Updates on Stock Status of Large Pelagic ICCAT species in the Mediterranean Sea.

Working Group (WG2) on pelagic fishes - ICCAT

ICCAT Secretariat

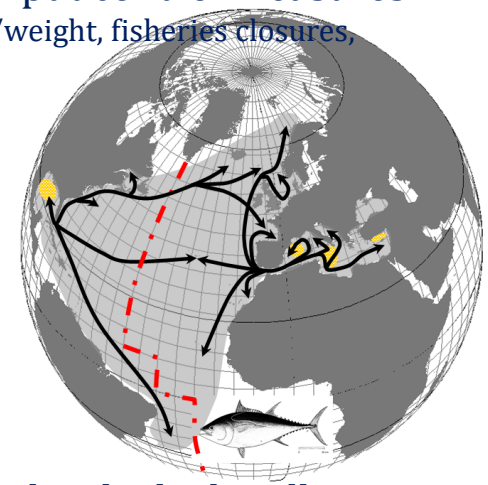
(6 October 2021)

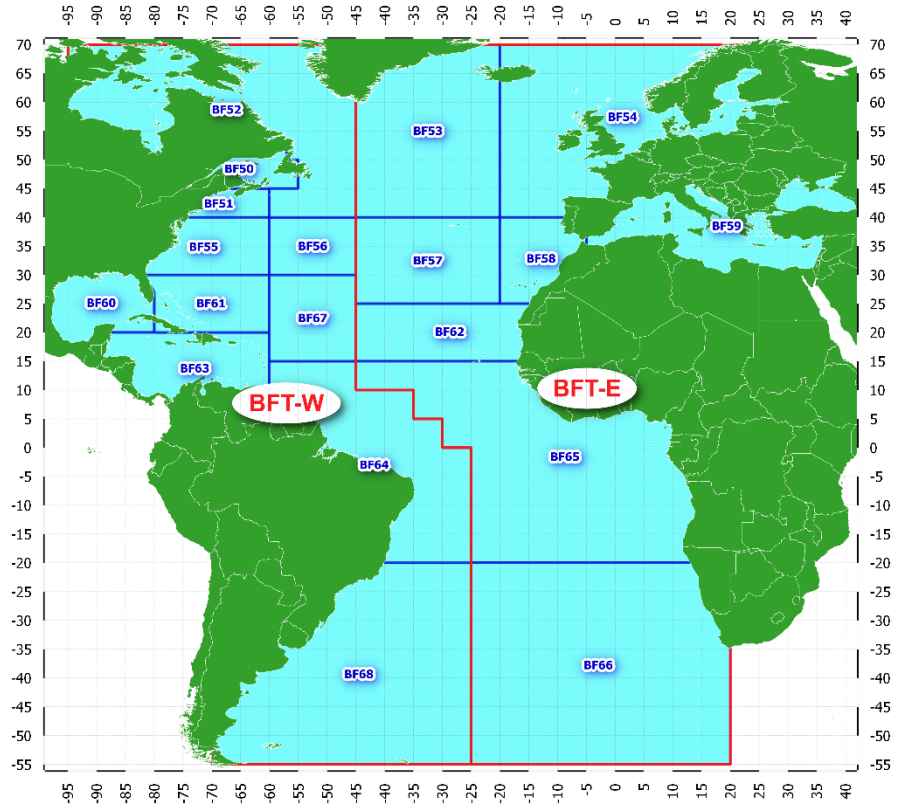
ICCAT CICTA CICAA

Bluefin tuna: Background information

Managed by International Commission for the Conservation of Atlantic Tunas (ICCAT):

- Two stocks East and West (mixing occurring, but extent not know)
- **No Assessment in 2021 only review of Indices of Abundance**. Last assessment: East-BFT 2020
- Management through input control measures (e.g. vessel list, minimum size/weight, fisheries closures, TAC, etc.)



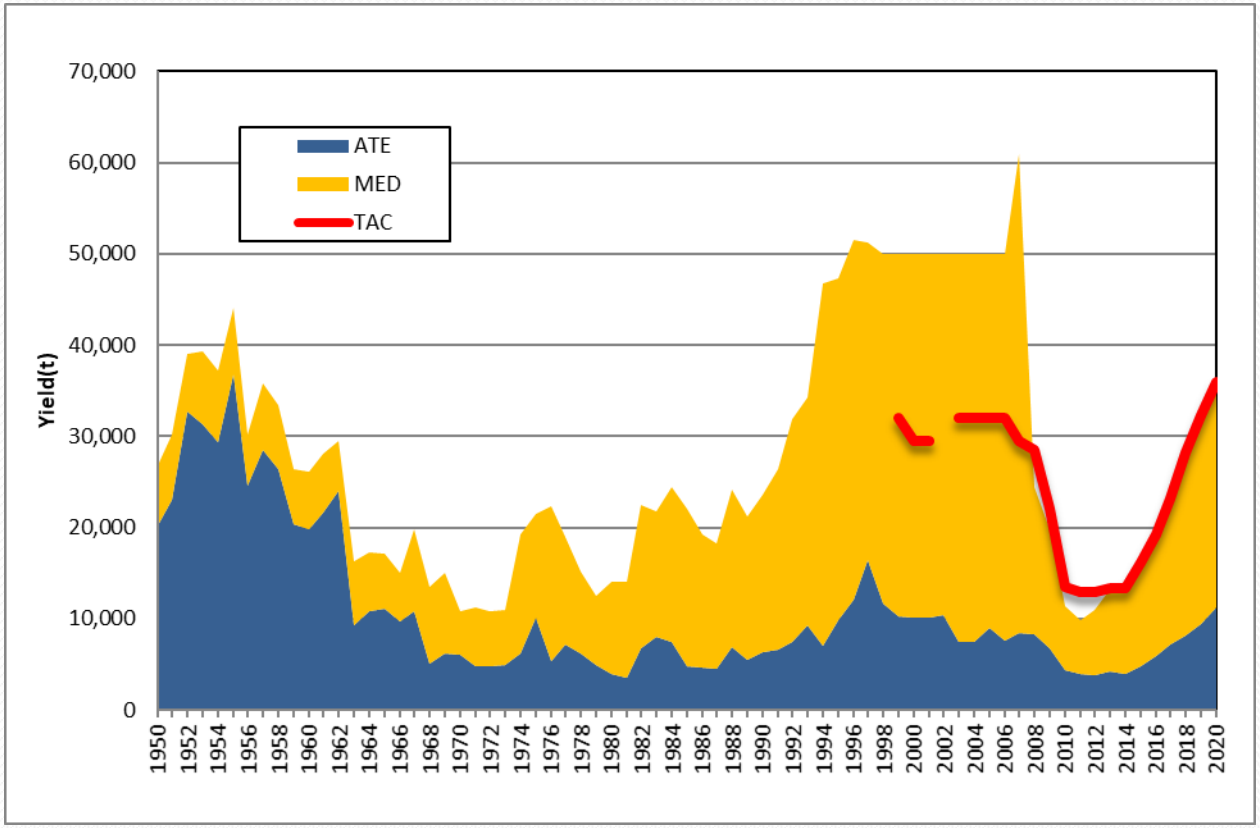


Objective:

