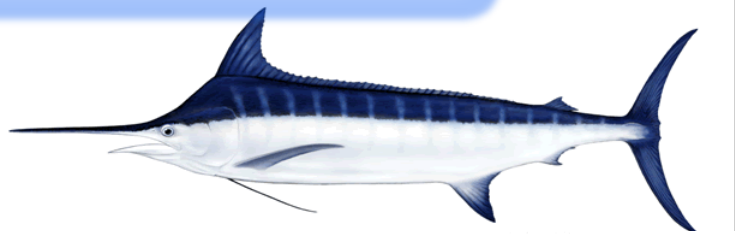
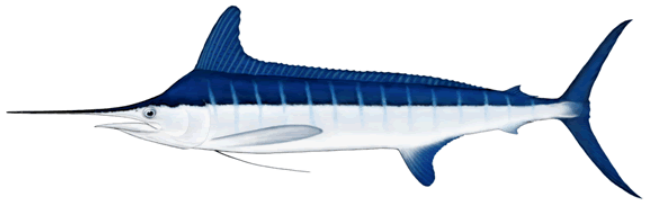
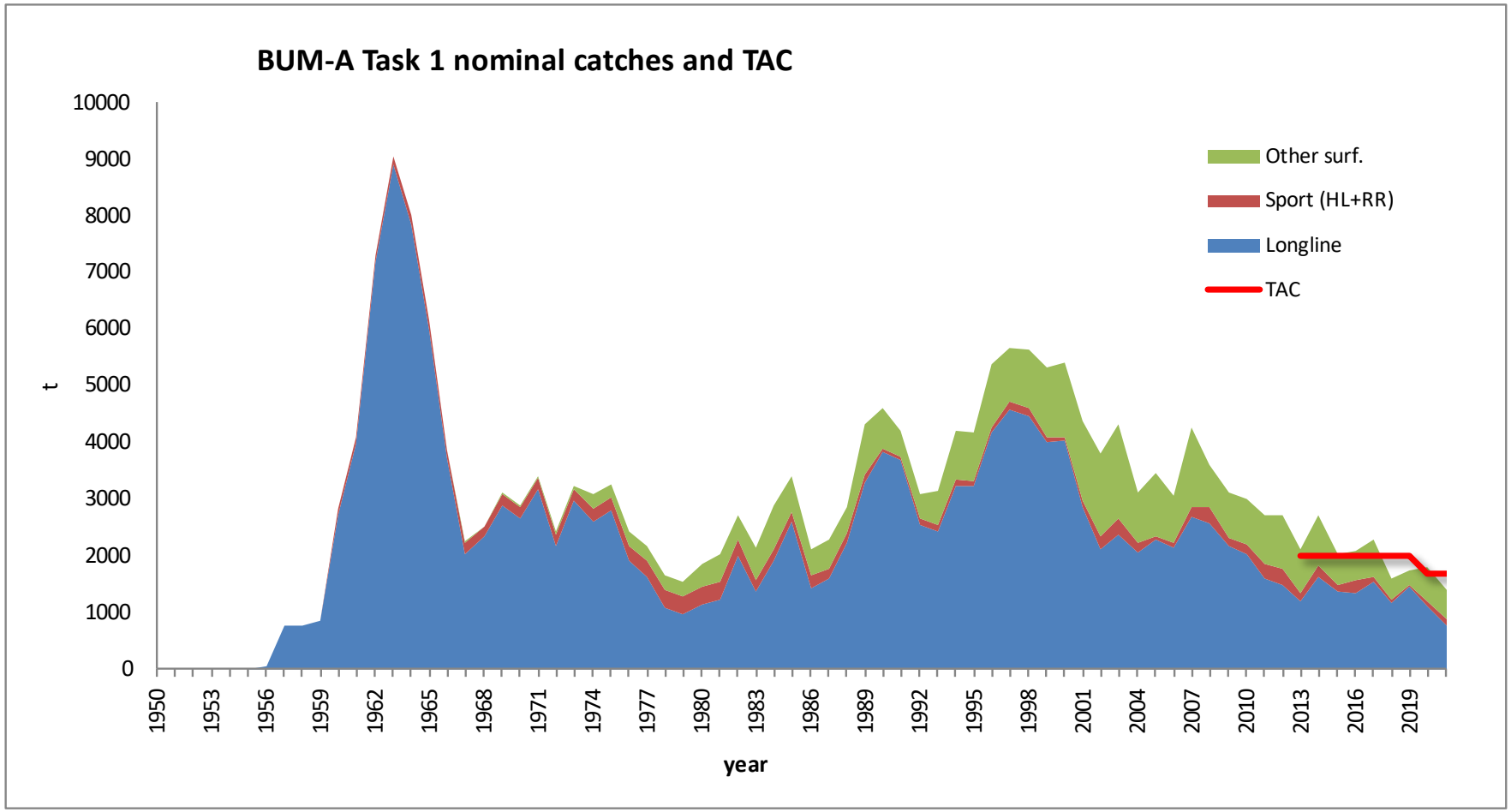
SCRS Report 2023 – PANEL 4

Swordfish
Billfishes
Sharks
Small tunas





Blue marlin annual catch by gear

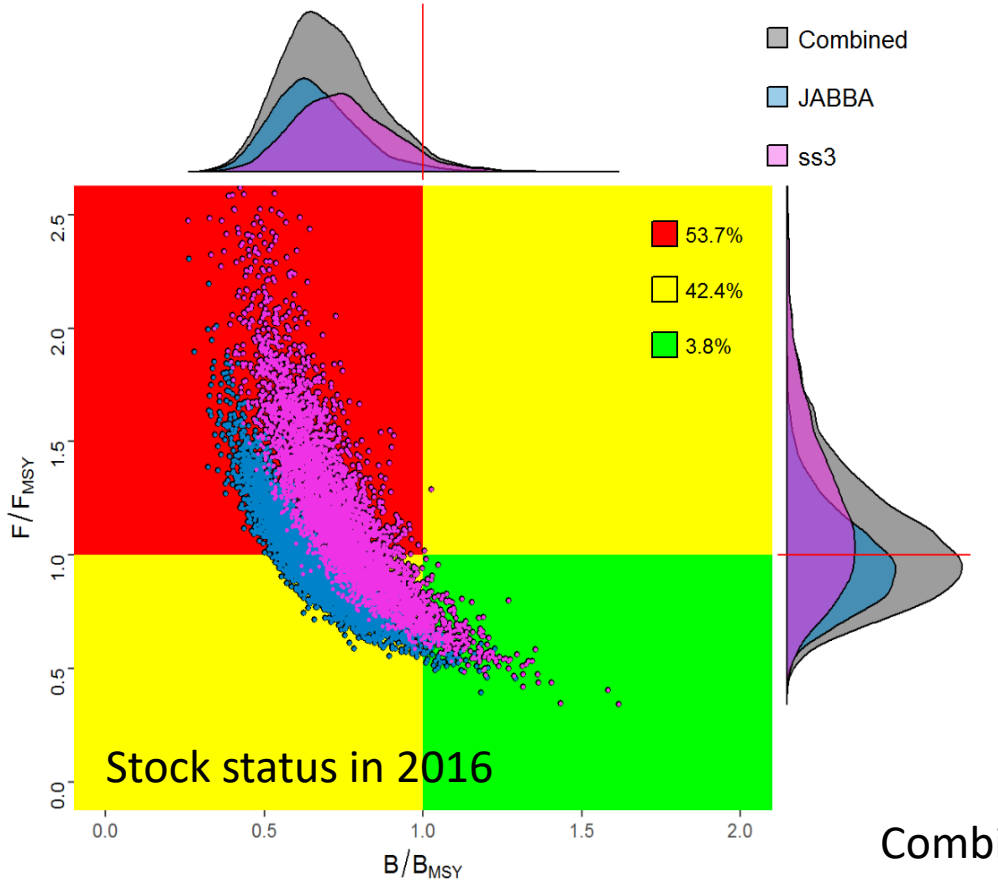


Catch (2020): 1,888 t
TAC (2020): 1,670 t

Catch (2021): 1,711 t
TAC (2021): 1,670 t

Catches 2020-2021

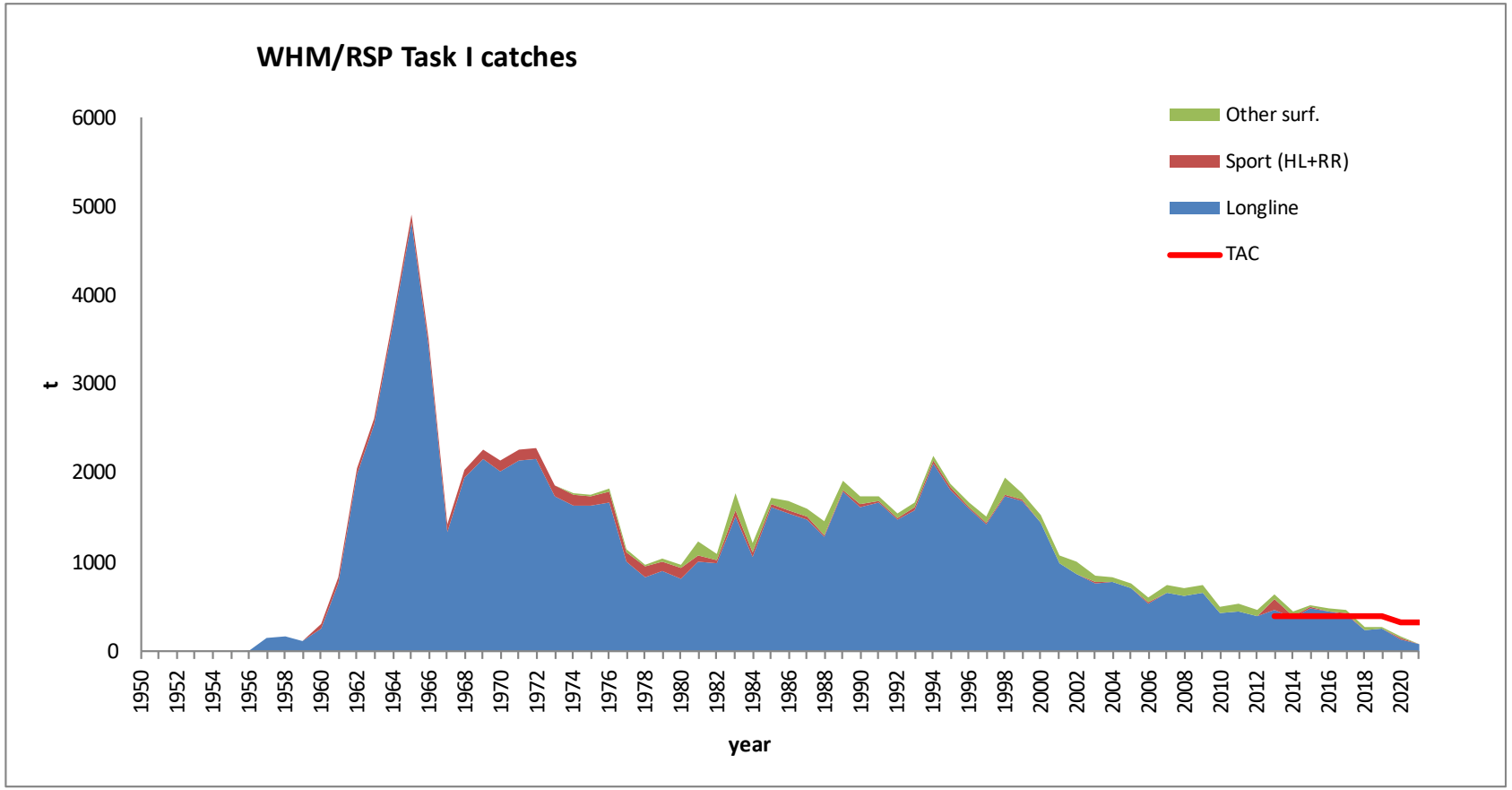
Blue marlin status



- Last assessment in 2018 (estimates of stock status for 2016)
- Results showed that the stock was **overfished, and undergoing overfishing.**

