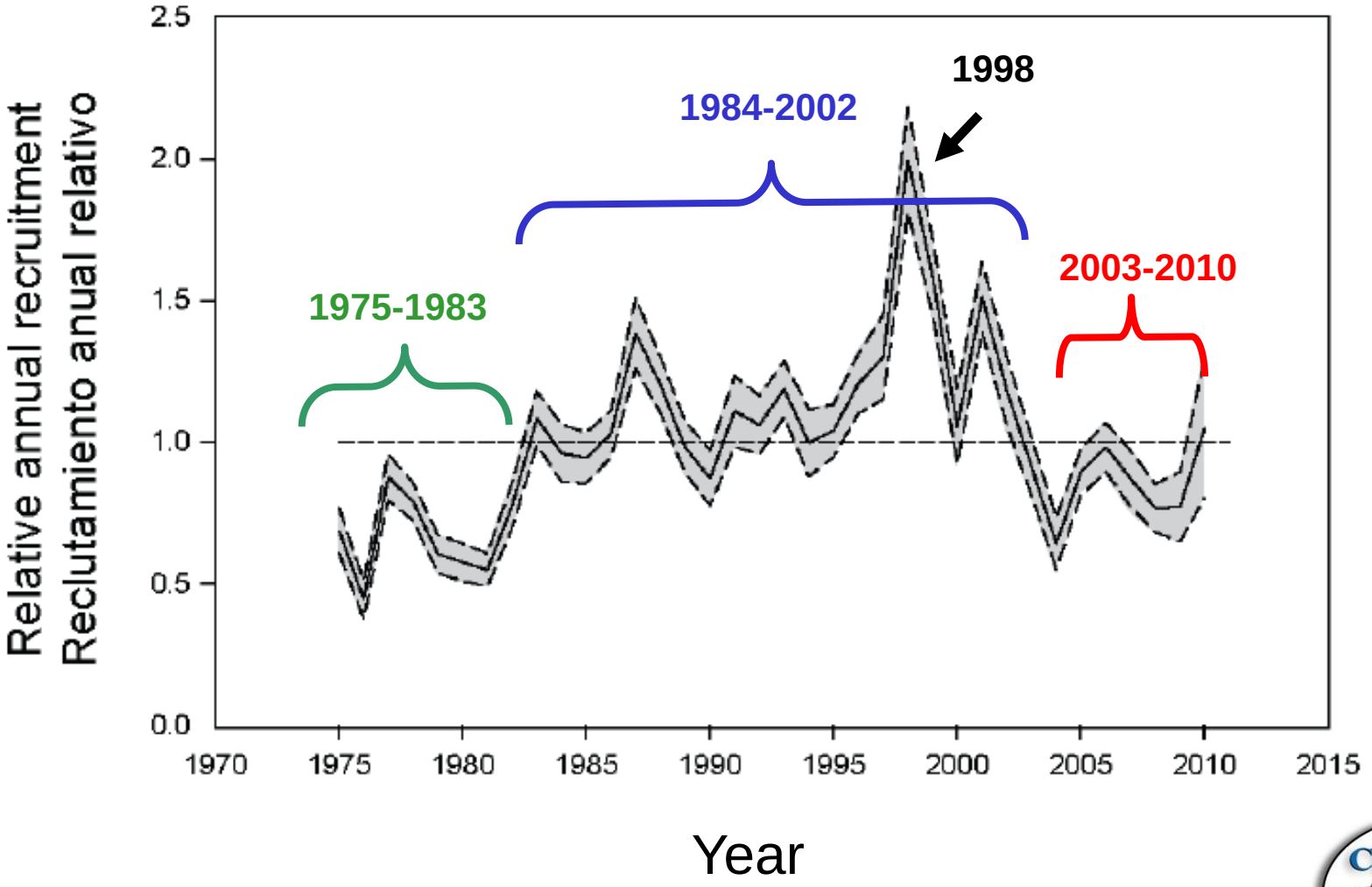
Fishing mortality



Recruitment

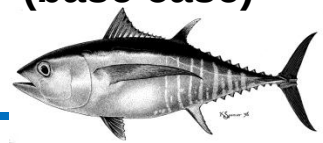
Results
(base case)