- Maintain the stocks at level which will permit maximum sustainable catch for food and other purposes

Fisheries

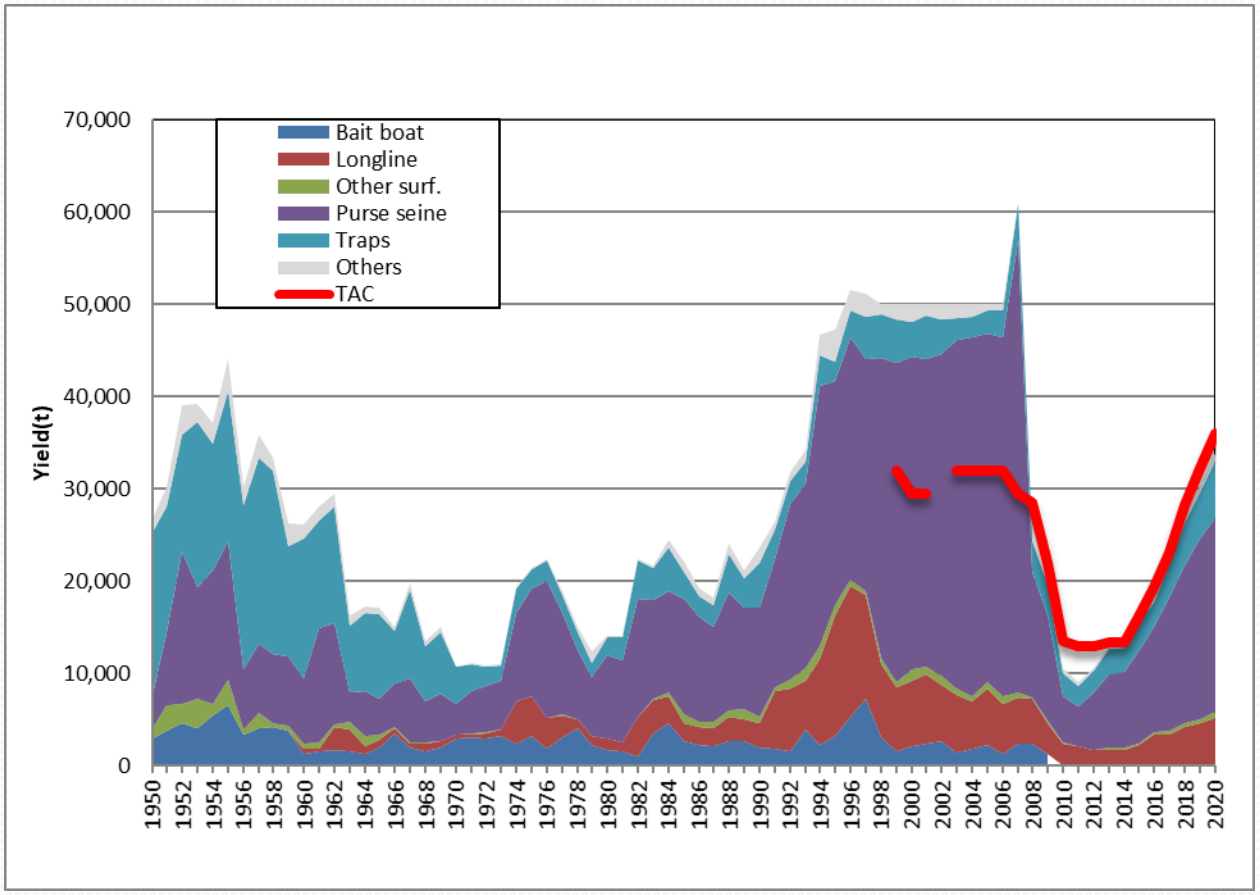
- Production:
  - Maximum catch estimated at 62,638 t in 2007.
  - Catch in 2021* **34,965** t (TAC **36,000**), of which **23,657** t (68%) in the Mediterranean Sea.



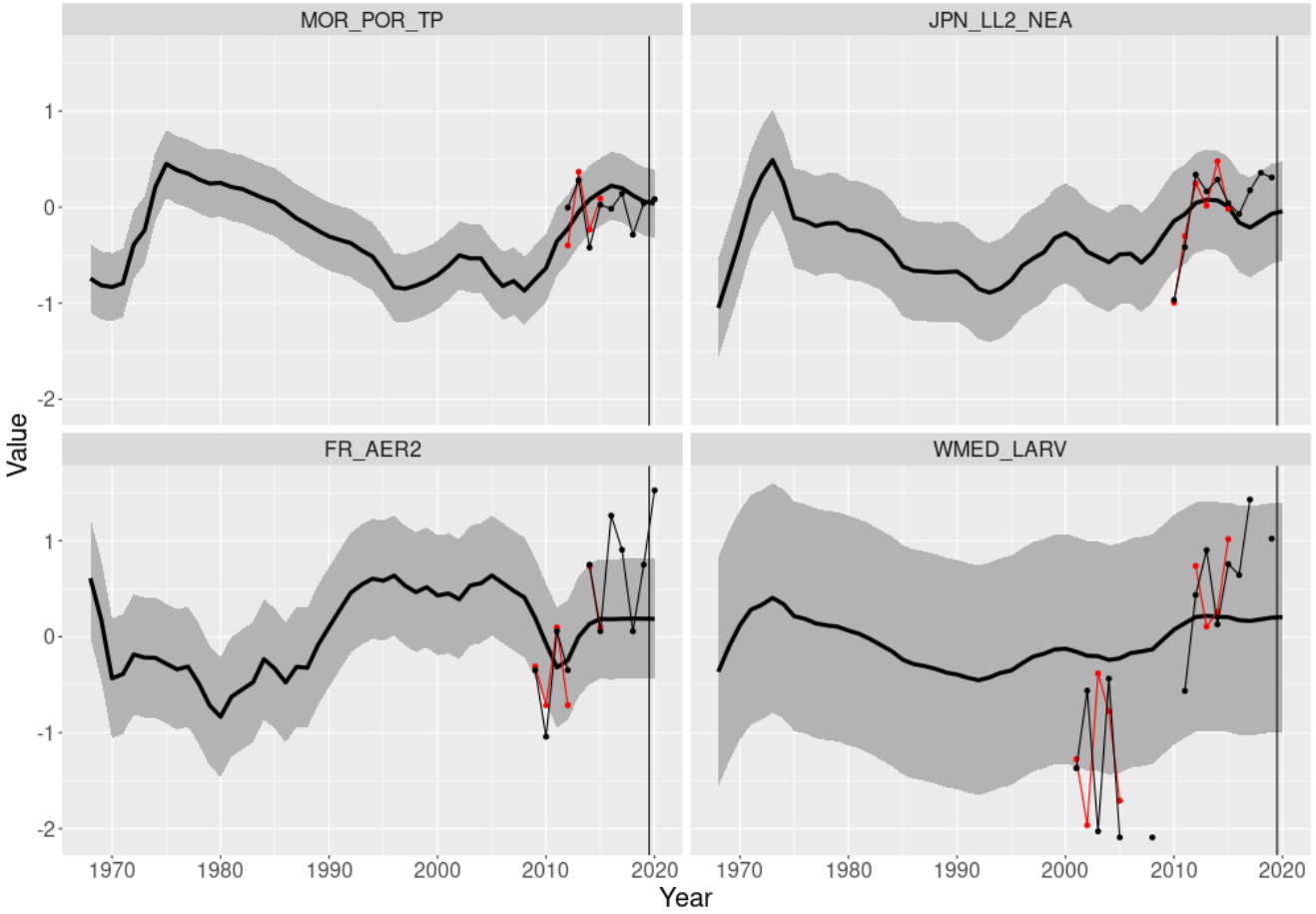
* Catch as of September 18, 2021.