Combined Kobe plot from production and integrated models

White marlin annual catch by gear



Catch (2020): 179 t
TAC (2020): 335 t

Catch (2021): 120 t
TAC (2021): 335 t

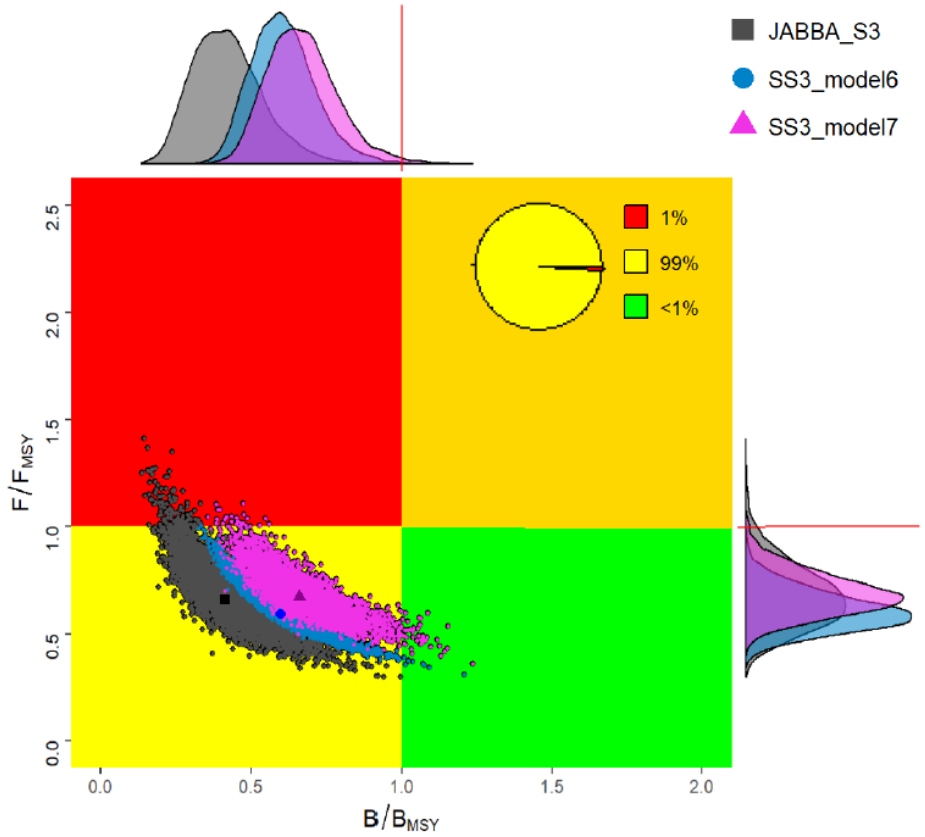
Catches 2020-2021

White marlin status

- Last assessment in 2019 (estimates of stock status for 2017)

- Results showed that the stock was:

overfished, but overfishing not occurring.

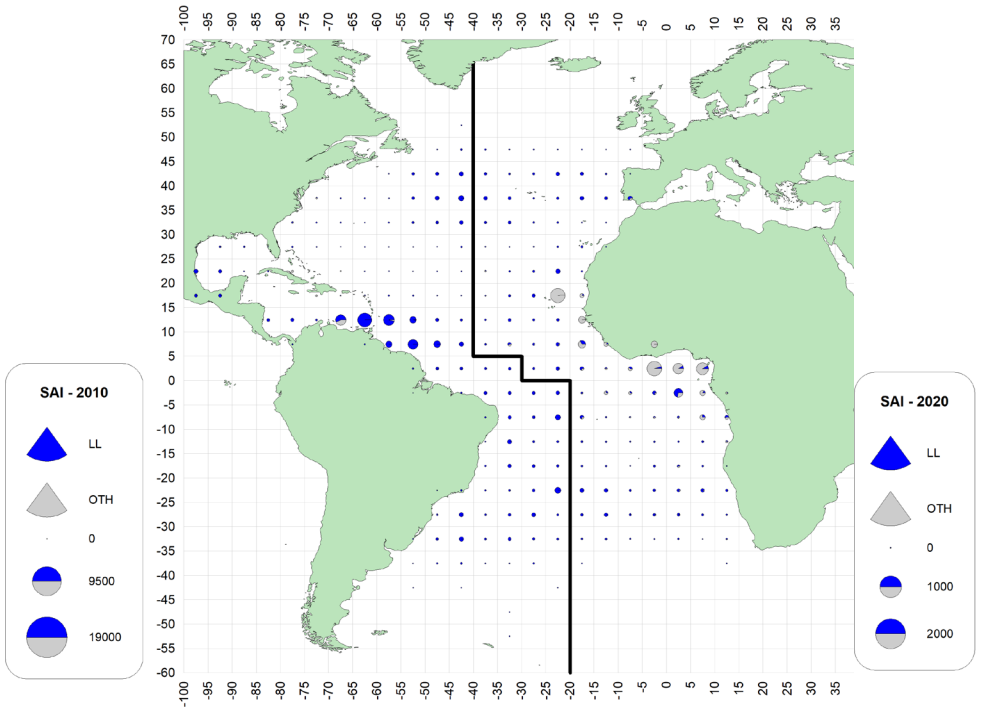


stock status (last data: 2017)

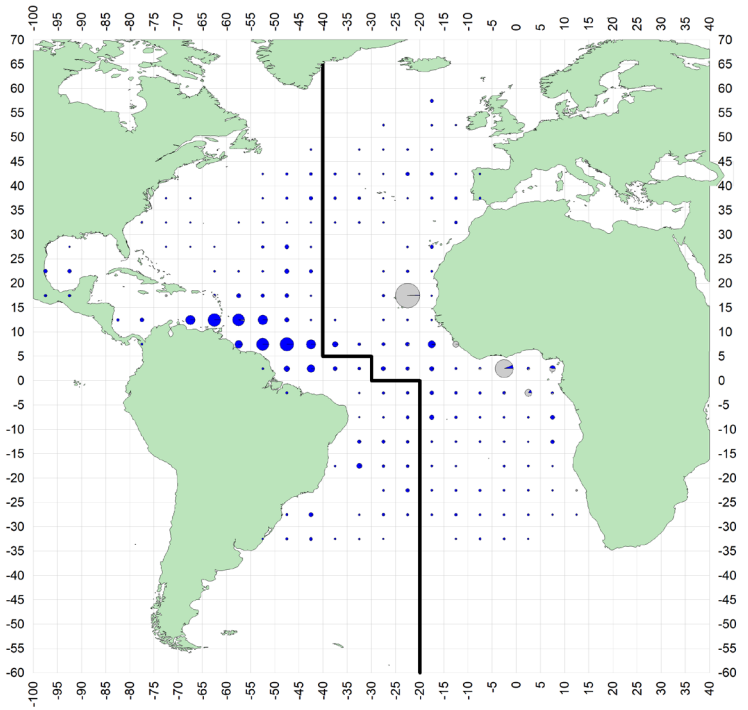
Stock assessments of both the W-SAI and E-SAI Stocks were conducted in 2023, using data through 2021

Geographic distribution of the catches (*last decade only covers 2 years*)

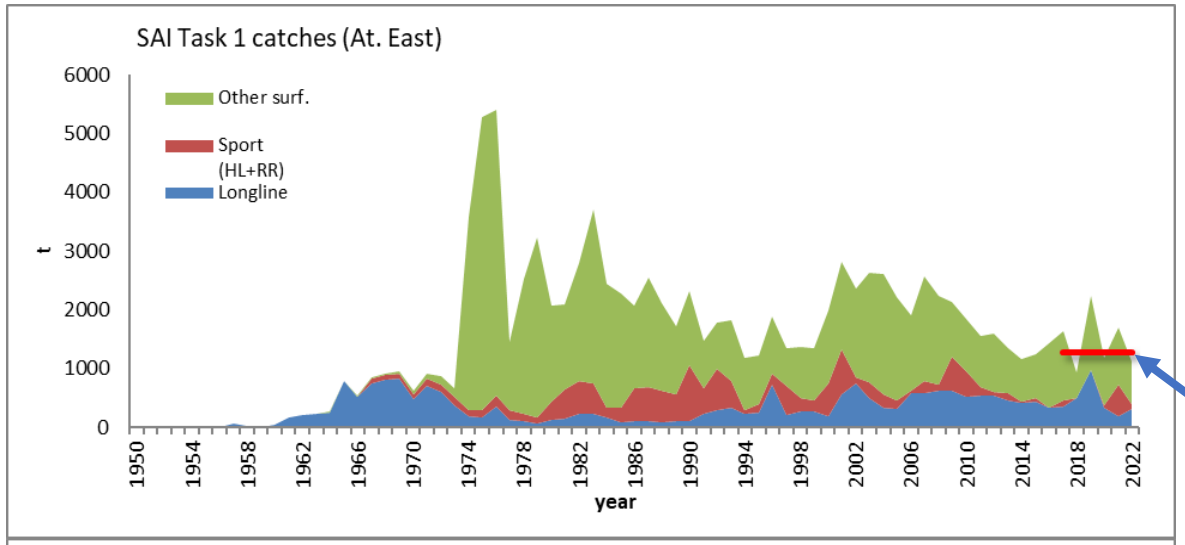
(2010-19)

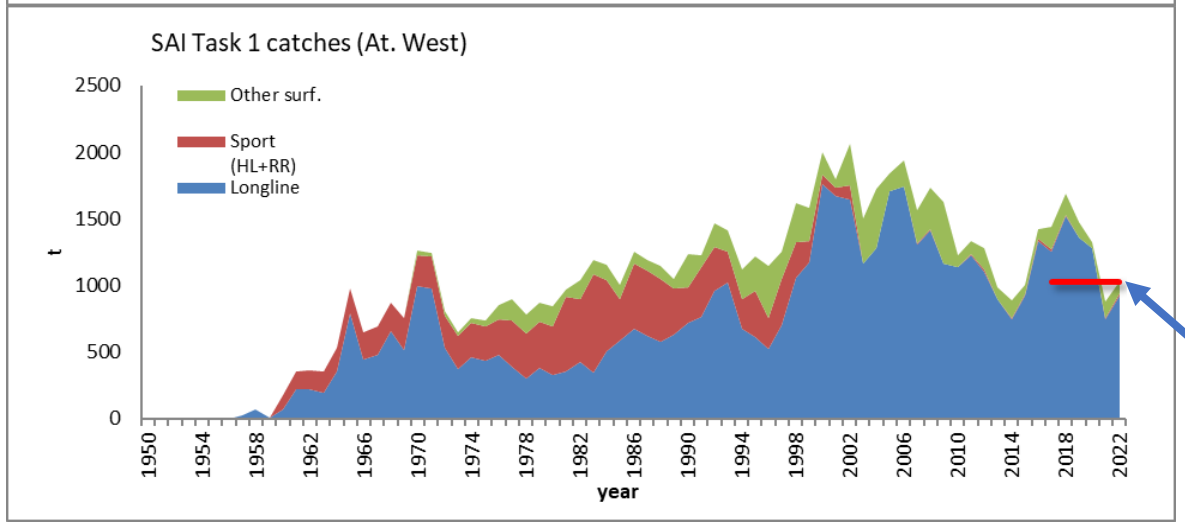


(2020-21)



Estimated catches of Sailfish (*Istiophorus albicans*) by gear (1956-2021)





Catches of sailfish East in 2022 were 1,110 t, compared to 1,706 t reported for 2021

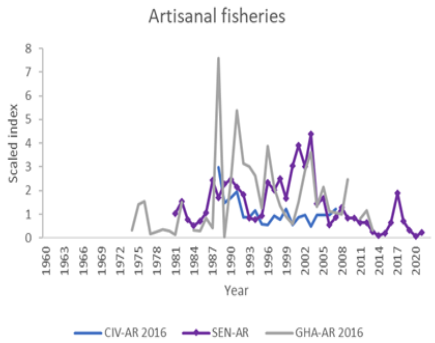
Catch limit 1271 t (Rec. 16-11)

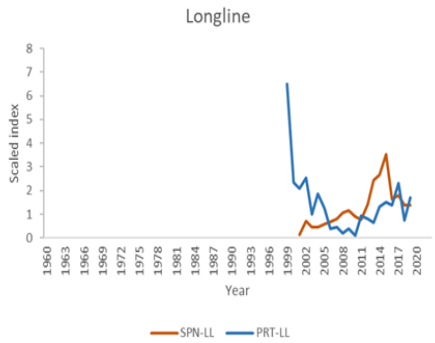
Catches of sailfish West in 2022 were 1,029 t, compared to 876 t reported for 2021