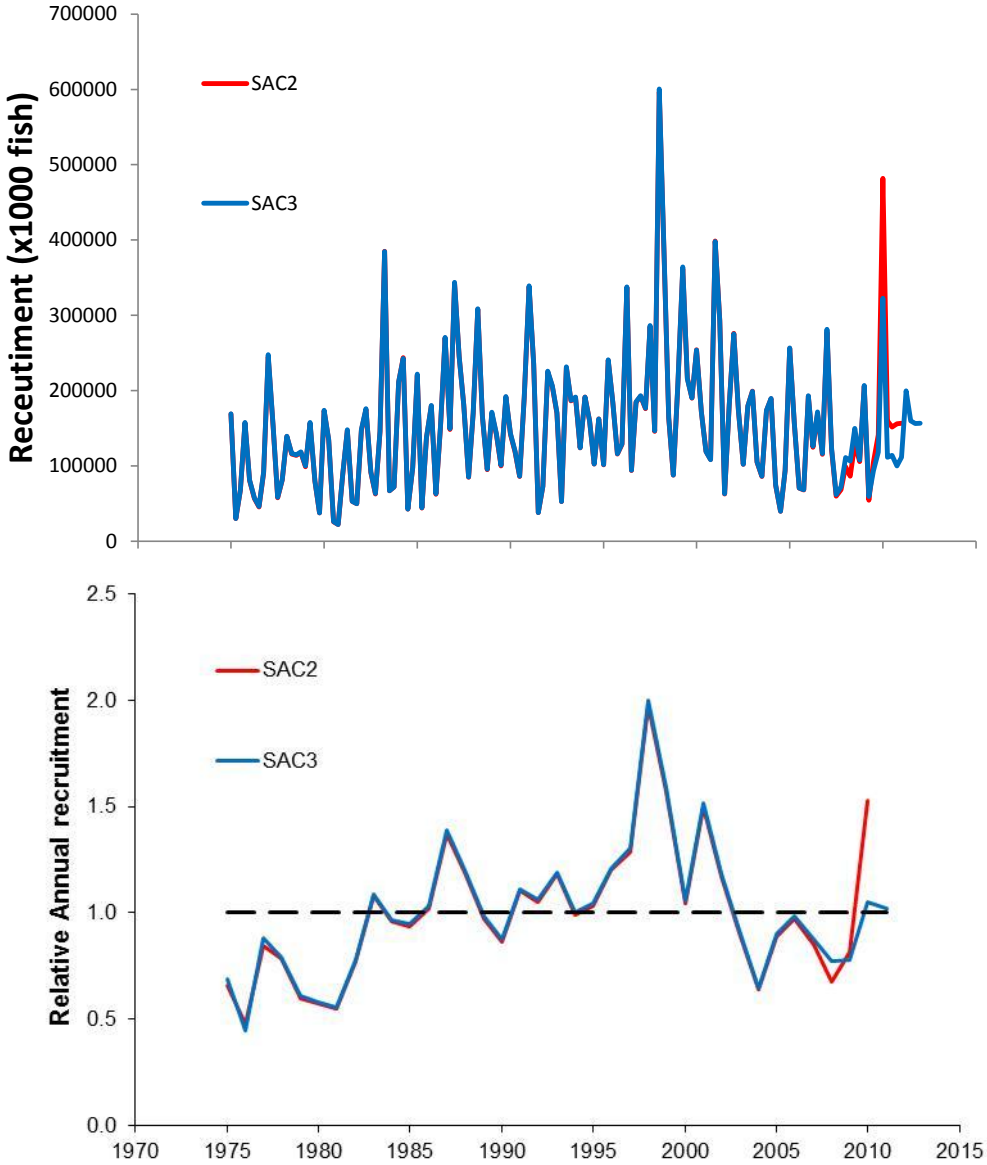




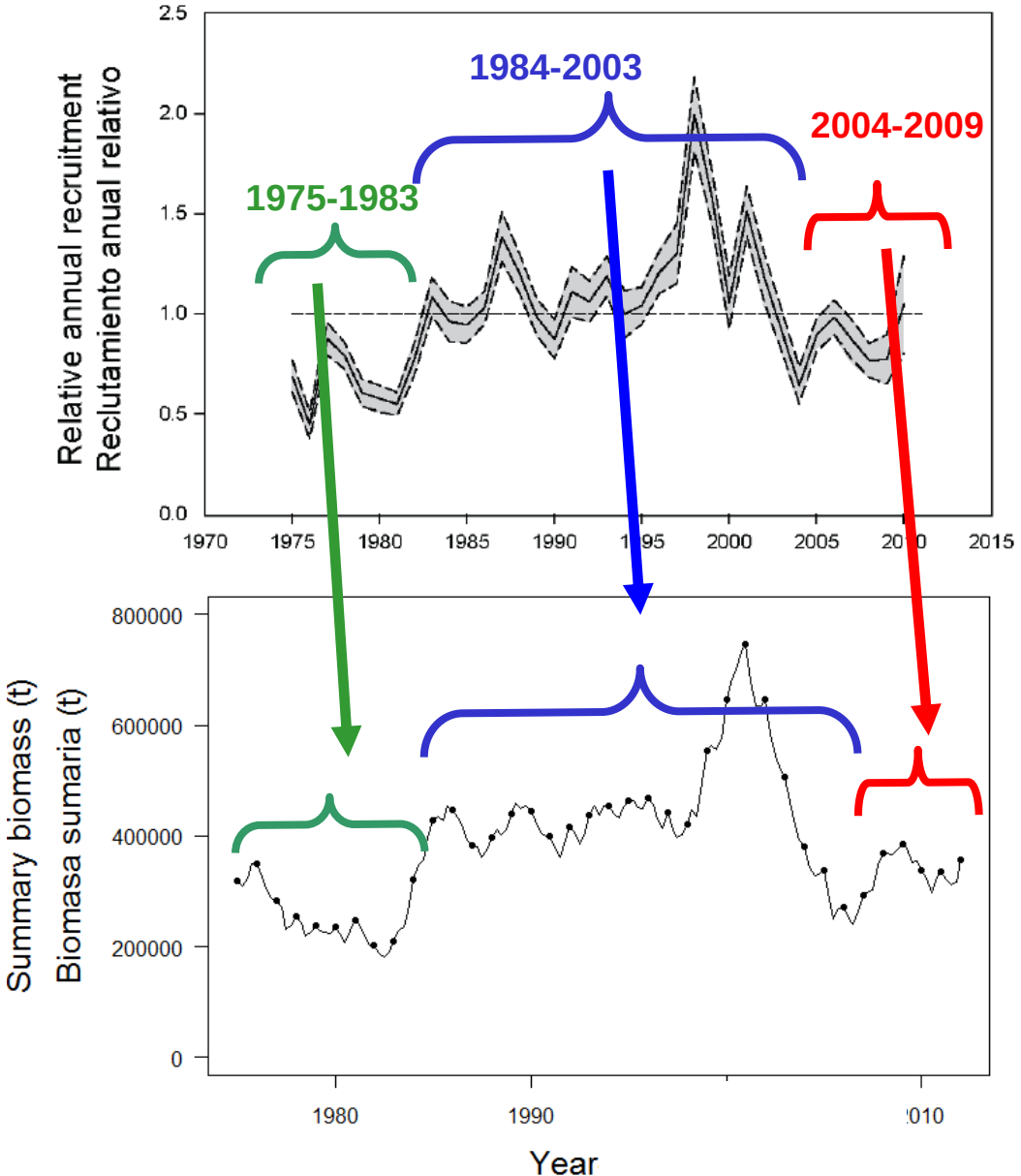
Recruitment

Results (base case)