Fisheries

- Main gears:
  - East-Atlantic -Traps, longlines and baitboats
  - Mediterranean – Purse-seine, traps, longlines and Sport fisheries



Updated Fisheries Indices of Abundance E-BFT



Updated 2021 indices (black points-line) and the indices used in the 2017 assessment (red points-line). Thick black lines are the central tendency of the population component corresponding to the index and predicted 80% prediction bounds from the 2017 VPA projected forward with observed catches (gray shade area).

East Atlantic and Mediterranean Bluefin tuna Exec Sum Table

Current reported yield (2020)	**34,965 t***
$F_{0.1}$	0.107 (0.081-0.147)[1]
$F_{2015\text{-}2017}/F_{0.1}$[2]	0.426 (0.359-0.502)[1]
Stock Status [3]	Overfishing: **NO**
Rec. 19-04 TAC 2019, 2020, 2021, Rec. 20-07	32,240 36,000 36,000 t and 36,000 t (2022)

1) Median and approximate 80% confidence interval from bootstrapping from the assessment.

2) $F_{2015\text{-}2017}$ refers to the geometric mean of the estimates for 2015-2017 (a proxy for recent F levels).

3) Biomass reference points to determine stock status were not estimated in the 2017 or 2020 assessment due to uncertainty in recruitment potential

* As of 18 September 2021.

Projections: Kobe matrix 2020 Stock Assessment

Kobe II Strategy matrix showing probabilities (%) of $F<F_{0.1}$ for TACs from 18,000 to 50,000 t from 2018 through 2022 assuming a future average recruitment as estimated for 2006-2011.

Constant catches up to 36,000 t have higher than 60% probability of maintaining F below F0.1 throughout 2022

Catch (t)	2018	2019	2020	2021	2022
18,000	100	100	100	100	100
20,000	99	99	99	99	99
22,000	99	99	98	98	98
23,655	98	98	98	98	98
24,000	98	98	97	98	97
26,000	97	96	96	96	96
28,000	95	94	94	94	94
30,000	93	92	92	90	89
31,000	90	90	89	89	88
32,000	89	88	87	86	83
33,000	86	85	83	81	80
34,000	82	81	79	78	75
35,000	79	77	76	72	70
36,000	75	73	70	68	64
37,000	70	68	65	62	59
38,000	65	63	60	57	54
39,000	59	57	54	52	49
40,000	56	52	49	46	44
45,000	36	35	34	30	28
50,000	24	22	20	18	18

SCRS 2021 East BFT Management Advice

- The updated Eastern abundance indicators were examined by the Committee to evaluate whether it was necessary to change the current TAC advice of 36,000 t recommended for 2022 (Rec. 20-07). The inspection of the updated biomass indicators and the projections of 2017 assessment did not provide any evidence to alter the current management advice. **No change in the current TAC advice of 36,000 t is recommended for 2022**.

- The Committee is of the opinion that the **MSE process is likely the best means of developing robust management advice** to the complexities of bluefin tuna including stock mixing, environmental variability and other uncertainties that affect current assessment advice. Significant progress on the **B-MSE process was accomplished in 2021** and it is given the **highest priority** in the Bluefin tuna **2022 workplan**.

SCRS 2021 East BFT Other items

- The Commission has requested **update the estimates of expected maximum growth of E-BFT in farming Operations**. In 2020/21 the SCRS started several research on individual growth studies. Preliminary results indicate that **BFT growth rates both in size and weight are higher compared to wild fish**. Results are expected to be presented in 2022.

- The Commission has requested **update on the Fishing Capacity of E-BFT fleets**. Preliminary analysis were presented based on individual vessels catch rates (CPUE) considering JFO and other management regulations. Results are expected to be presented in 2022.

- The Commission has requested **review of the protocols and algorithms for Stereo-camera systems** and **estimates of total weight from video recordings**. The Committee has progress on this research in 2021, providing new weight-length relationships for BFT caught by Portuguese and Moroccan traps. Further results will be presented in 2022.

2021 SCRS Recommendations

East and Mediterranean Bluefin tuna

- Continue **BFT-MSE development process as Primary objective**. With 3 meetings devoted to MSE review and dialog with Panel 2 in Nov 12/2021 and 2022. Plus, support for the Ambassador meetings: Oct 13-15, 2021, others in 2022.

- Recommends a **E-BFT data preparatory** meeting in 2022 and **E-BFT Stock Assessment** in 2023.

- **Continued funding to support the essential work of GBYP**, including funding of the MSE development process, biological studies and the full **GBYP** workplan.