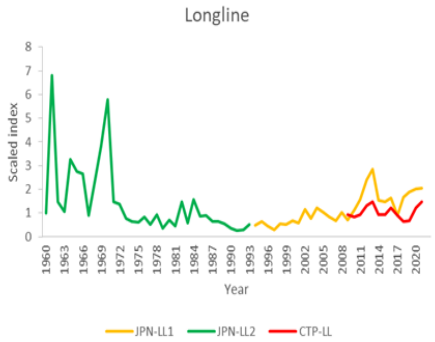
Catch limit 1030 t Rec. 16-11

Relative abundance indices used in the assessments

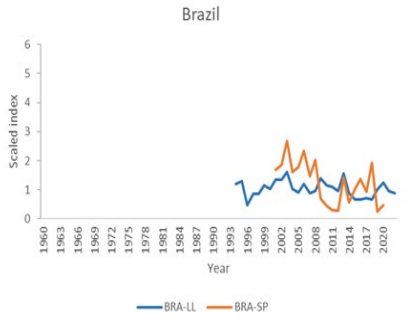
Eastern Atlantic

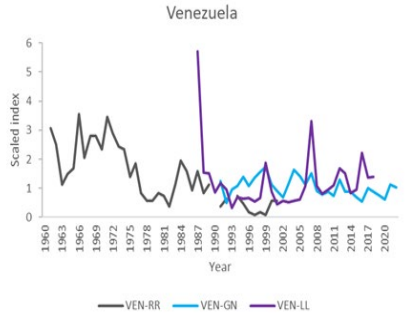


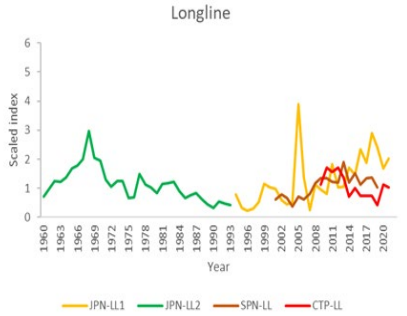




Western Atlantic







CPUEs (6)

EU-POR-LL

SEN

CIV *

GHN*

EU-PRT-LL 1999 *

CTP-LL, JP- LL (early and late)

For both stocks, some of the available CPUE time series showed a decreasing trend while others showed an increasing

Conflicting trends among the indicators of stock abundance for both stocks

CPUEs (8)

JPNLL (early and late)

CTP -LL

EU-SPN-LL

US-LL observer

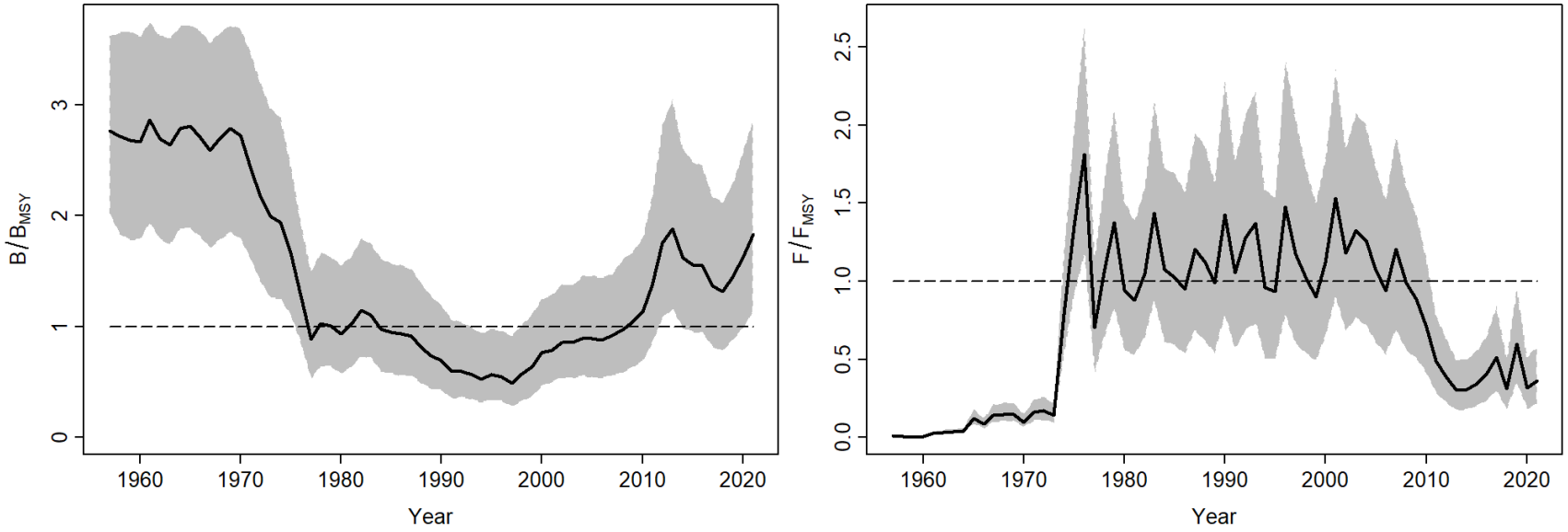
Bra-LL

Ven- LL

Ven-RR

US-RR* , BRA-RR* & VEN-GN

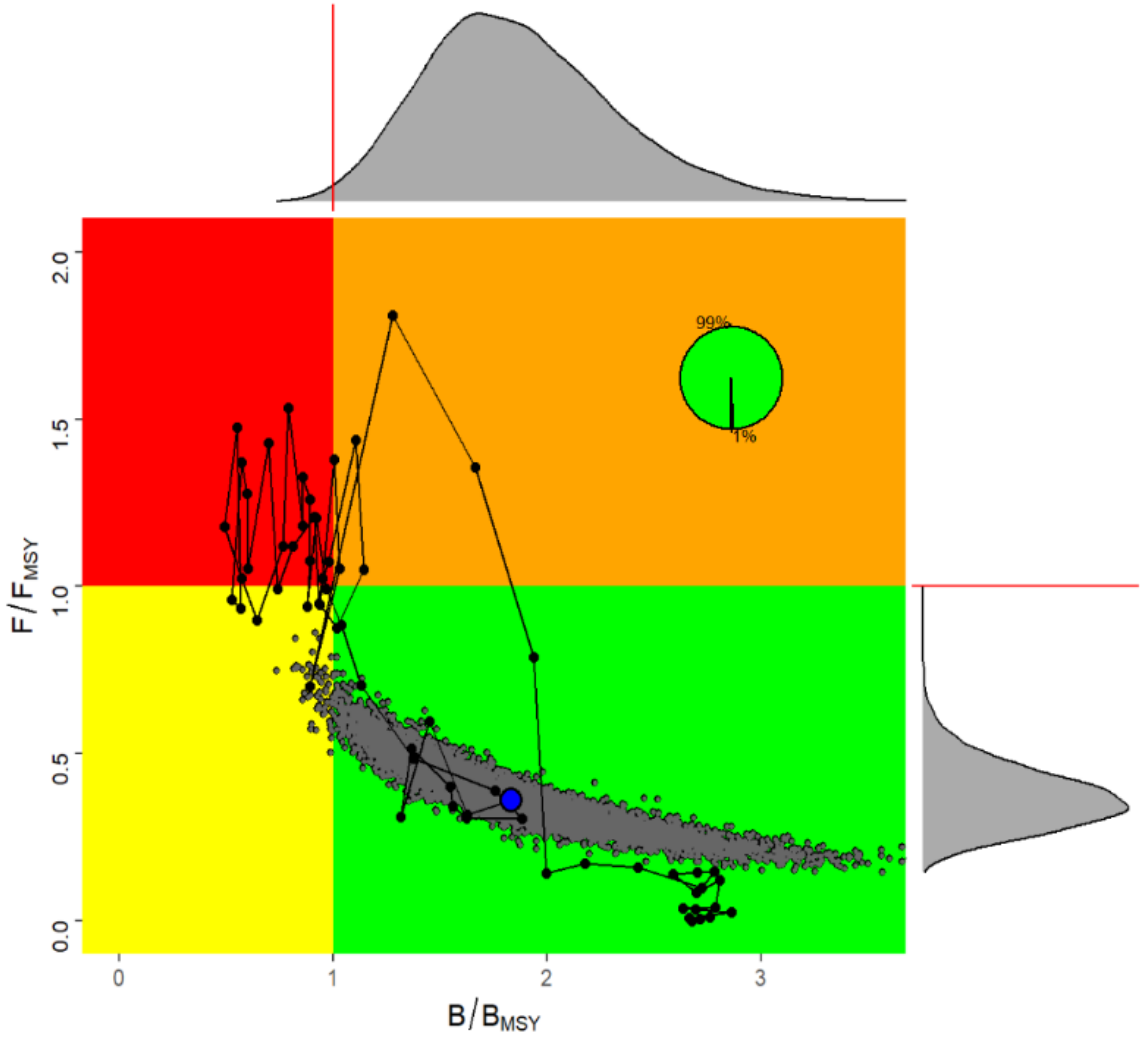
Sailfish East: State of the Stock (JABBA)



The trajectories of B/B_{MSY} and F/F_{MSY} .

- The stock was determined to be NOT overfished:
- B_{2021}/ B_{MSY} = 1.83 (1.14 - 2.88)
- And NOT undergoing overfishing:
- F_{2021}/ F_{MSY} = 0.362 (0.212-0.585).

Sailfish East: State of the Stock



The resultant stock status for 2021 has:

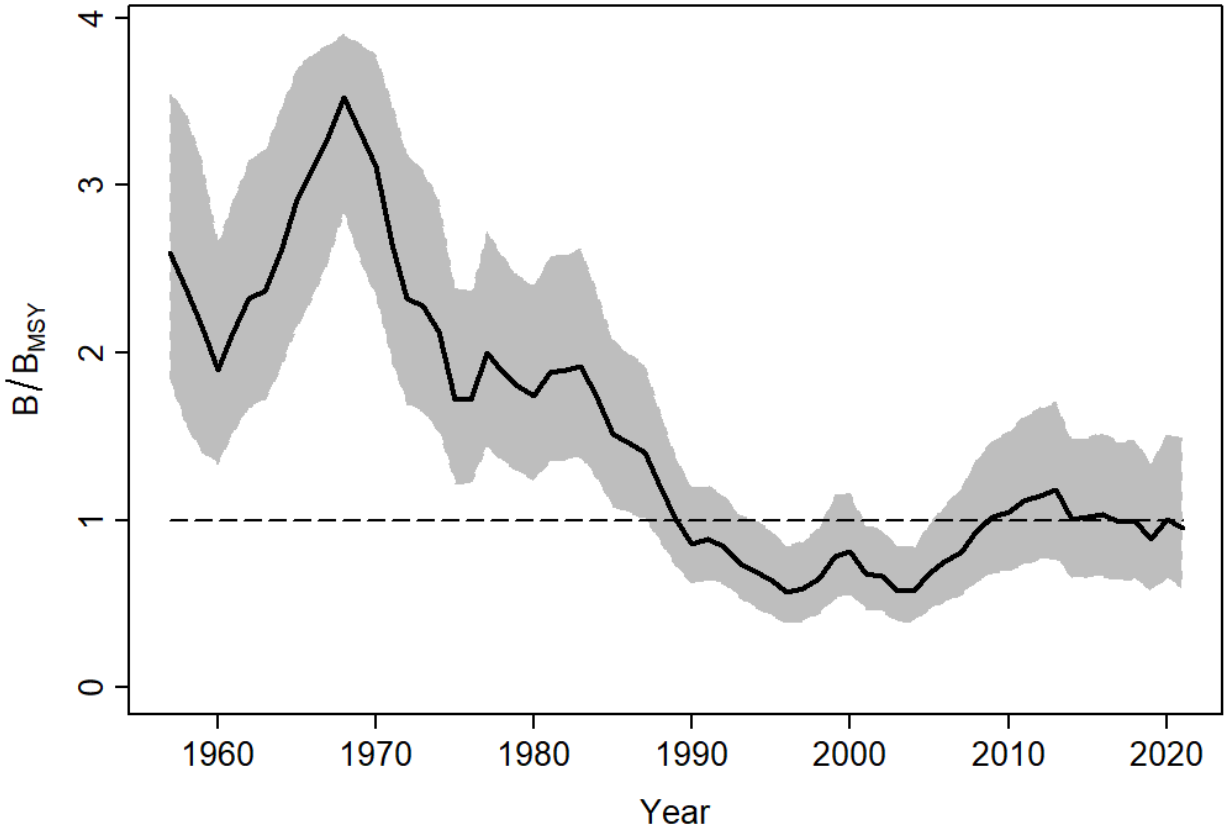
- a high probability of being in the green quadrant of the Kobe phase plot (99%),