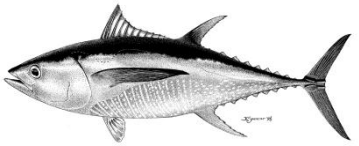


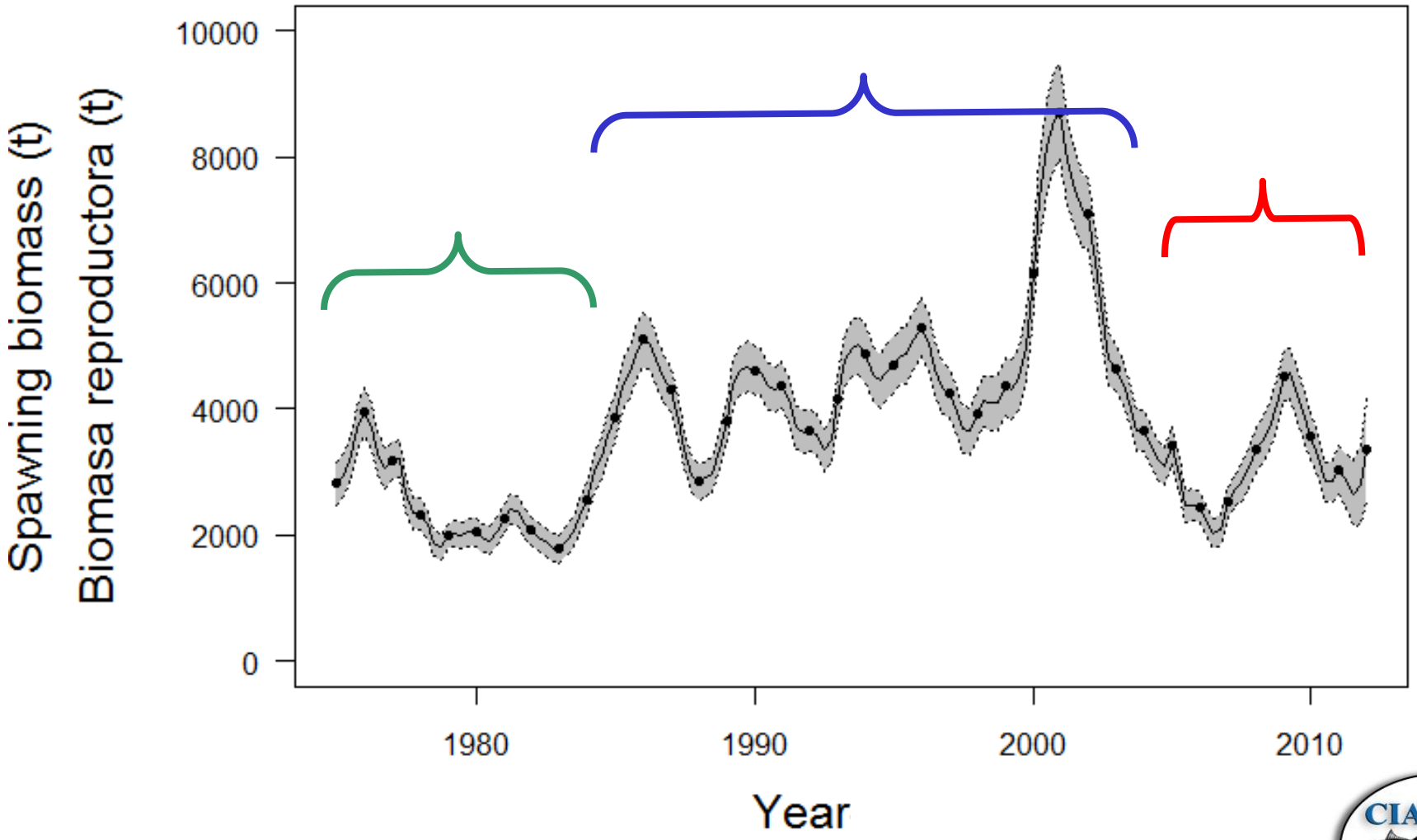


Summary biomass

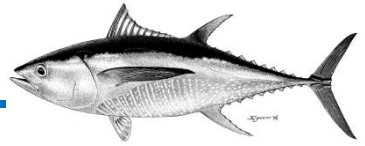


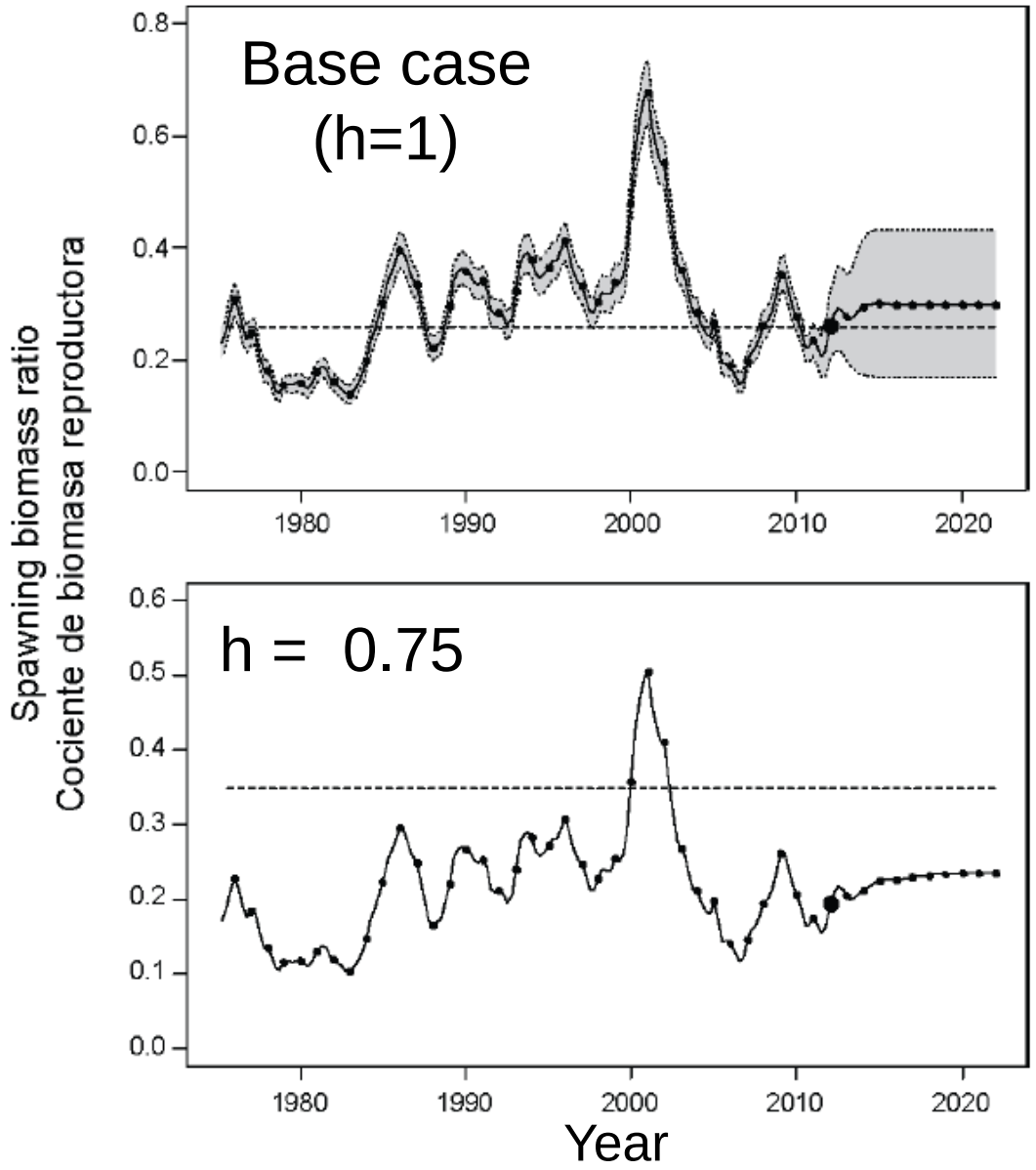
Spawning biomass





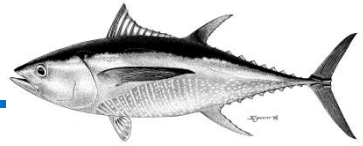
Spawning Biomass Ratio (SBR)