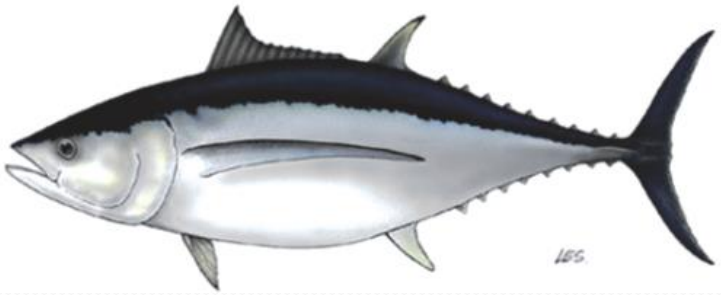
- Support **the Subgroup on E-BFT modelling** in preparation for 2022/23 E-BFT Stock Assessment.

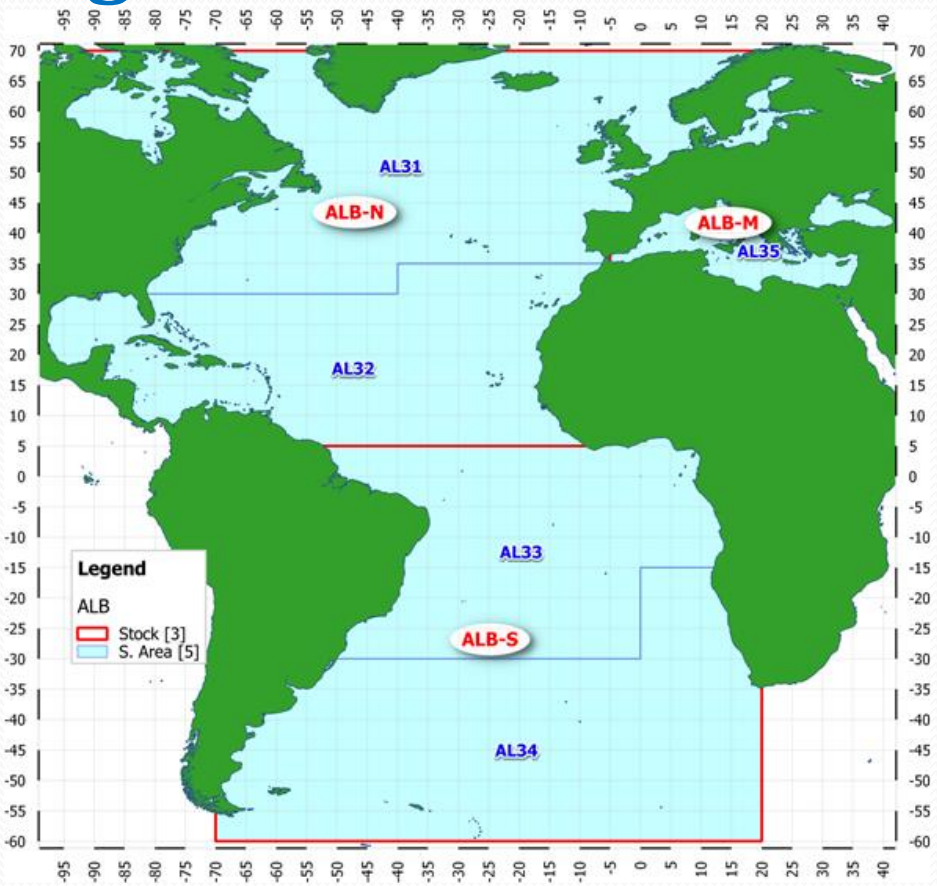
- The Committee **recommends support for workshops in statistical techniques for index standardization** and to develop a working network for analysts to facilitate the future sharing of knowledge and tools.

MED Albacore tuna: Background information

Managed by International Commission for the Conservation of Atlantic Tunas (ICCAT):

- ALB Three stocks (N-ATL and MED mixing occurring but extent unknow)
- **MED-ALB Stock Assessment** in **June 2021** with data until **2019.**
- Management through input control measures (e.g. vessel list, temporal fisheries closures)



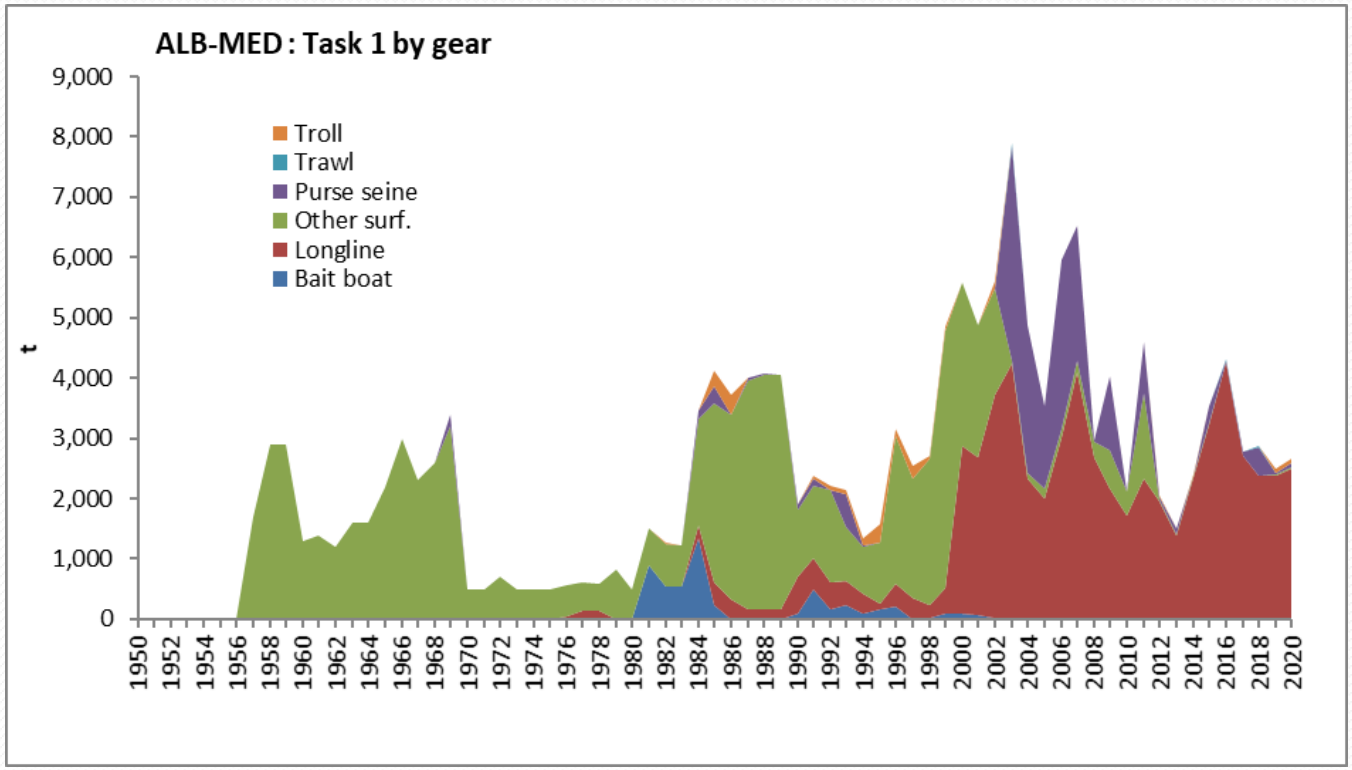


Objective:

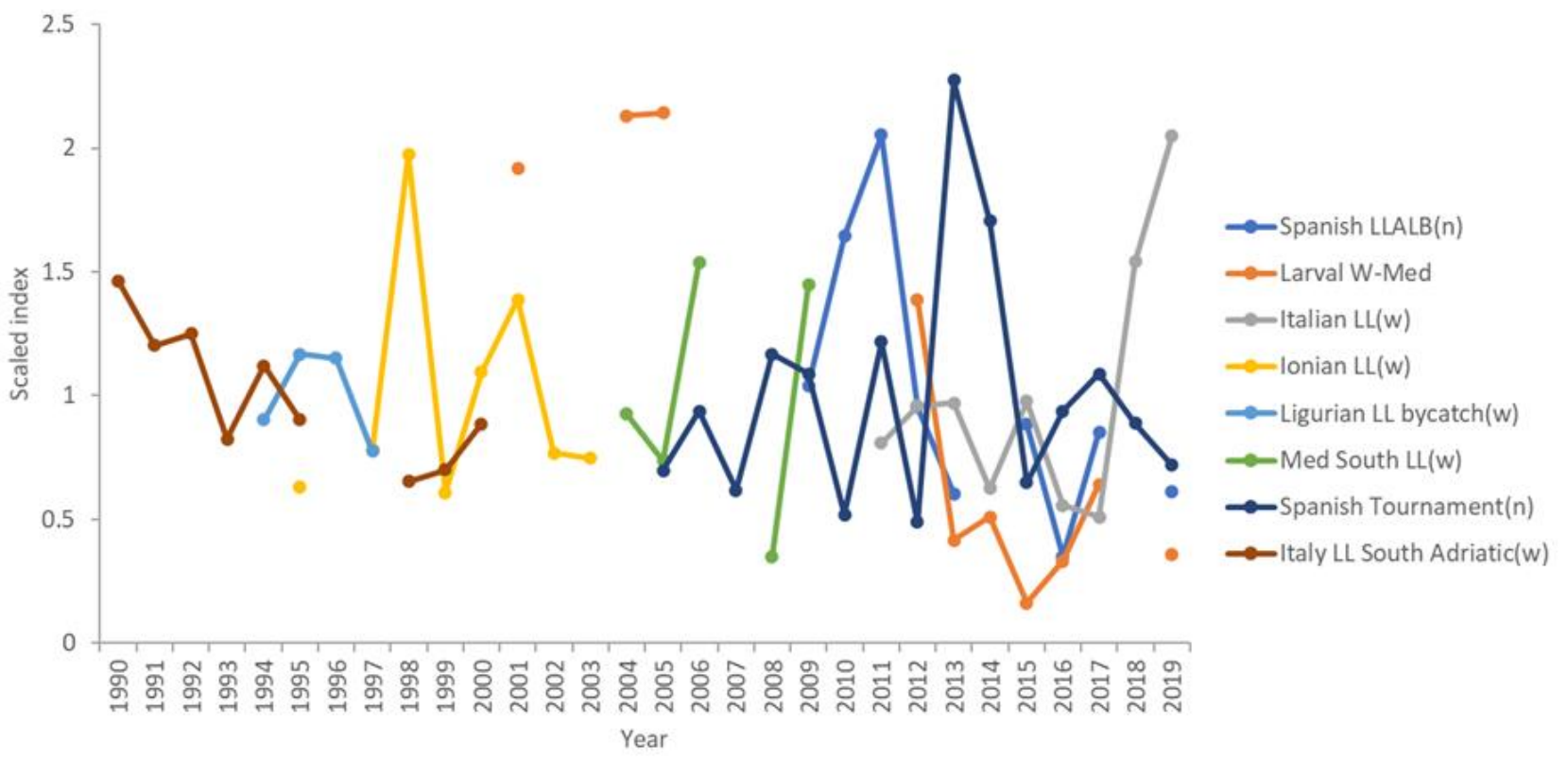
- Maintain the stocks at level which will permit maximum sustainable catch for food and other purposes

Fisheries

- Production in the Mediterranean:
  - Catch peak of 7,898 t in 2003, average of 2,845 t period 2010-2020
  - 2,780 t in 2017; 2,863 t in 2018; 2,484 in 2019 and **2,659** t in 2020.
  - Uncertainty of non-reported catches in the Mediterranean (IUU).