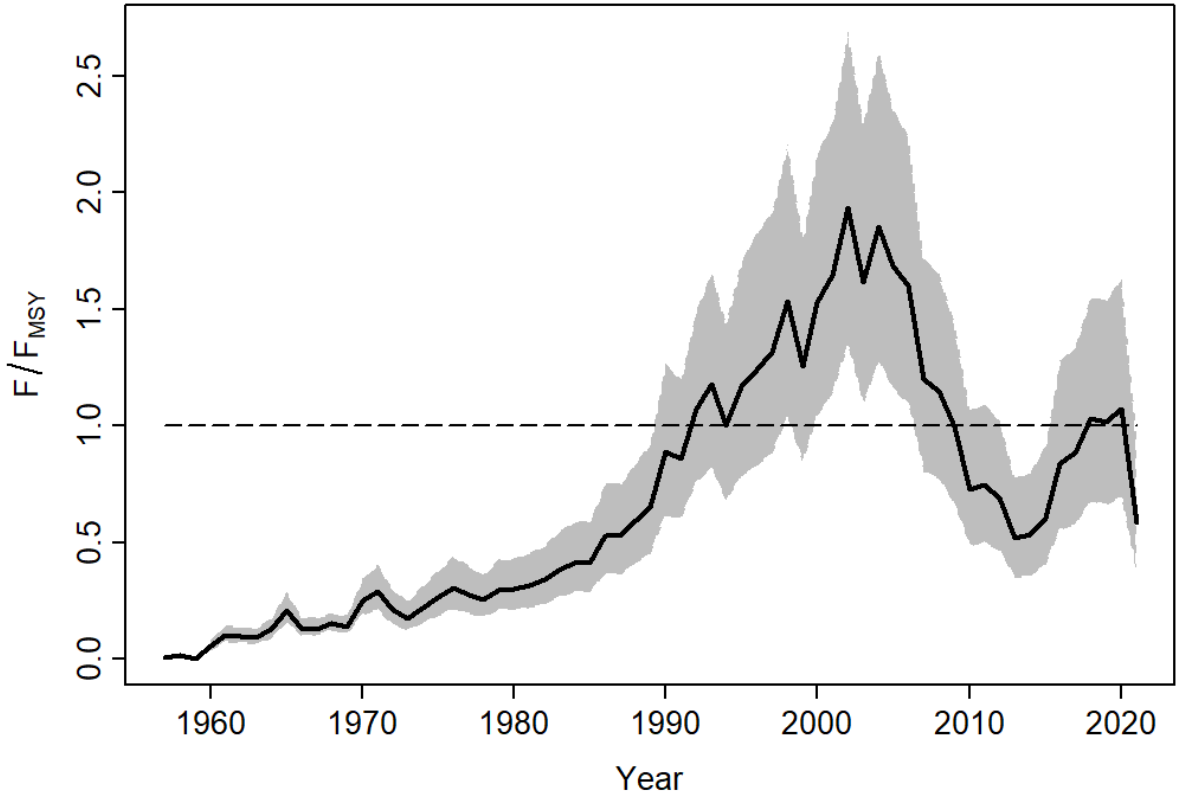
The stock is not overfished nor undergoing overfishing .

Sailfish West : State of the Stock

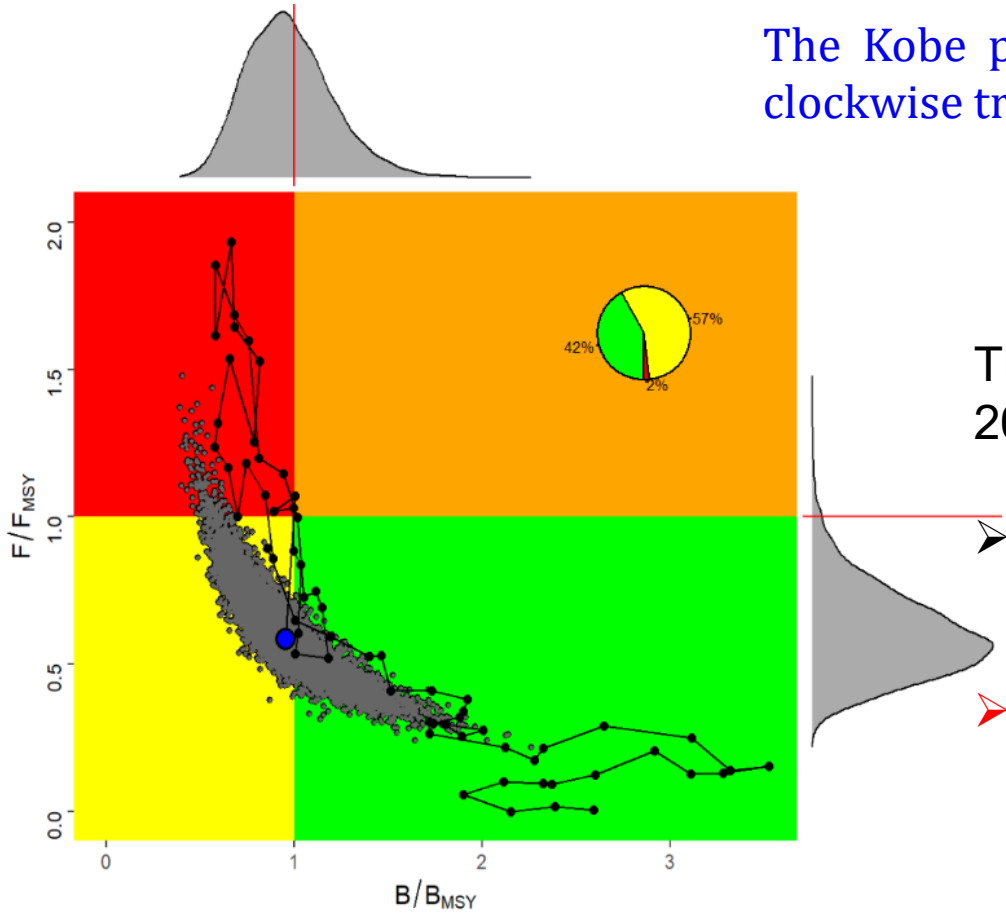
The trajectories of B/B_{MSY} and F/F_{MSY}.

- The stock was determined to BE overfished:
  $B_{2021}/ B_{MSY} = 0.96$ (0.59-1.49)
- And, NOT undergoing overfishing:
  $F_{2021}/ F_{MSY} = 0.585$ (0.364-0.952).





Sailfish West: State of the Stock



The Kobe phase plot shows a typical anti-clockwise trajectory

The resultant stock status in 2021 for the final model has

- the highest probability (57%) of being overfished
- There is a high probability (98%) that the stock is not undergoing overfishing

Kobe 2 Strategic Matrices for the East Atlantic sailfish stock

Probability of being in the green zone

Probability $F<=F_{MSY}$ and $B>=B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%
1000	98%	99%	99%	99%	99%	99%	99%	100%	100%	100%
1250	98%	99%	99%	99%	99%	99%	99%	99%	99%	99%
1500	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
1750	98%	98%	97%	97%	97%	97%	96%	96%	95%	96%
2000	98%	97%	96%	96%	95%	94%	93%	92%	91%	91%
2250	98%	96%	94%	93%	91%	89%	87%	85%	82%	81%
2336	98%	96%	93%	91%	88%	86%	83%	81%	78%	76%
2500	97%	93%	90%	86%	82%	78%	74%	71%	67%	64%
2750	94%	88%	82%	75%	69%	63%	58%	52%	48%	44%
3000	90%	81%	72%	62%	54%	46%	40%	35%	30%	27%

Kobe 2 Strategic Matrices for the West Atlantic sailfish stock

Probability of being in the green zone

The results provided in the Kobe II Strategy Matrix to be interpreted with extreme caution.

Probability $F<=F_{MSY}$ and $B>=B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	68%	87%	95%	98%	99%	100%	100%	100%	100%	100%
1000	68%	75%	80%	84%	87%	89%	91%	92%	93%	94%
1250	68%	71%	74%	76%	78%	79%	81%	82%	83%	83%
1500	67%	66%	66%	66%	65%	65%	65%	64%	63%	63%
1600	65%	63%	61%	60%	58%	57%	56%	54%	54%	53%
1700	61%	58%	55%	52%	50%	48%	46%	44%	43%	42%
1750	59%	55%	52%	48%	46%	44%	41%	39%	38%	36%
1800	56%	52%	48%	45%	42%	39%	37%	34%	32%	31%
1900	50%	45%	41%	36%	34%	30%	28%	26%	24%	22%
2000	45%	39%	33%	30%	26%	23%	21%	19%	16%	15%

Effect of current regulations

- ***Eastern stock***

It was established in Rec. 16-11 that if the total catch harvested in any year exceeds 1,271 t, the Commission shall review the recommendation and effectiveness of this.

Catches in 2019 (2,244 t) and 2021 (1,706 t) did exceed this level.

- ***Western stock***

It was established in Rec. 16-11 that if the total catch harvested in any year exceeds 1,030 t, the Commission shall review the recommendation and effectiveness of this.
The reported catch levels in 2018, 2019, and 2020 exceeded this level.

- Some countries have established domestic regulations to limit the catch of sailfish. of releasing all billfish from longline vessels, minimum size restrictions, use of circle hooks and catch and release strategies in sport fisheries.

- Rec. 22-12: mandate or encourage the use of circle hooks on their pelagic longline fleets

Management recommendations

East Atlantic

The stock status of SAI-E indicates that the stock is not overfished and not undergoing overfishing. Given the number of unquantified uncertainties described above, the Commission should consider managing to catch levels that will keep the stock in the green quadrant of the Kobe phase plot with a high probability.

West Atlantic

The Committee noted that while the reported catches in the past few years have been below the estimated MSY (1,612 t), the stock remains overfished. The Committee believes that the reported catches are significantly underreported. Given the important uncertainties described above, the Committee recommends that the results provided in the Kobe 2 Strategy Matrix be interpreted with extreme caution. Should the Commission choose to continue setting the catch level at 67% of the current MSY, that value will be 1,080 t.

ATLANTIC SAILFISH SUMMARY

ATLANTIC SAILFISH SUMMARY		
	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	1,612 (1,357-1,968) t[1]	2,337 (2,003-2,833) t[1]
Current Yield (2022)	1,029 t[2]	1,110 t[2]
B_{2021}/B_{MSY}	0.96 (0.59-1.45)[1]	1.83 (1.14-2.88)[1]
F_{2021}/F_{MSY}	0.59 (0.36 - 0.95)[1]	0.36 (0.21 - 0.59)[1]
Overfished	Yes (59% prob.)[3]	No (99% prob.)[3]
Overfishing	No (98% prob.)[3]	No (100% prob.)[3]
Management Measures in Effect:	Recommendation (Rec. 16-11): Limit Atlantic sailfish Catches of either stock to the level of 67% of MSY	

Enhanced Program for Billfish Research (EPBR)

- Established in 1986

Objectives

- Provide catch and effort statistics
- Initiate billfish tagging program
- Collect age and growth data
- Evaluate habitat use
- Investigate spawning patterns
- Conduct genetic studies

Overall and Eastern coordinator: Fambaye Ngom Sow (Senegal)

Western coordinator: Karina Ramirez López (Mexico)

*Fund The specific funding for EPBR previously available has now been combined with the general research fund (ICCAT Science Envelope). Project funding will now be allotted on a competitive basis with other species working groups.

The United States Data Fund has been supporting the EPBR activities

Billfish Workplan for 2024

- The last assessment for the blue marlin (BUM) stock was conducted in 2018 (Anon., 2018c). The next blue marlin stock assessment is proposed for 2024.

Several high priority tasks have been identified that require increased effort, including, but not limited to:

- An intersessional hybrid data preparatory meeting in March 2024 (5 days) to collect and analyze all the existing information required for stock assessment, using data through 2022.
- A stock assessment hybrid meeting in July 2024 (5 days), using data through 2022.

- ***Catch (Task 1), catch and effort, and size data (Task 2)***
- ***Discards***

  The WGSAM developed a generalized tool for the estimation of bycatch. CPCs should make every effort to take advantage of this tool and participate in 2024 workshop in an effort to improve the estimation and reporting of discards.