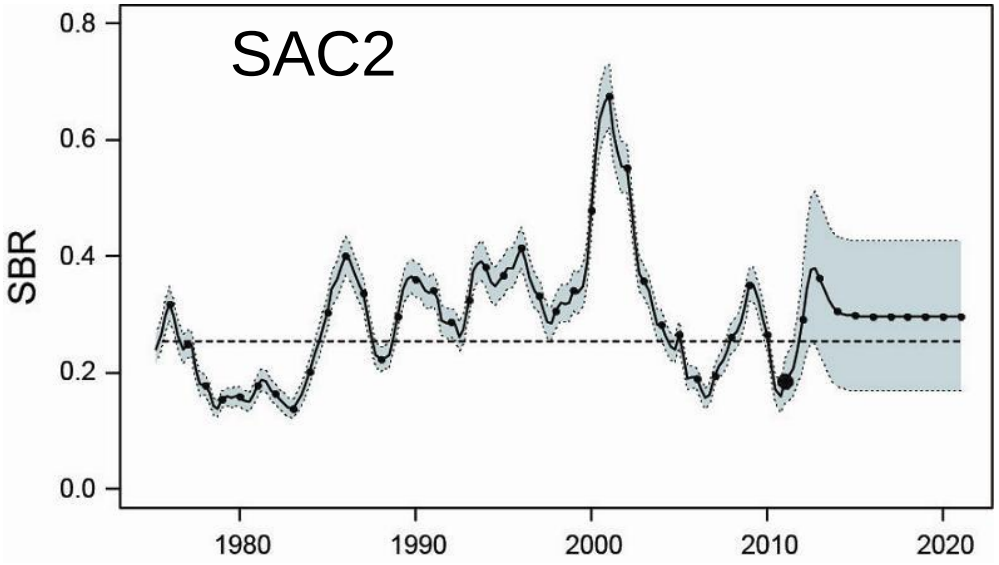


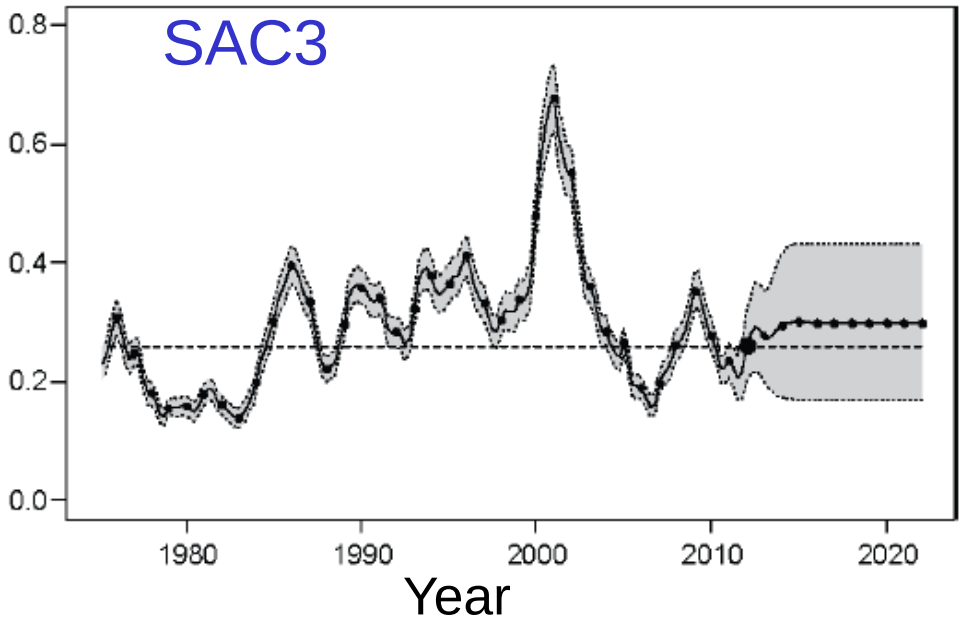


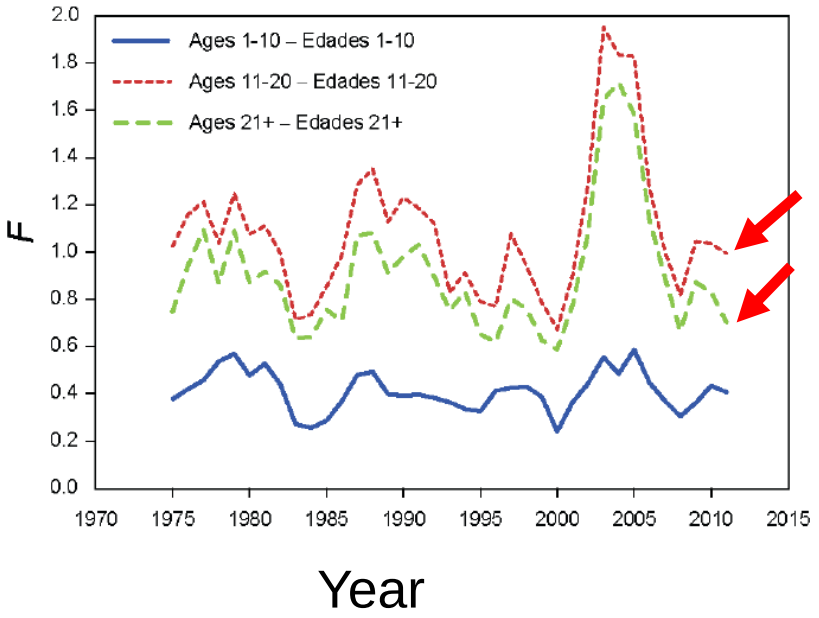
Spawning Biomass Ratio (SBR)

Stock status (base case)



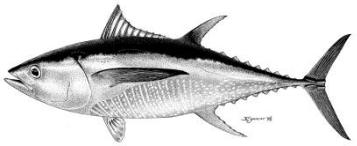


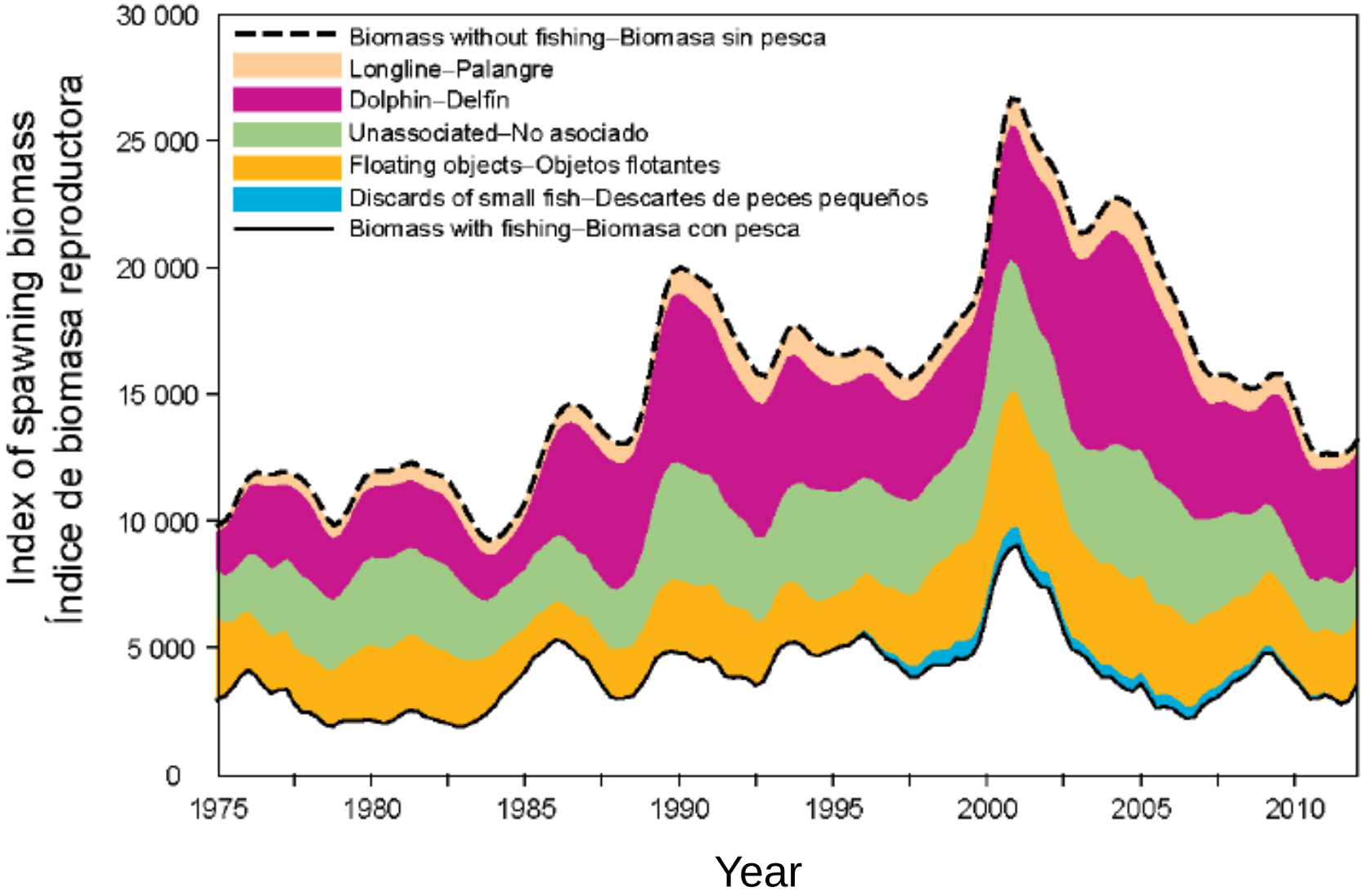




Fishery impact

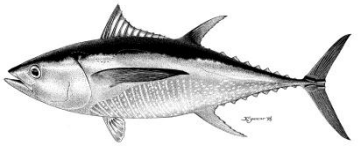
Results (base case)