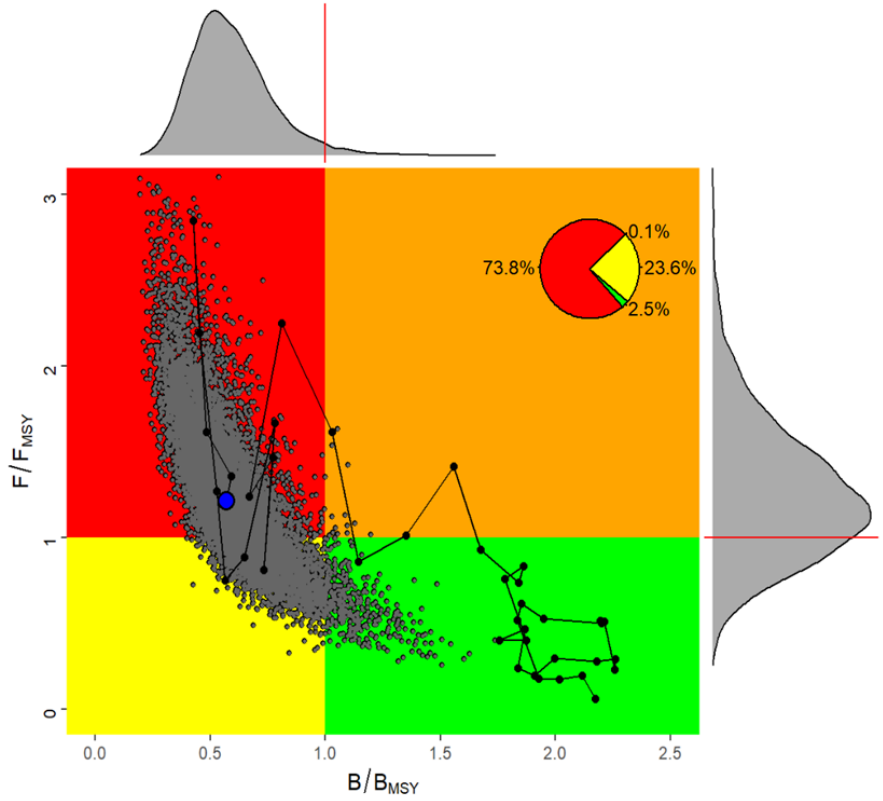


Indices of Abundance



Mediterranean albacore. Abundance indices used in the *2021 Assessment of the Mediterranean albacore stock* (Anon., in press). *n* and *w* refer to abundance indices in number and weight, respectively.

M-ALB Kobe plot – Stock status



Uncertainty:
- Under-reporting catches (IUU)
- Restrictive spatial-temporal coverage of CPUEs
- Lack of historical CPUE series
- Conflicting trend of CPUEs e.g., LL Italy vs W-Med larval index.

Probability of being overfished 97.4% $B < B_{MSY}$
Probability of overfishing occurring 74% $F > F_{MSY}$

Stock status trajectories of B/B_{MSY} and F/F_{MSY}, as well as uncertainty around the current estimate (Kobe plots) for the Bayesian surplus production JABBA model.

Mediterranean Albacore Exec Sum 2021

MEDITERRANEAN ALBACORE SUMMARY	
Maximum Sustainable Yield	3,653.9 t (2,446-5,090 t)[1]
Current (2020) Yield	2,675 t
Yield in last year of assessment (2019)	2,484 t
B_{MSY}	19,703.1 t (11,676 - 36,833 t)[1]
F_{MSY}	0.184 (0.091 - 0.335)[1]
B_{2019}/B_{MSY}	0.570 (0.322 - 1.004)[1]
F_{2019}/F_{MSY}	1.213 (0.618 - 2.175 t)[1]
Stock Status	Overfished: YES
	Overfishing: YES
Management measures in effect:	Rec. 17-05: Time closure of two months (1 Oct - 30 Nov) for longlines, aimed at protecting the Mediterranean swordfish juveniles. A list of vessels authorized to target Mediterranean albacore implemented in 2017. No increase of catch and effort until more accurate advice is delivered.

[1] Median and 95% credibility intervals from the Bayesian surplus production model.

Management Advice MED-ALB 2022

- Uncertainty in data inputs contribute to uncertainties in the characterization of stock status, specially for fishing mortality (Wide confidence intervals on F/F_{MSY})
- Based on the best available data and models, projections of current (2019) stock status show that catches exceeding 4,000 t would lead to a high probability of driving the stock to extremely low levels, risking stock collapse.
- By comparison, catches on the order of 2,700 t, close to the average of the last three years (2017-2019) would allow the stock to recover to the green quadrant of the Kobe plot with a greater than 50% probability by 2032.
- However, this level of fishing also has a 17% probability of reducing B/B_{MSY} below 0.2 in 2032.
- Decreasing catches below 2,700 t would allow for faster recovery and higher probabilities of being in the green quadrant.

2021 SCRS Recommendations

Mediterranean Albacore

- The Committee **supports the continuation of larval data collection in the Balearic Sea** and other spawning areas (central and eastern Mediterranean). Including method s and tools for developing habitat standardized larval indices of abundance.

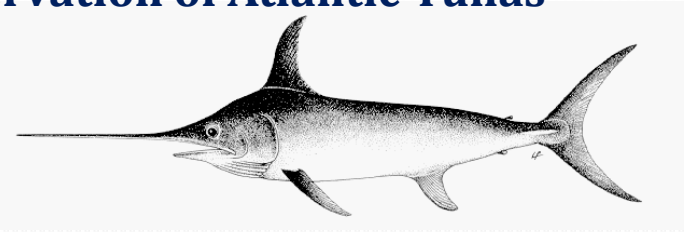
- The Committee **recommended increasing efforts to complete the Task 1 data for Mediterranean albacore**, this being one of the main uncertainties not quantified in the assessment. It was **requested that CPCs and Secretariat work together** to complete the task 1 data and to **consider methods** developed by the WGSAM **to estimate unreported of catches**.

- The Committee **recommends that CPCs with important Mediterranean albacore fisheries increase size sampling** to facilitate the implementation of alternative **age structured stock assessment models.**

- The Committee **recommends conducting a review on age-length** data to update the estimates of the Growth model for Mediterranean albacore.