- ***Life history parameters***

Continue the Enhanced Programme for Billfish Research (EPBR) activities including:

Recommendations from the Billfish SG :

General recommendations to the Commission that have financial implications

For the next two-years, research will be focused on the following areas by order of priority:

- Continue the growth study of the three priority billfish species in the eastern Atlantic; including the provision of laboratory equipment (Microscope);
- Initiate reproduction study of blue marlin (BUM) in the Gulf of Mexico;
- Conduct a Workshop on small-scale fisheries (artisanal in the Central America and Caribbean regions (funding already available from 2023 science budget)
- Continue the electronic tagging of marlins (BUM/WHM) in the North-east Atlantic and start tagging activities in South-west Atlantic;
- Conduct a technical workshop that should focus on age reading and building a reference set for both spines and otoliths in 2025;

Billfish	*2024*	*2025*
Tagging		
Electronic tagging, rewarding and awareness (Portugal)	€10,000	€30,000
Electronic tagging, rewarding and awareness (Brazil)	€30,000	
Biological studies:		
Reproduction	€15,000	€15,000
Age and growth	€20,000	€20,000
Genetic		
Other (if any, identify)		
Sample collection and shipping	€10,000	€10,000
Stock assessment		
BUM assessment external review	€10,000	
WHM assessment external review		€10,000
Workshops/meetings		
Ageing workshop		€25,000
Equipment		
Microscope with high resolution for reading (SMZ25/SMZ18 Model)	€11, 000	
TOTAL	**€106,000**	**€110,000**

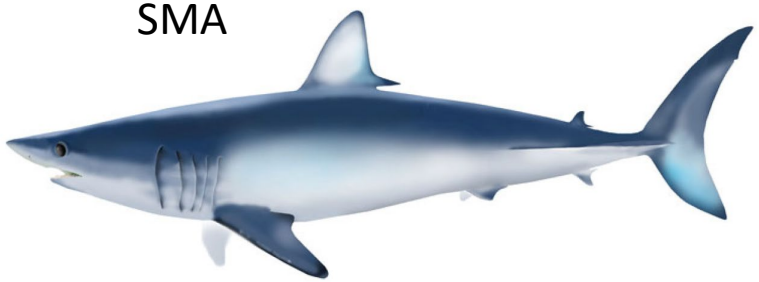
Responses to the commission

- **SCI_133** (SCRS shall review these data and determine the feasibility of estimating fishing mortality by commercial fisheries, recreational fisheries and artisanal fisheries, Rec. 16-11 para 2)

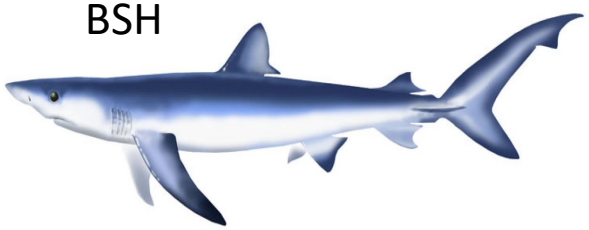
- **SCI_134** (SCRS shall revise the statistical methodology used to estimate dead and live discards and provide feedback to CPCs, Rec. 19-05 para 16)

SHK - SHARKS

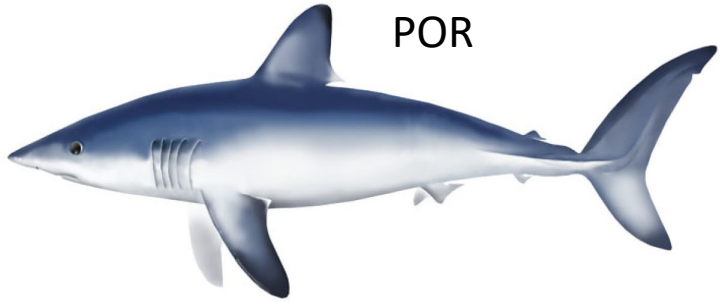
SMA



BSH



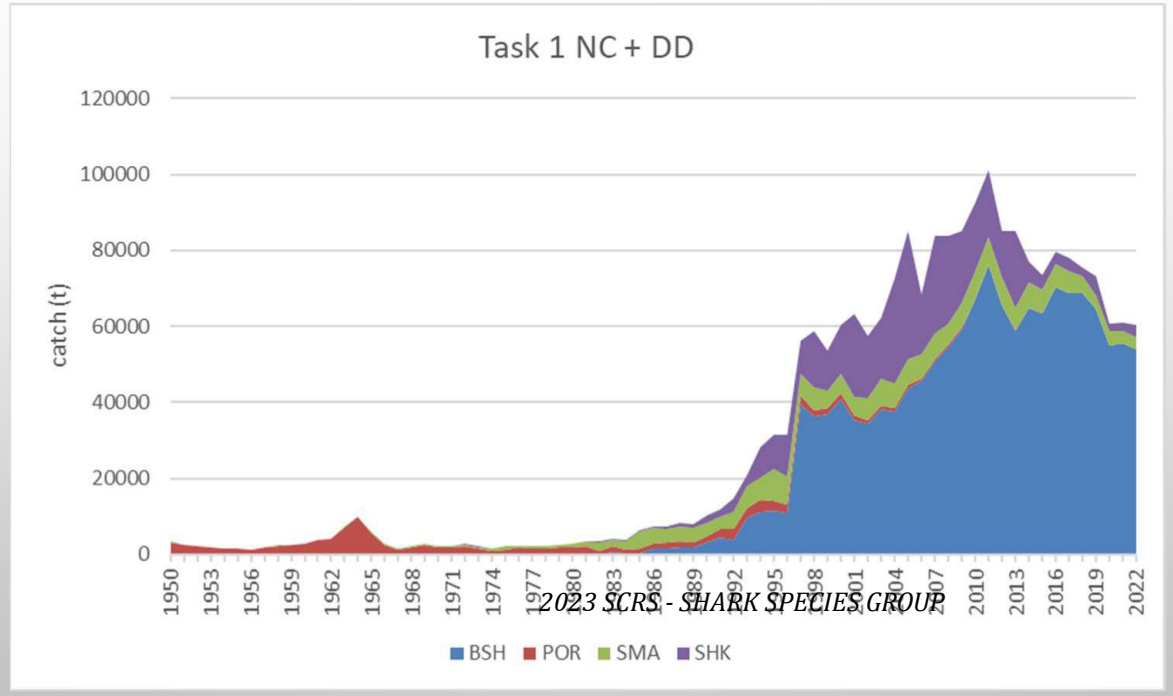
POR



…and 21 more species (sharks and rays)

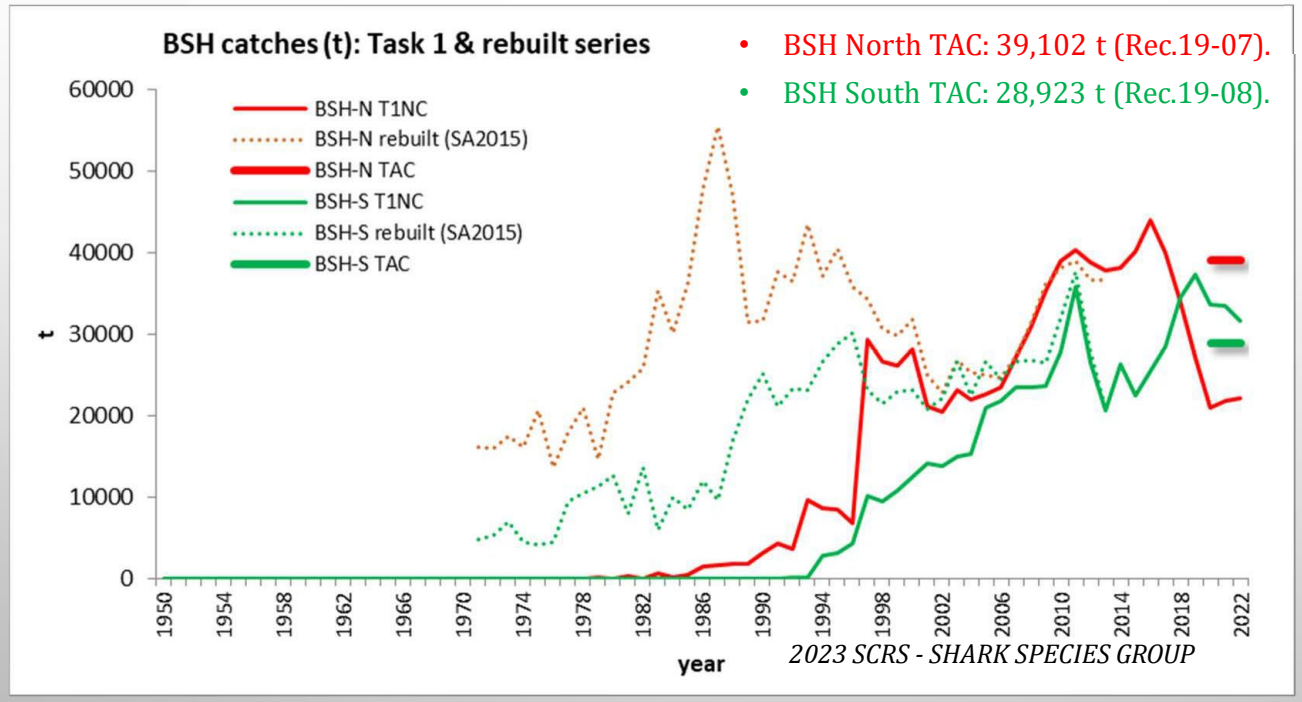
➢ 2023 Review of Major SHK catches

- Total accumulated catches (landings and dead discards, t) by groups of sharks (major, others) and year.



➢ 2023 Review of Major SHK catches

- Blue shark catches



- BSH North TAC: 39,102 t (Rec.19-07).
- BSH South TAC: 28,923 t (Rec.19-08).

North: Captures below the TAC since 2018.

2022: 22,057 t

+174 t

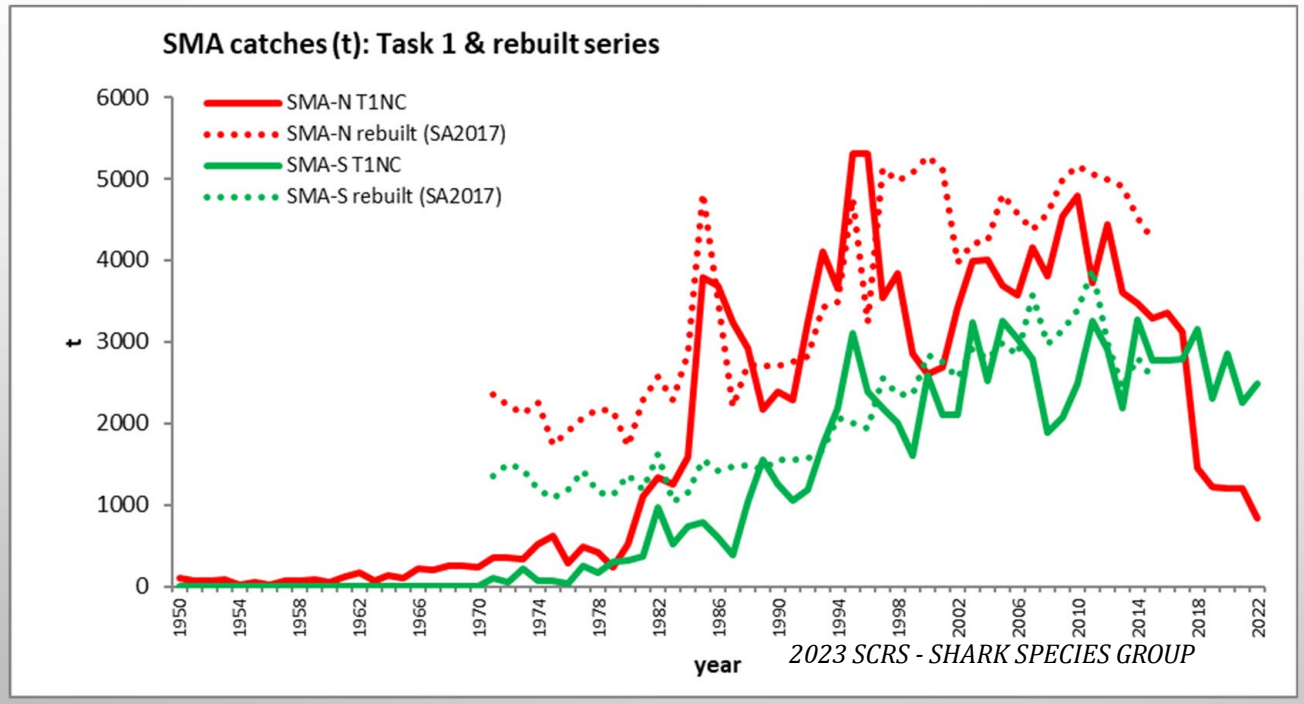
South: Captures 10 – 20% over the TAC since 2018.