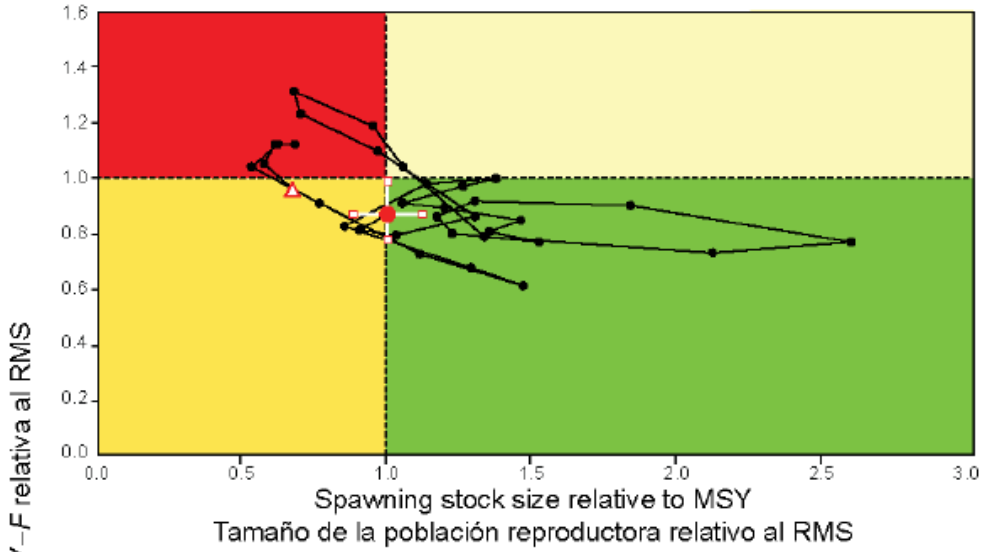


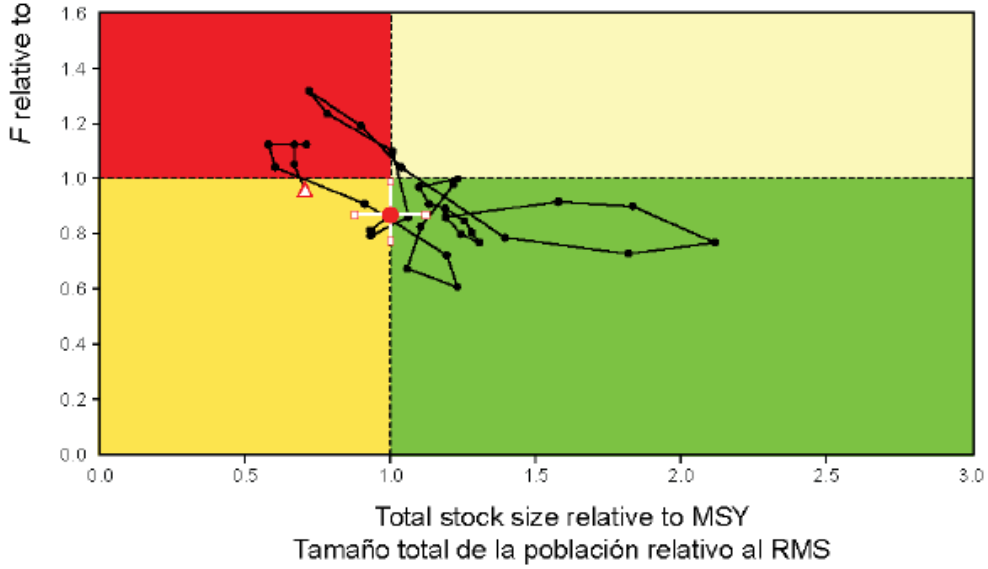


Phase plots

Stock status (base case)

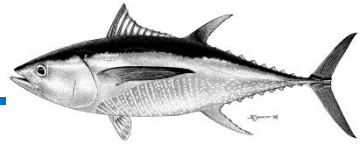


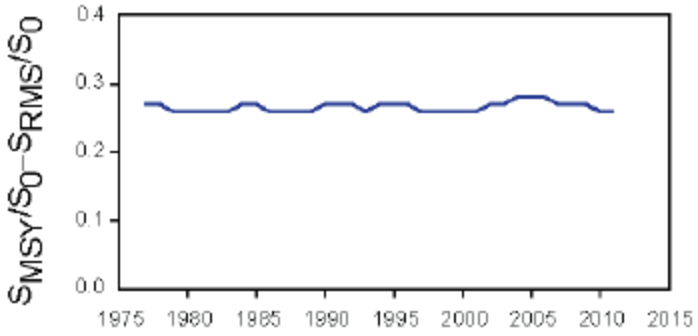


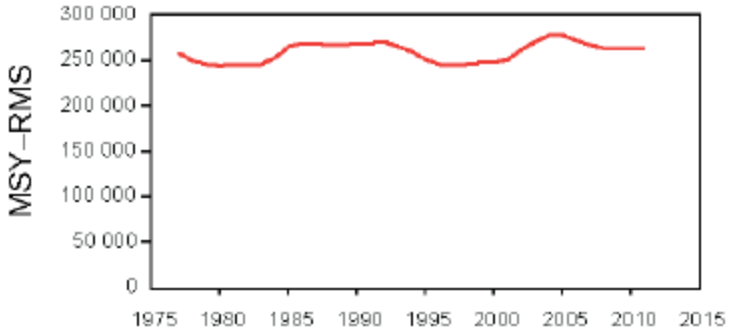


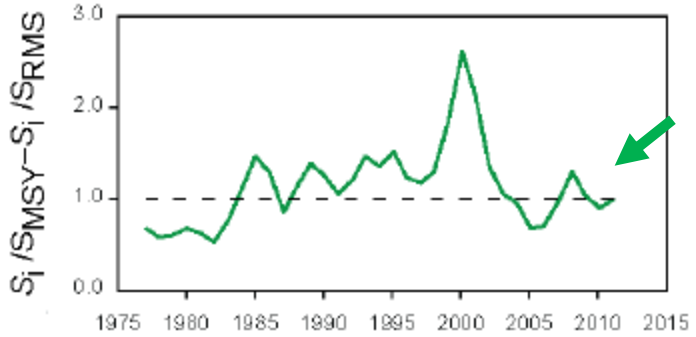
Time varying indicators

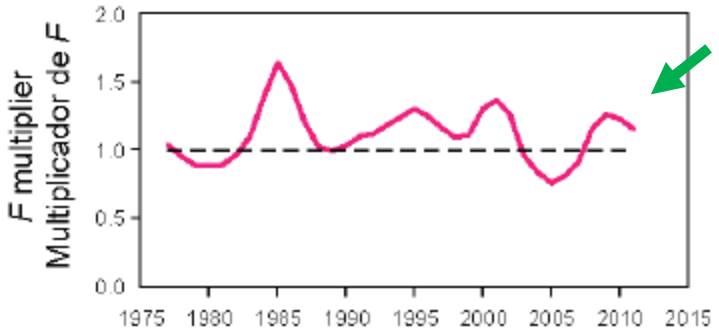
Stock status (base case)





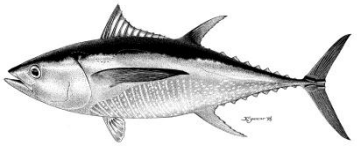






Management quantities

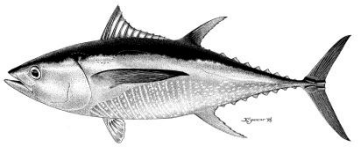
Stock status (base case)