MED Swordfish: Background information

Managed by International Commission for the Conservation of Atlantic Tunas



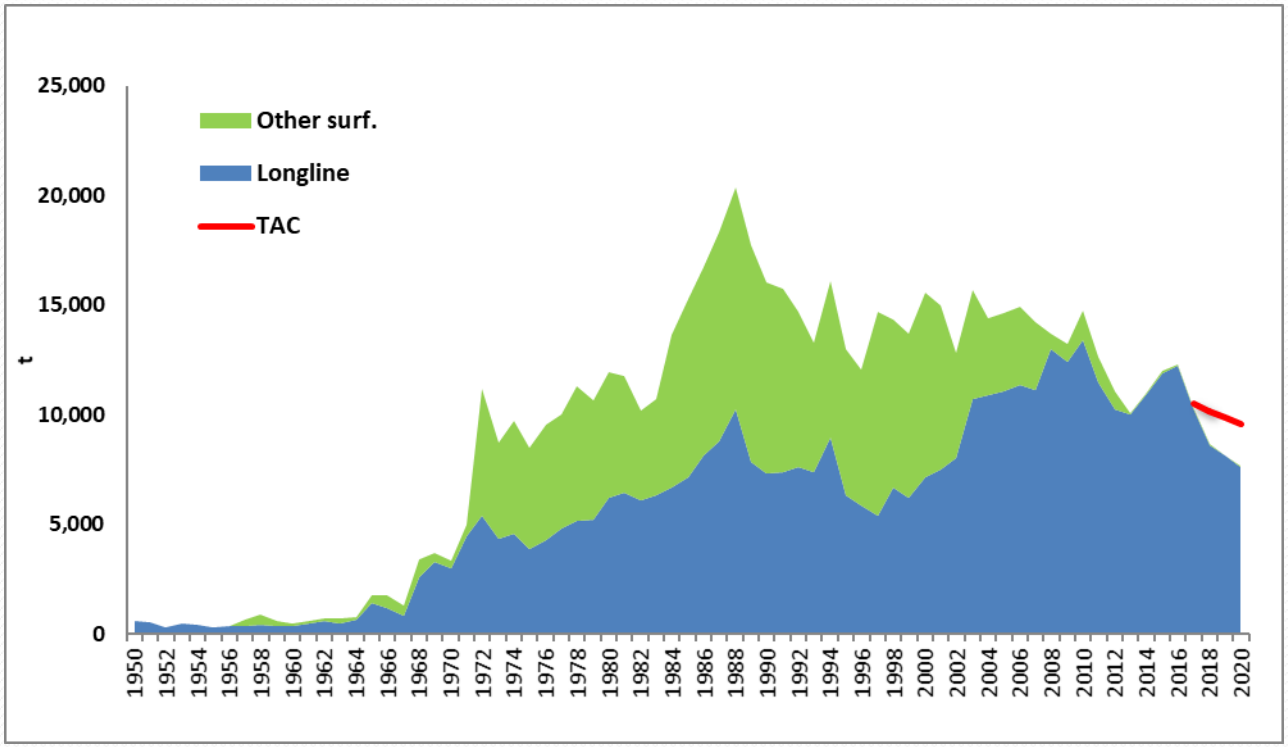
- Single stock unit with limited mixing with N-ATL stock
- **No Assessment in 2021.** Last Assessment **June 2020**
- Management through input control measures (e.g. TAC, vessel list, min. size/weight, fisheries closures)

Objective:

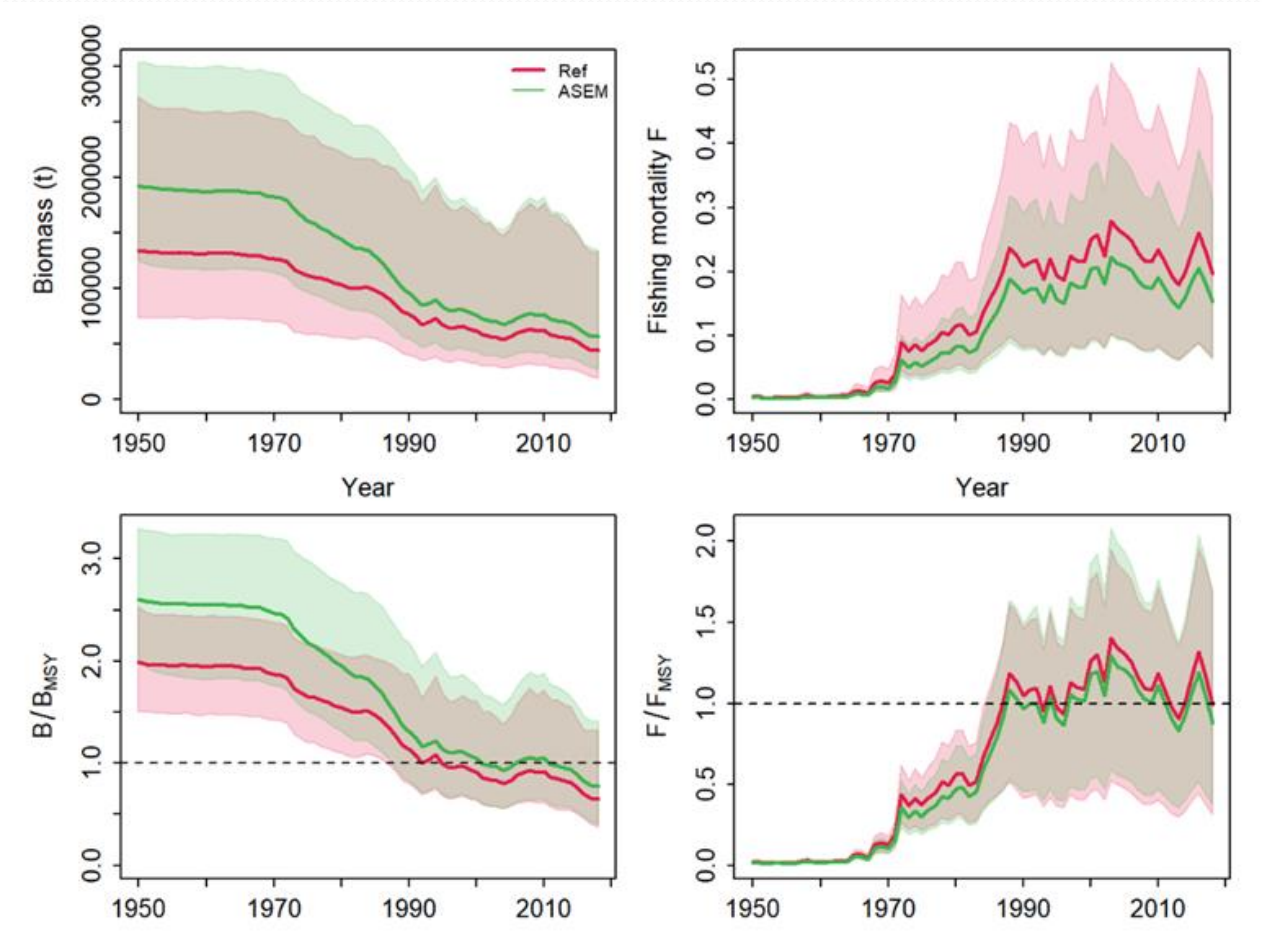
- Maintain the stocks at level which will permit maximum sustainable catch for food and other purposes