2022: 31,727 t

-1,744 t

➢ 2023 Review of Major SHK catches

- Shortfin mako catches



2023 SCRS - SHARK SPECIES GROUP

2022: 831 t

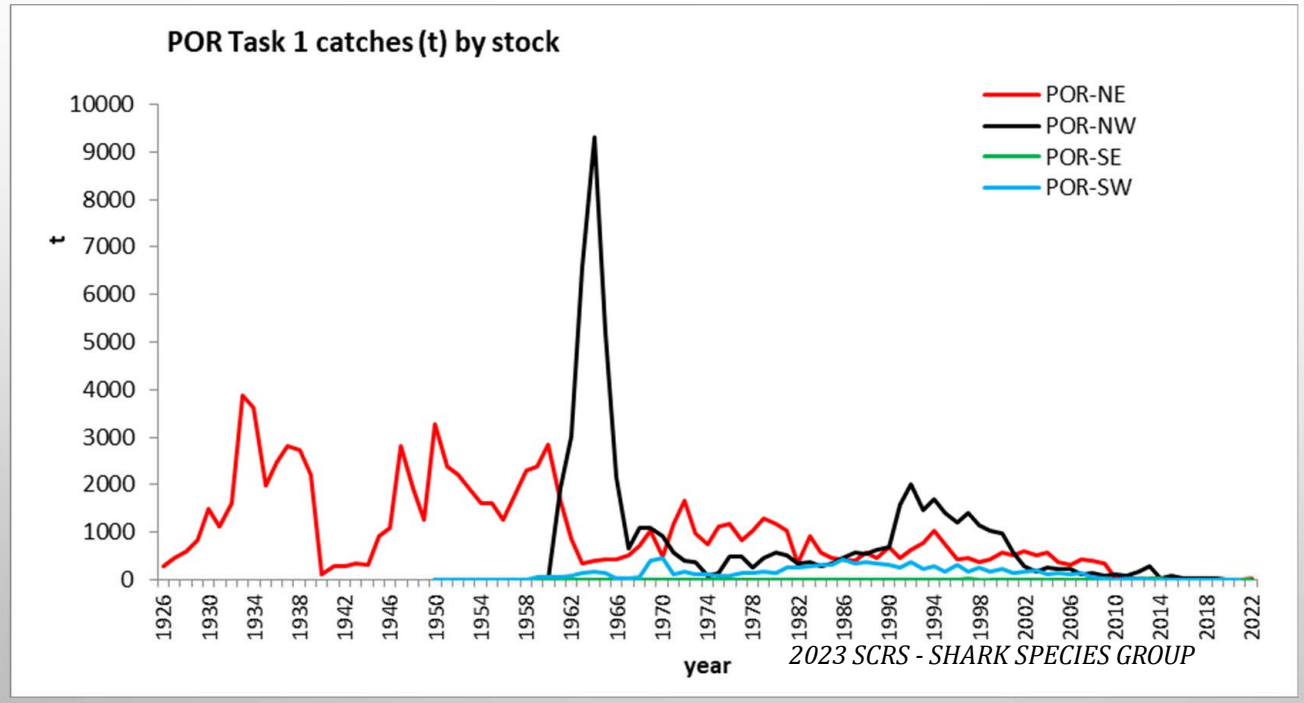
-365 t

2022: 2,485 t

229 t

➢ 2023 Review of Major SHK catches

- Porbeagle shark catches



NW captures decreasing, with less than 20 t since 2018.

NE captures low, with increment in 2022, 15 t.

SW captures are 0 t since 2013.

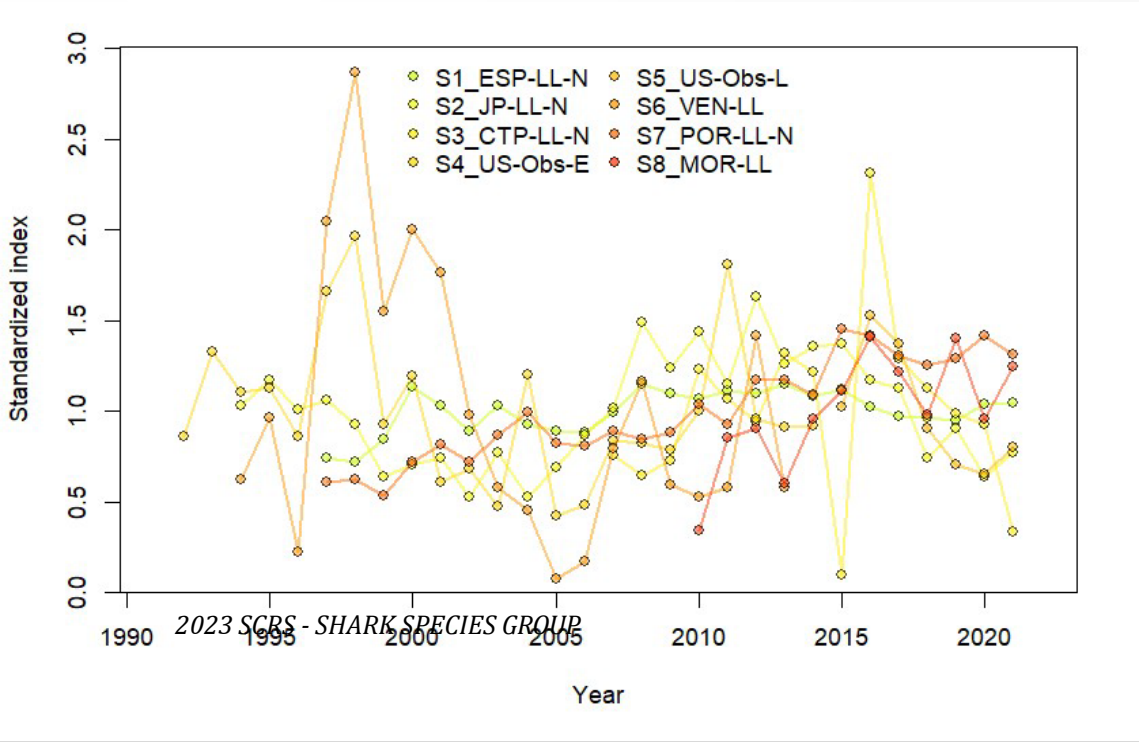
SE captures are 0 t since 2019.

- **2023 ICCAT Blue shark Stock Assessment**

2023 SCRS - SHARK SPECIES GROUP

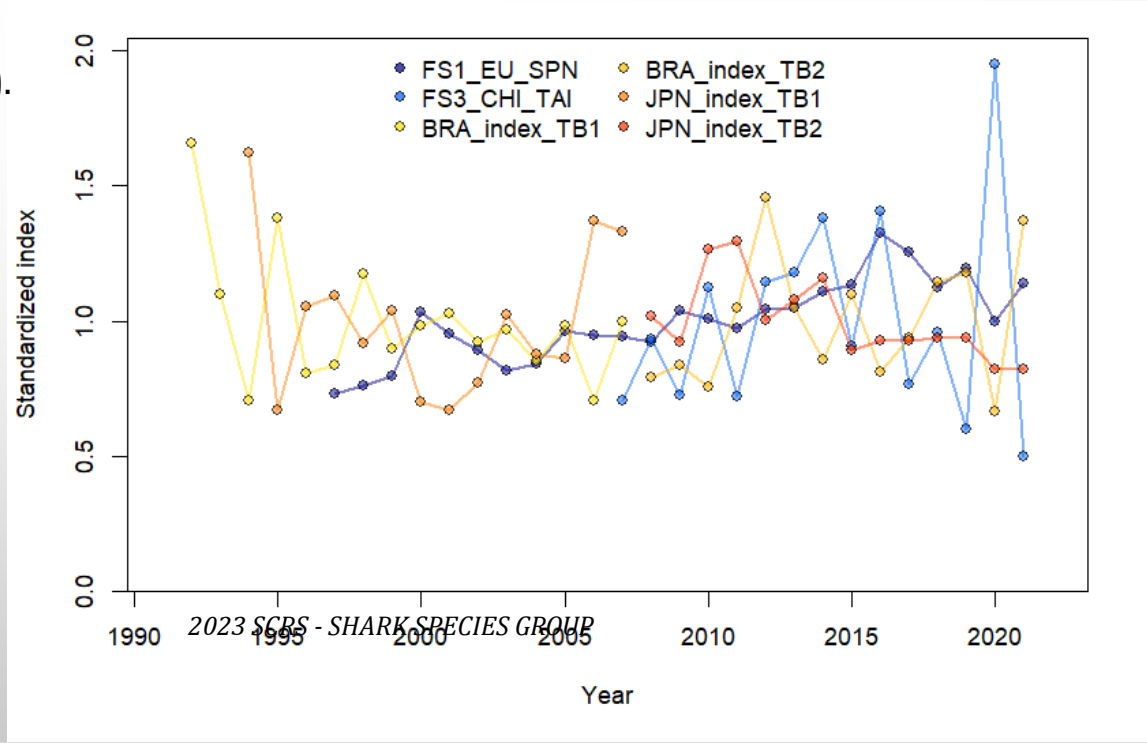
➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH North Atlantic Stock**
  - Seven indices were presented:
    - Chinese-Taipei (2007-2021).
    - EU-Portugal (1997-2021).
    - EU-Spain (1997-2021).
    - Japan (1994-2021).
    - Morocco (2010-2022).
    - US
      - (1992-2014).
      - (2015-2021).
    - Venezuela (1994-2013).



➢ 2023 ICCAT Blue shark Stock Assessment

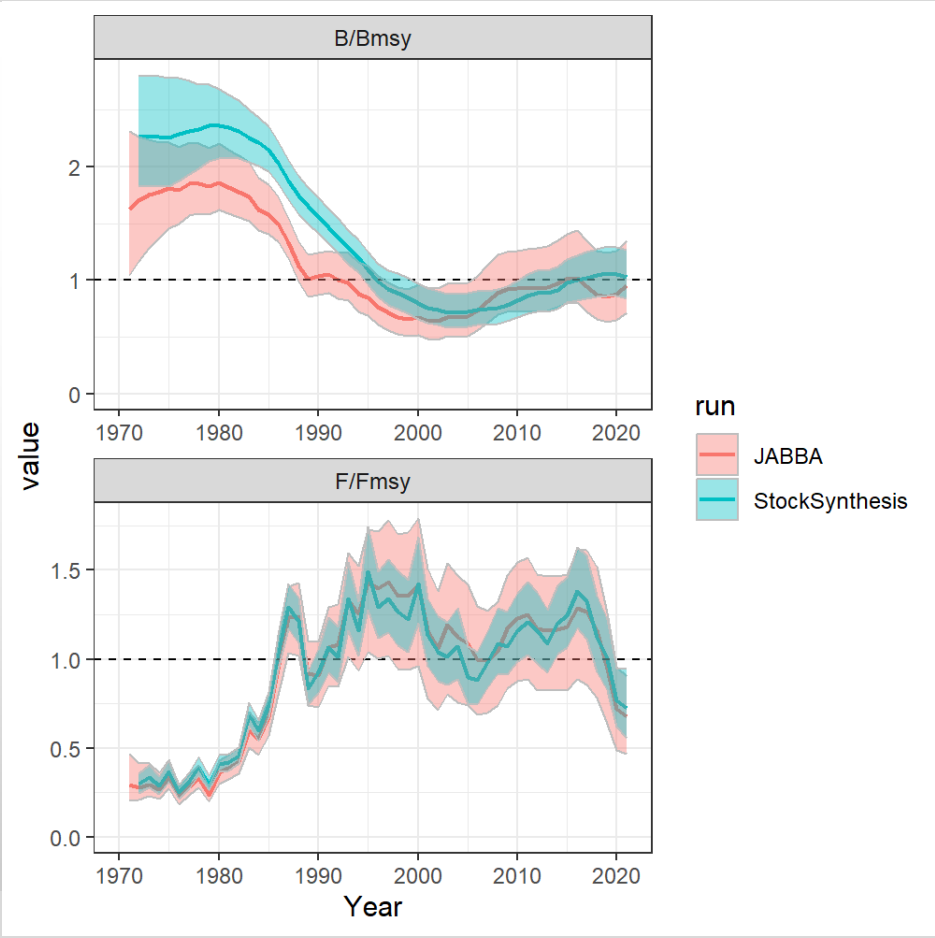
- **BSH South Atlantic Stock**
  - Seven indices were presented:
    - Brazil – Uruguay (1992-2022).
      - Two time blocks.
    - Chinese-Taipei (2007-2022).
    - EU-Spain (1997-2021).
    - Japan (1994-2021).
      - Two time blocks.



➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH North Atlantic Stock**

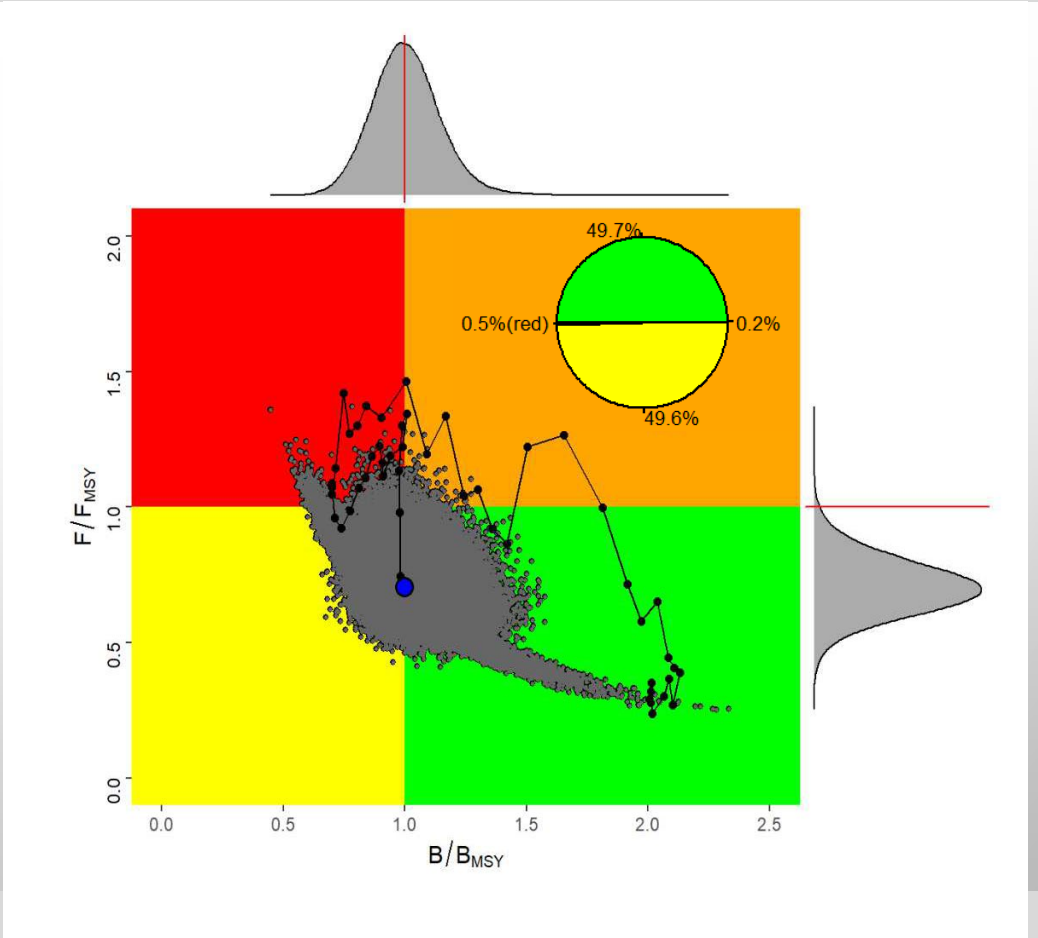
- Both models agreed that overfishing is not occurring, and that biomass is very close to $B_{MSY.}$



➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH North Atlantic Stock**

- Kobe phase plot:
  - Not overfished.
  - No overfishing.
  - Probabilities very close to overfished.



➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH North Atlantic Stock**
  - Current TAC of 39,102 t has a probability near 3% of being in the green qudrant of the Kobe plot through 2033.
  - Removals at MSY level would have a 51% probability of being in the green quadrant
  - Current removals have a probability greater that 97% to be in the green quadrant.

2020	20,963
[illegible]	[illegible]

MSY

TAC: 39,102 t

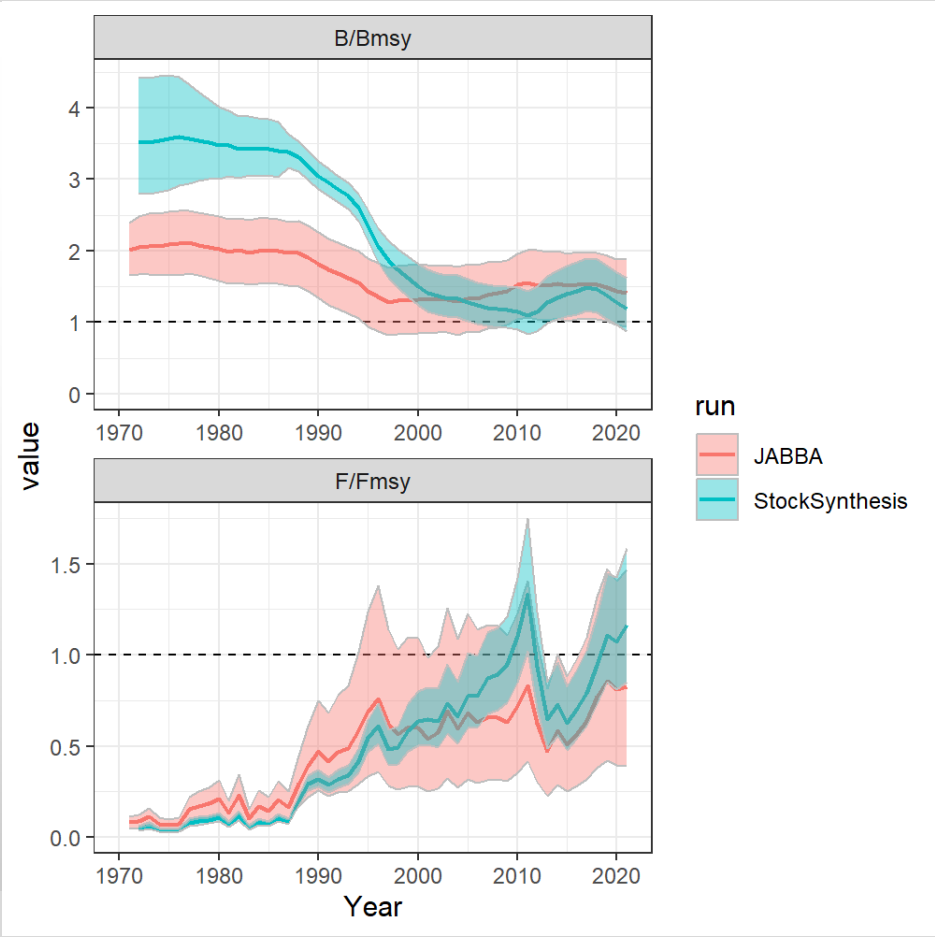
(c) Probability $F \leq F_{MSY}$ and $B \geq B_{MSY}$.

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	71%	83%	95%	100%	100%	100%	100%	100%	100%	100%
20000	59%	58%	62%	73%	84%	91%	95%	97%	98%	99%
22500	58%	56%	59%	68%	78%	85%	90%	93%	95%	97%
25000	56%	53%	55%	63%	71%	77%	82%	86%	88%	91%
27500	55%	51%	52%	58%	64%	69%	73%	76%	78%	80%
30000	53%	49%	50%	53%	57%	60%	63%	65%	66%	67%
32500	51%	47%	46%	47%	49%	51%	51%	52%	52%	53%
32689	50%	46%	46%	47%	49%	50%	51%	51%	51%	51%
35000	46%	42%	40%	39%	38%	37%	36%	35%	34%	33%
37500	38%	33%	29%	26%	23%	21%	19%	17%	15%	14%
40000	30%	23%	18%	14%	11%	8%	7%	5%	4%	3%

➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH South Atlantic Stock**

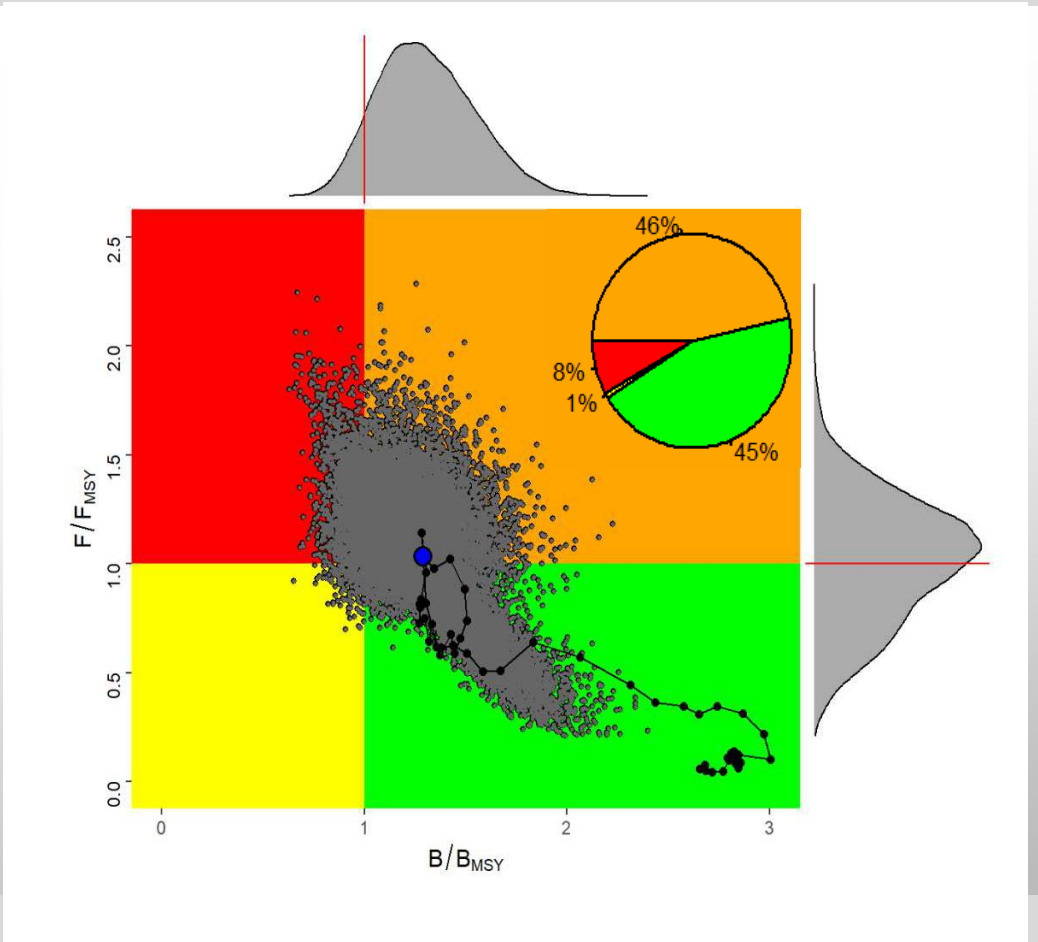
- Both models agreed that the stock is not overfished, and removals are very close to $F_{MSY.}$



➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH South Atlantic Stock**

- Kobe phase plot:
  - Overfishing
  - Not overfished.
  - Probabilities very close to no overfishing.



➢ 2023 ICCAT Blue shark Stock Assessment

- **BSH South Atlantic Stock**
  - Current removals have a probability of being in the green quadrant of less that 28%.
  - Removals at MSY level would have a 54% probability of being in the green quadrant.

2020	33,884
2021	33,608
2022	33,604

TAC: 28,923 t

MSY

(c) Probability $F \leq F_{MSY}$ and $B \geq B_{MSY}$.

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%
15000	83%	89%	93%	95%	97%	98%	99%	99%	99%	99%
17500	81%	86%	90%	92%	94%	95%	96%	97%	97%	98%
20000	79%	83%	86%	88%	89%	90%	91%	92%	93%	94%
22500	77%	79%	81%	82%	82%	83%	84%	84%	85%	86%
25000	74%	75%	75%	75%	74%	74%	73%	73%	73%	72%
27500	68%	68%	67%	65%	63%	61%	59%	59%	54%	53%
27711	67%	67%	66%	63%	61%	60%	58%	56%	55%	54%
30000	58%	57%	54%	51%	49%	47%	44%	43%	41%	40%
32500	47%	45%	42%	39%	37%	34%	32%	31%	29%	28%

2023 SCRS - SHARK SPECIES GROUP

➢ SRDCP

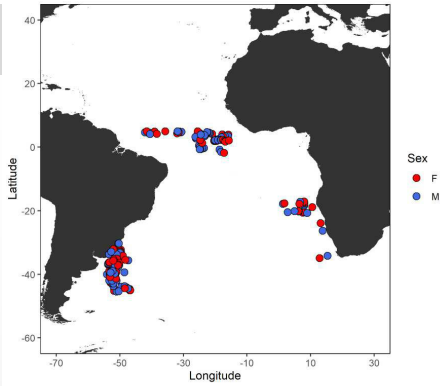
- 2014 the Sharks SG proposed the implementation of a research program.
- 2015 four project proposals covering different aspects of the life history, stock structure, and fisheries of the shortfin mako were presented.
- 2023 SRDCP Workshop (13 – 15 July, hybrid).
  - History and overview of the program.
  - Results obtained and ongoing activities.
  - Difficulties faced and ways to overcome.
  - Future steps.
  - Towards Phase 2 of the SRDCP.
- Report of the Workshop: SCRS/2023/179.