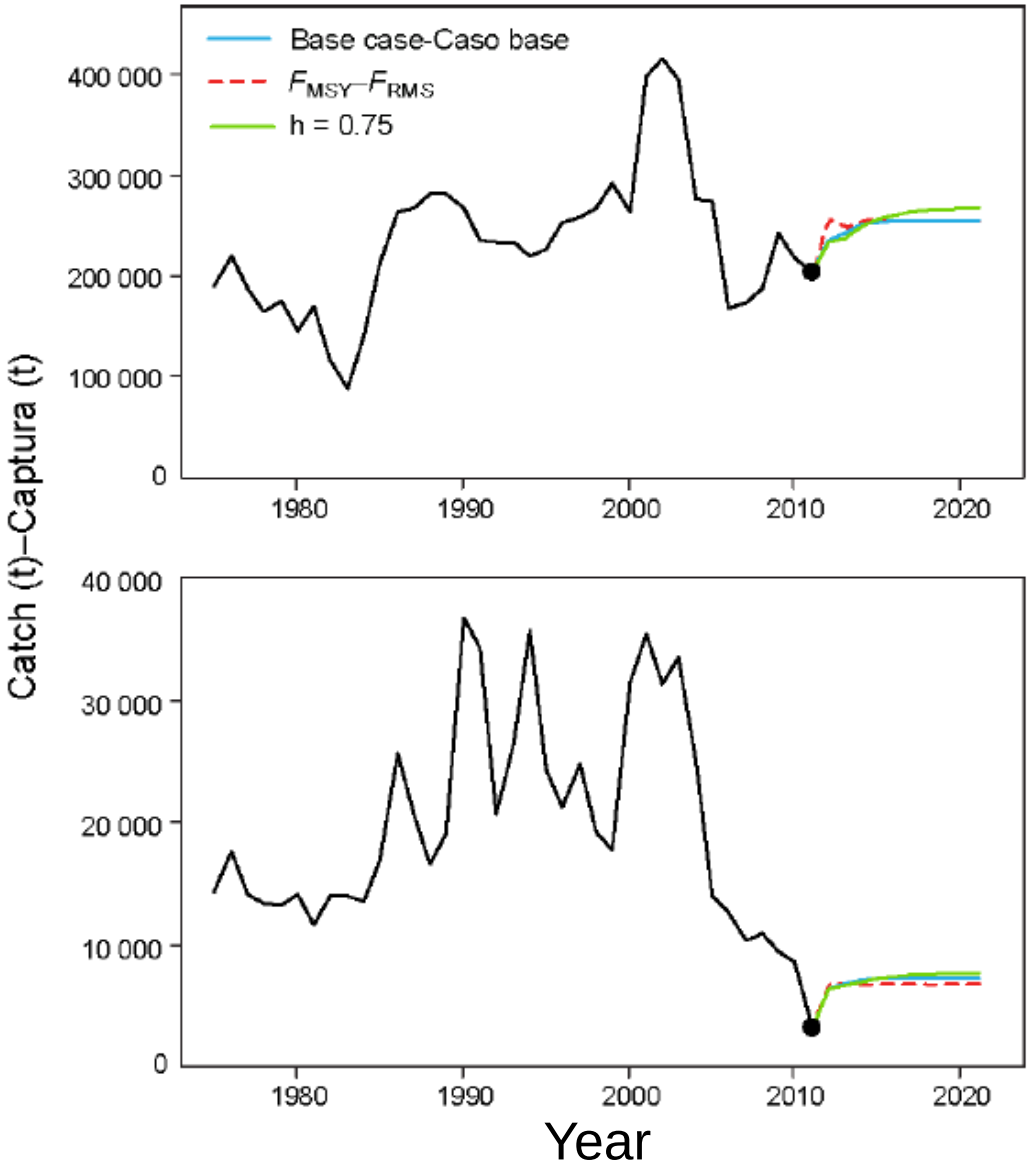
Data – Datos	Base case Caso base	$h = 0.75$
MSY-RMS	262,642	290,680
B_{MSY}- B_{RMS}	356,682	560,354
S_{MSY}- S_{RMS}	3,334	6,013
B_{MSY}/B_0- B_{RMS}/B_0	0.31	0.37
S_{MSY}/S_0- S_{RMS}/S_0	0.26	0.35
C_{recent}/MSY- C_{recent}/RMS	0.79	0.71
B_{recent}/B_{MSY}- B_{recent}/B_{RMS}	1.00	0.63
S_{recent}/S_{MSY}-S_{recent}/S_{RMS}	1.00	0.56
F multiplier-Multiplicador de F	1.15	0.72

3,57050/356,682=1.00103

3,350/3,334=1.0048



Projected catches – *Status quo* (F_{cur})



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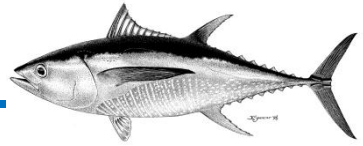
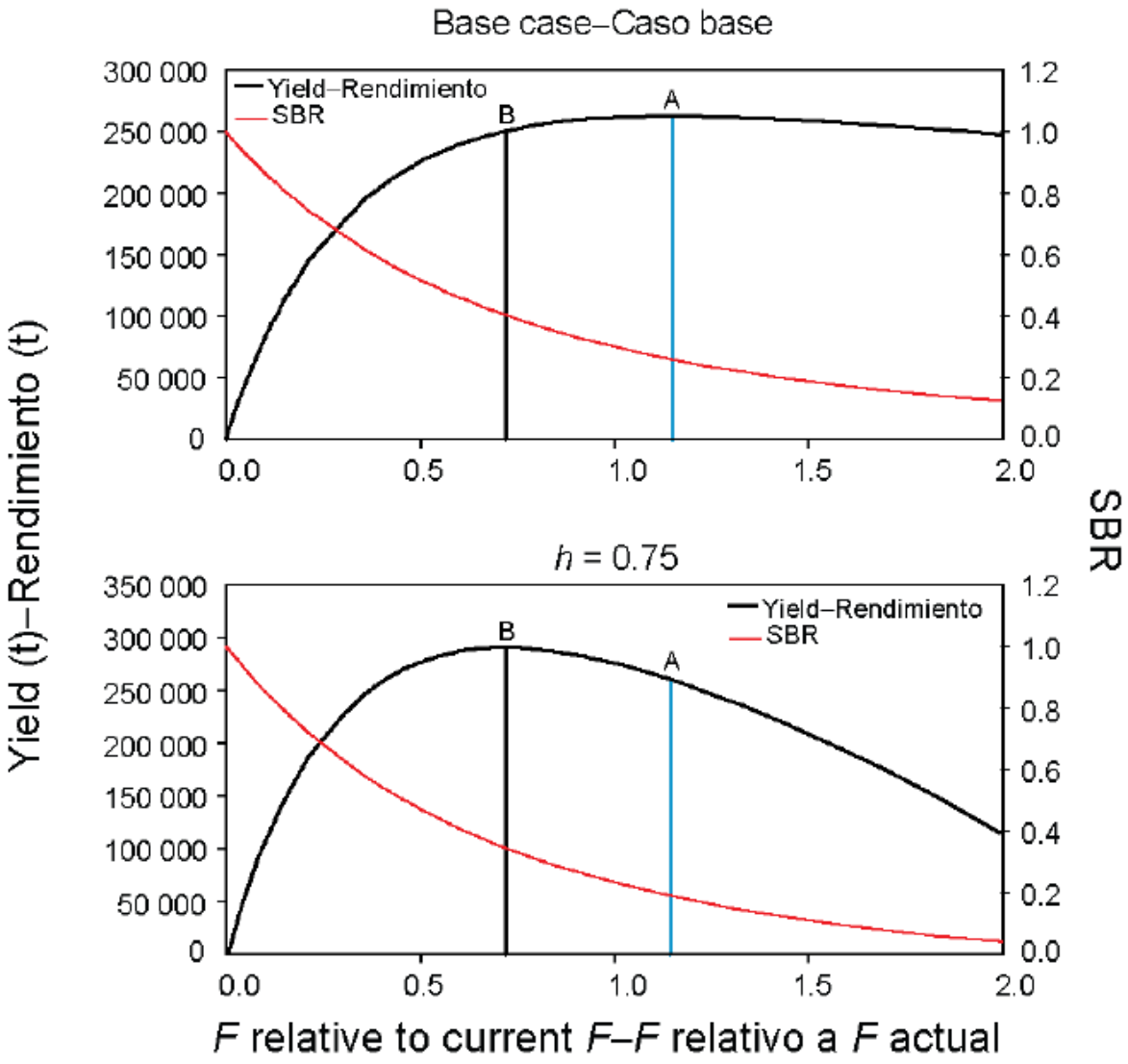
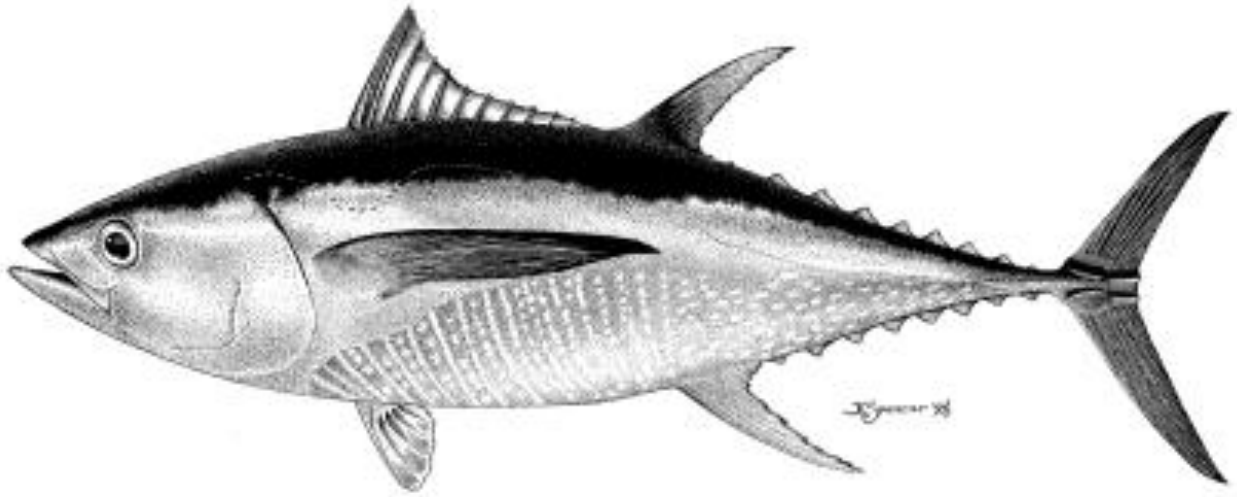