Fisheries

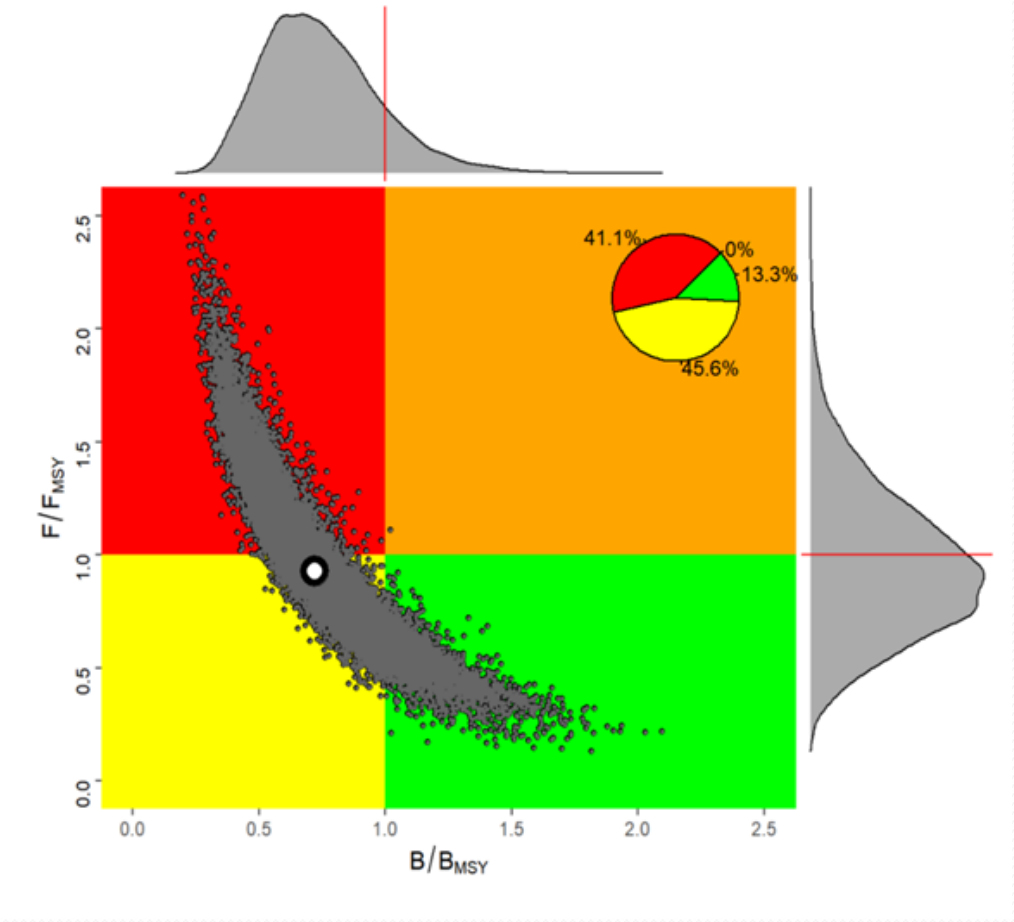
- Main gears: Longlines (surface, mesopelagic) and Gillnets (prohibited since 2012)
- Production declining in the recent years from 12,300 (2016) to 7,665 (2020).
- Catch in 2020 **7,665** t a 15% decrease compare to average catch 2017-2019 and below TAC (9,583 t).



Estimates of Task I swordfish catches (t) in the Mediterranean by major gear types, for the period 1950-2020. Non- reporting may occur in the earlier period (up to the middle 1980s).



SWO-MED-Figure 3. Trends in biomass and fishing mortality (upper panels) and biomass relative to BMSY (B/BMSY) and fishing mortality relative to FMSY (F/FMSY) (bottom panels) for each scenario from the Bayesian state-space surplus production model fits to Mediterranean swordfish.



SWO-MED-Figure 4. Kobe phase plot showing the combined posteriors of B_{2018}/B_{MSY} and F_{2018}/F_{MSY} presented in the form of joint MCMC posteriors of JABBA model runs for Mediterranean swordfish. The probability of posterior points falling within each quadrant is indicated in the pie chart.

Mediterranean Swordfish Summary 2020

Maximum Sustainable Yield	**13,325 (10,899 – 17,346 t)[1]**
Current (2020) Yield	7,665 t
B_{MSY}	71,319 (42,562 – 113,758) t[1]
F_{MSY}	0.19 (0.12 – 0.34)[1]
Relative Spawning Biomass B_{2018}/B_{MSY}	0.72 (0.38 – 1.29)[1]
Relative Fishing Mortality F_{2018}/F_{MSY}	0.93 (0.42 – 1.68)[1]
Stock Status (2018)	Overfished: **Yes**[1] Overfishing: **No**
Management Measures in Effect:	Driftnet ban [Rec. 03-04] Three-month fishery closure, gear specifications (number and size of hooks and length of gear), minimum catching size regulations, list of authorized vessels, fishing capacity restrictions, domestic observers onboard on longlines. TAC [**Rec. 16-05**]: 10,500 t in 2017, 10,185 t in 2018, 9,879 in 2019, 9,583 in 2020, **9,296** in **2021** and **9,017** in **2022**.

[1] 95% credibility intervals of 30,000 MCMC iterations from Bayesian surplus production models.

SWO-Med Management recommendations 2020

- **Stock biomass 2018 is about 30% lower** than that corresponding to MSY, while **2018 fishing mortality was around F_{MSY}.**

- Analysis indicated that **the probability of stock rebuilding** by the end of the **projection period (2028) is 60%** if a **TAC equal to 10,000 t** is implemented.
-
- The probability increases if lower TACs levels are selected.

- There are **uncertainties on stock productivity**, therefore these estimates may be optimistic and should be interpreted with caution.

Mediterranean Swordfish Recovery Plan Rec. 16-05

Rec. [16-05] Multi annual **Recovery plan 2017 – 2031**

TAC in 2017 of 10,500 t.

- Reduction of TAC 2018-2022 by 3% each year
- **Fishing capacity reduction** and **limitation**
  - Limit to the average number of vessels 2013-2016
- Fishing countries to submit **Fishing Plans** to ICCAT yearly.
- **Closed fishing season**(s) Jan 1st – Mar 31st / Oct 1st – Nov 30th
- **Gear restrictions** hook size/ length LL 100 cm LJFL/11.4 kg.
- Sport – recreational fisheries restrictions.

2021 SCRS Recommendations

Mediterranean Swordfish

Improvements in historical T1 and T2 data compared to 2016 assessment. However, the available CPUE data for the earlier period are still limited and the early period of the fisheries cannot be fully accounted. It is **recommended conducting a recovery of historical data,** so that the entire history of the fishery is reflected when assessing the stock.

Research funding for biology and stock structure, including age, growth and reproductive studies, as well as stock structure and mixing. Given the **current uncertainties that still exist,** the Committee recommends as **high priority to continue biological studies on Mediterranean swordfish**.

2021 SCRS Recommendations …

Mediterranean Billfish

- To resume and enhance **the collection of fishery data on Mediterranean spearfish and other billfish** which are present in the Mediterranean.

Please visit also the ICCAT 2021 meeting webpage

(2021 SCRS Advice to the Commission)*

https://www.iccat.int/en/Meetings.html

Thanks for your attention