Yield

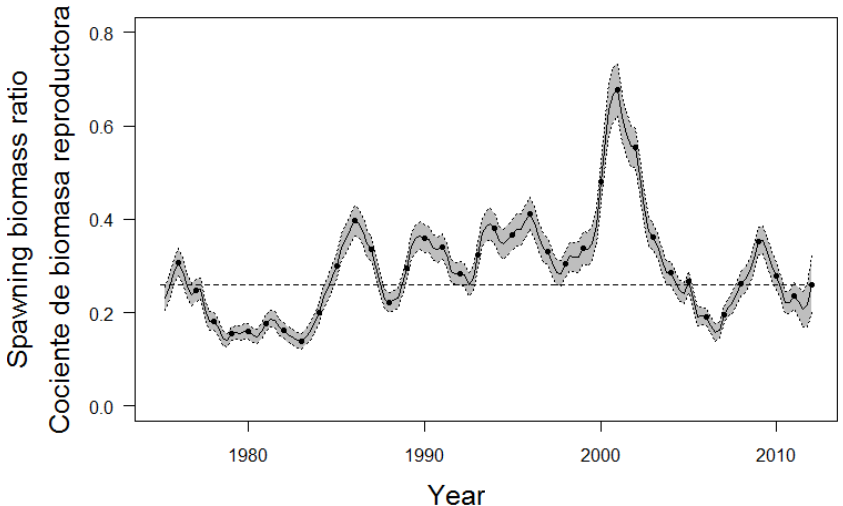

Base case–Caso base
Yield–Rendimiento
SBR
A
B
300 000
250 000
200 000
150 000
100 000
50 000
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
2.0
h = 0.75
Yield (t)–Rendimiento (t)
SBR
F relative to current F–F relativo a F actual



Summary

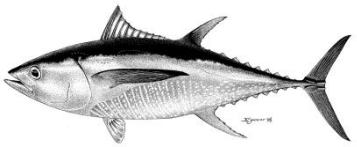
Summary: key results

- The recent **fishing mortality** rates are estimated to be lower than those corresponding to the MSY(F_{recent}<F_{MSY})
- The recent levels of **spawning biomass** are estimated to be at those corresponding to the MSY (S_{recent}=S_{MSY})



Plausible Sensitivities and Uncertainties
- lessons from previous assessments

Summary



- Results are more **pessimistic** with:
  - The inclusion of a stock-recruitment relationship
  - Higher values of the average size of the oldest fish (L_2 > 182 cm)
  - Lower rates of adult natural mortality (M)

- Results are more **optimistic** with:
  - Lower values of the average size of the oldest fish (L_2 < 182 cm)
  - Higher rates of adult natural mortality (M)
  - Fitting to CPUE DEL-N as main index of abundance (S_{recent}>S_{MSY})

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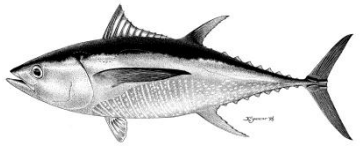
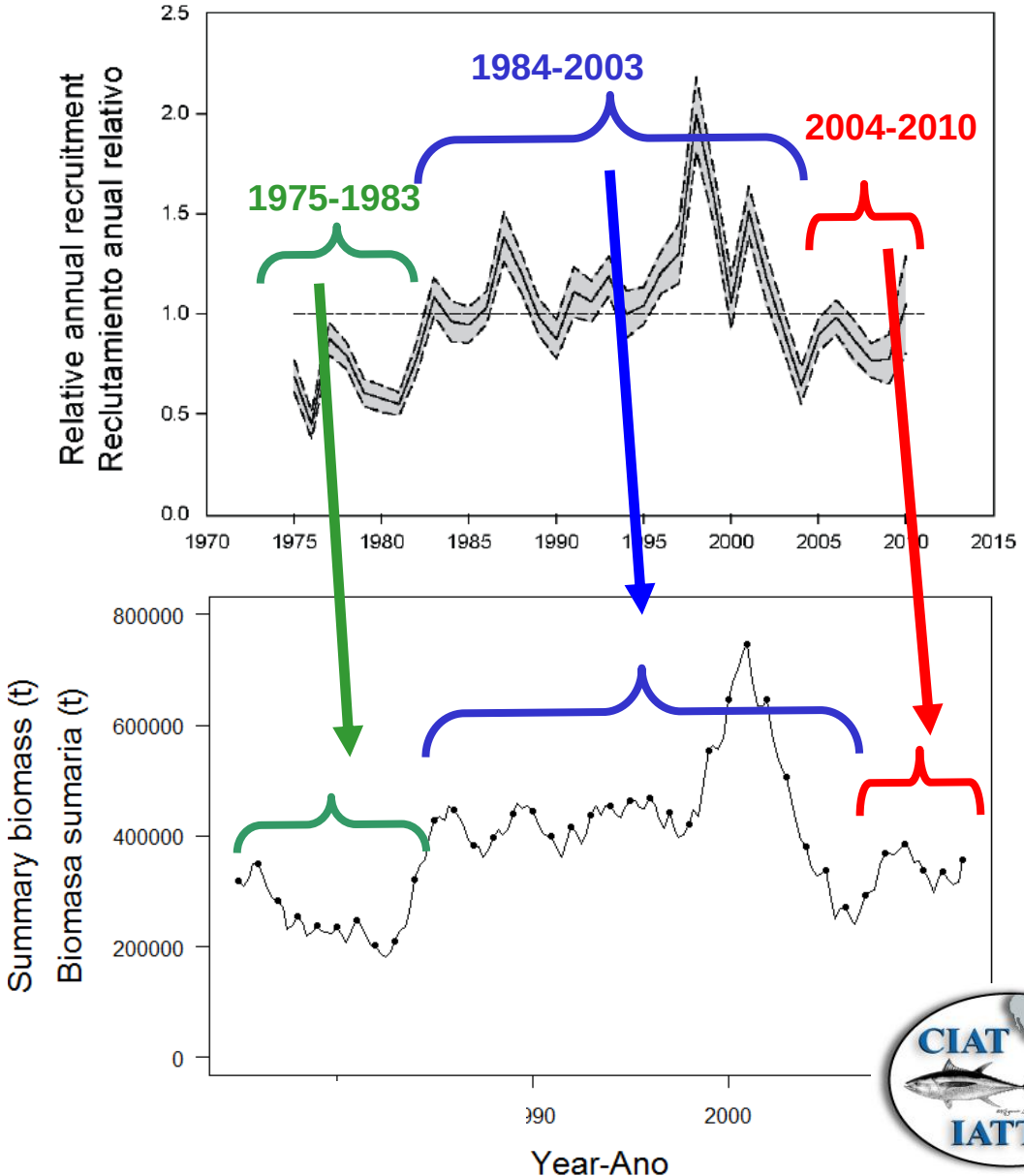
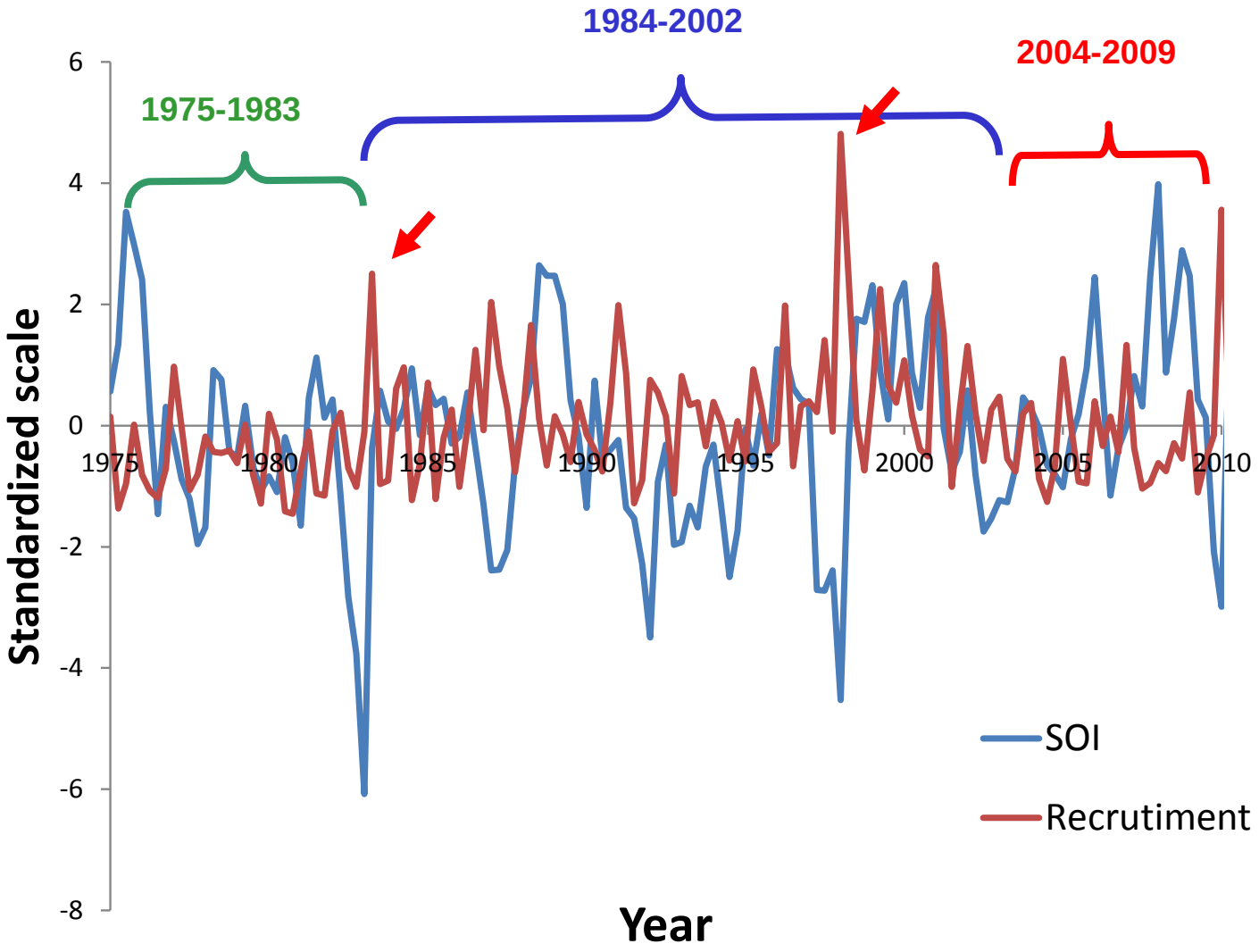
Summary: key results (cont.)



- There population may have recently switched from a high to a an intermediate productivity regime

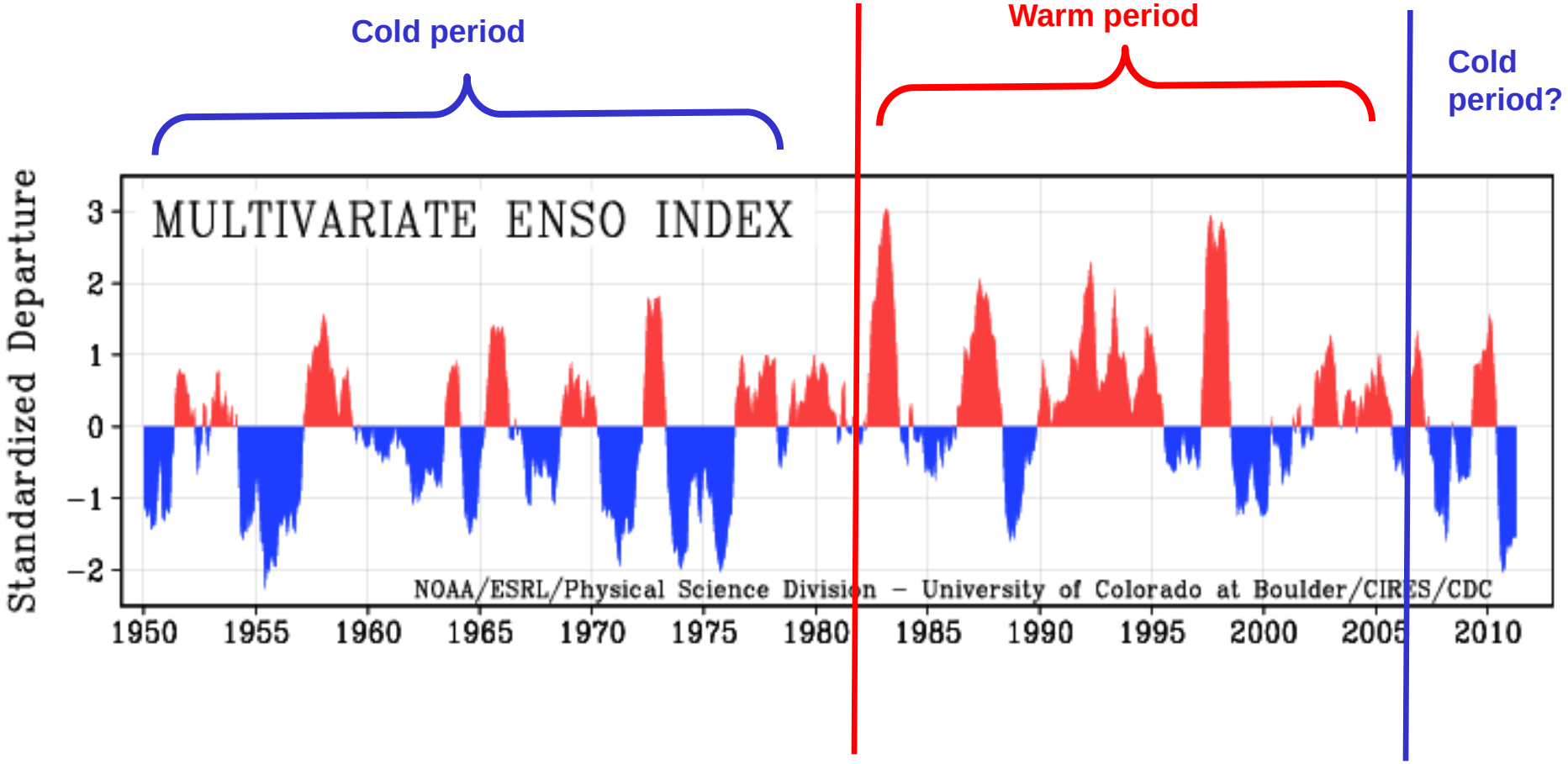


SOI - El Niño / La Niña?

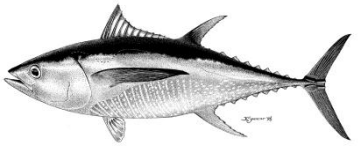


Summary

ENSO

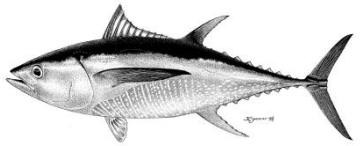


Future directions



- Alternative assumptions on stock structure (LL fishery definitions)
- Time-variant selectivity for PS fisheries
- More robust selectivity curves
- Determine appropriate weighting of the different data sets

External Review



- External review of IATTC YFT assessment methods and assumptions (15-19 October, 2012)

Questions?