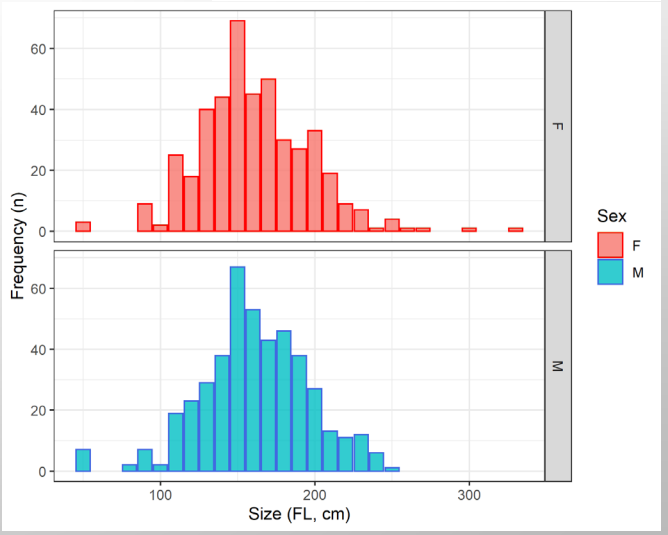
➢ SRDCP

- Currently:
    - Age and growth of South Atlantic shortfin mako.
    - Satellite tagging studies of several species.
    - Genetic analysis of porbeagle in the Atlantic Ocean.
    - Reproduction study on North Atlantic shortfin mako.
- Future activities:
    - Age and growth other species (POR, FAL, SPN, OCS, BTH).
    - Tagging campaigns.
        - Electronic and conventional tagging.
    - Include BSH and BTH.

➢ SRDCP - Age and growth of shortfin mako in the Atlantic Ocean

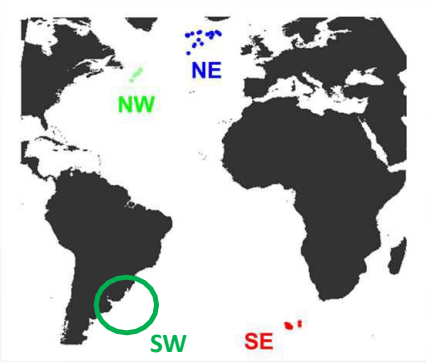
- Lead by EU-Portugal with scientist from United States, Uruguay, Japan, Namibia and Brazil
- 2018 South Atlantic SMA stock: the use of the growth curves was not recommended.
  - Lack of samples from the extremes of the size distribution.
- Working on alternative approaches to overcome the lack of samples.
  - Fitting Bayesian growth models with informative priors on L_0 and L_{inf} to improve the biological plausibility of growth estimates.
- Complete age readings 2023.
- 2024 Data Prep: Present analysis and growth models.

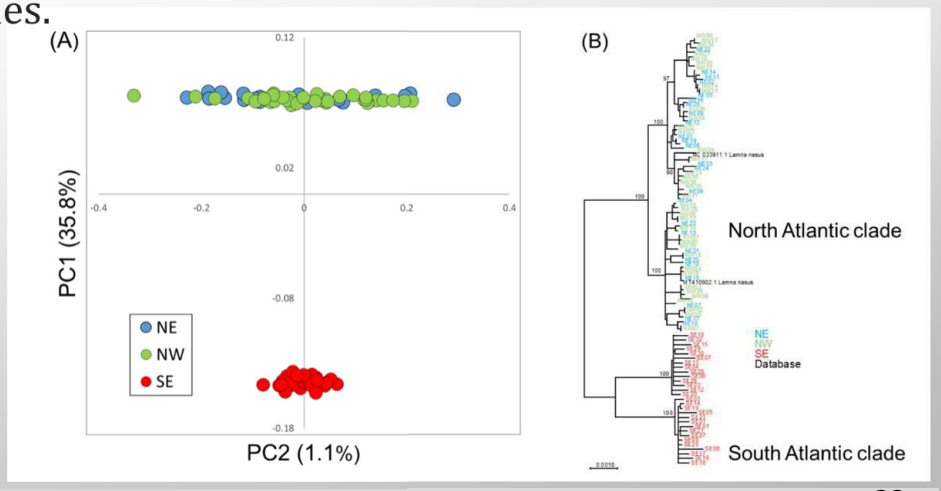




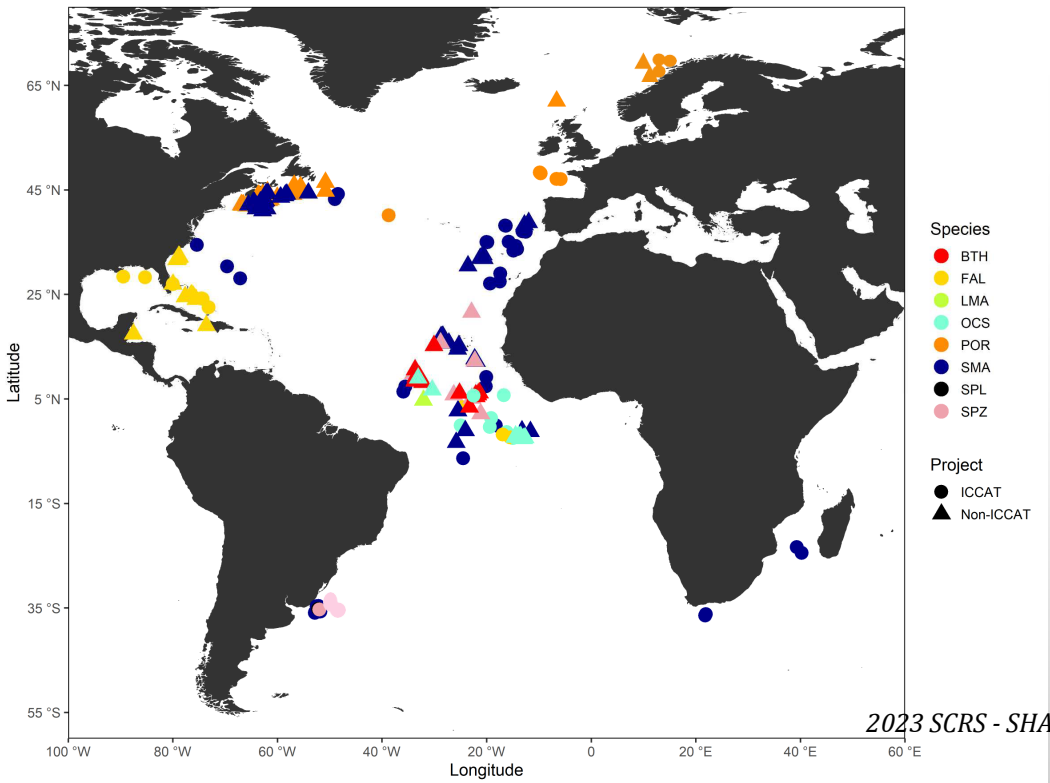
➢ SRDCP – POR Genetics

- Lead by Japan.
- 2020 Stock assessment research recommendation.
- 96 Individuals from 3 locations.
- The result showed the existence of two distinct mitogenome clades.
  - High possibility of being two distinct species.
  - No genetic differentiation between east and west regions in the North Atlantic.
- Next steps:
  - Include samples available from SW Atlantic.
  - Sample from SW Indian Ocean.





➢ SRDCP - Tagging



Species	Deployed (n)	To be deployed (n)
SMA	53	1
POR	8	4
SPL	1	
SPZ	3	
OCS	8	
FAL	21	2
LMA/FAL/OCS/ SPN/BSH/BTH		39
Total	94	46
Grand total	135	

2023 SCRS - SHARK SPECIES GROUP

➢ SRDCP - Tagging

- Ongoing and upcoming studies:
  - Movements, stock boundaries and habitat use of silky, oceanic whitetip, longfin mako, hammerheads, **blue shark**, **bigeye thresher** in the Atlantic Ocean.
    - FAL Eastern Atlantic.
    - SPZ in the Western Atlantic and SPL in the Eastern.
    - Tagging campaigns.
  - Post-release mortality of shortfin mako in the Atlantic Ocean.
    - Update with new information from new released tags.
  - Movements, stock boundaries and habitat use of porbeagle in the Atlantic Ocean.
    - Pop-up tags recently deployed in Norway.

- **Sharks Workplan and Research Plan for 2024 (SCI-74).**

➢ Sharks Workplan and Research Plan for 2024

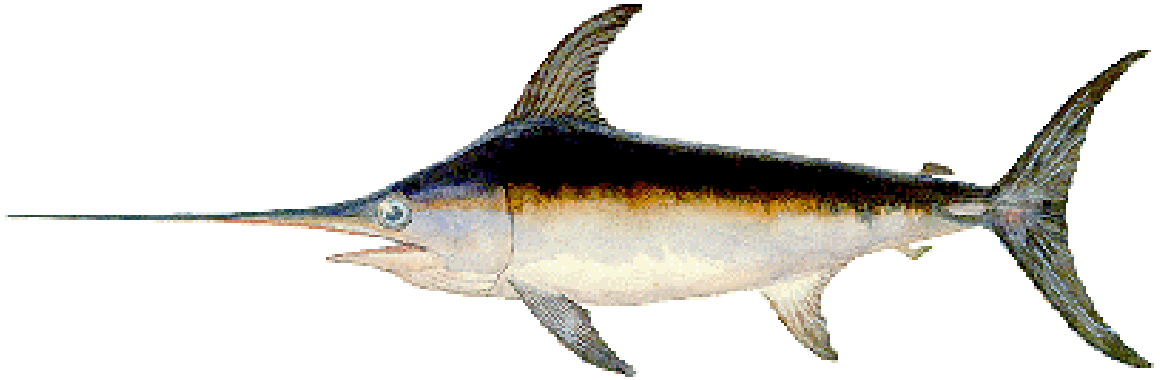
- To conduct a stock assessment for shortfin mako in 2024 the Group will conduct the following activities:
  - Hold a 5-day Data Preparatory meeting (in March/April) to collate and analyze all the existing information required for stock assessment, using data through 2022.
  - Hold a 5-day Stock Assessment meeting (in June/July), using data through 2022.
- Continue and/or expand participation in:
  - The activities of the SRDCP.
  - SCRS Subgroup on Technical Gear Changes.
  - SCRS Subgroup on Electronic Monitoring System.

➢ Recommendations (SCI-87)

- Recommendations with financial implications:
  - Provide funding for Year 10 of the SRDCP (€233,000) to:
    - Requested funds for 2024 are meant to 1) continue with biology studies, 2) satellite and conventional tagging projects, and to 3) satellite tagging campaign.
    - A detailed table of the funds requested is provided in SCI-87.
  - Hire one or more external expert for the 2024 shortfin mako stock assessment (€20,000).
    - A detailed description of the activities to be conducted is provided in SCI-87.

Sharks	*2024*	*2025*
Tagging		
Electronic tagging, rewarding and awareness	€12,000	€12,000
Purchase of Stainless-Steel dart spaghetti tags	€7,000	€7,000
Electronic tagging campaign	€100,000	€50,000
Biological studies:		
Reproduction (SMA North)	€10,000	€10,000
Age and growth (SMA South)	€7,000	
Age and growth (other species)	€7,000	€7,000
Genetic (POR)	€25,000	€25,000
Other (if any, identify)		
Sample collection and shipping	€2,000	
Workshops/meetings		
Workshop on Age and growth (2025)		€20,000
SMA stock assessment expert	€20,000	
Equipment		
TDRs and Hook-timers (long-term study, requested by Rec. 21-09)		€ 30,000
TOTAL	**€190,000**	**€161,000**

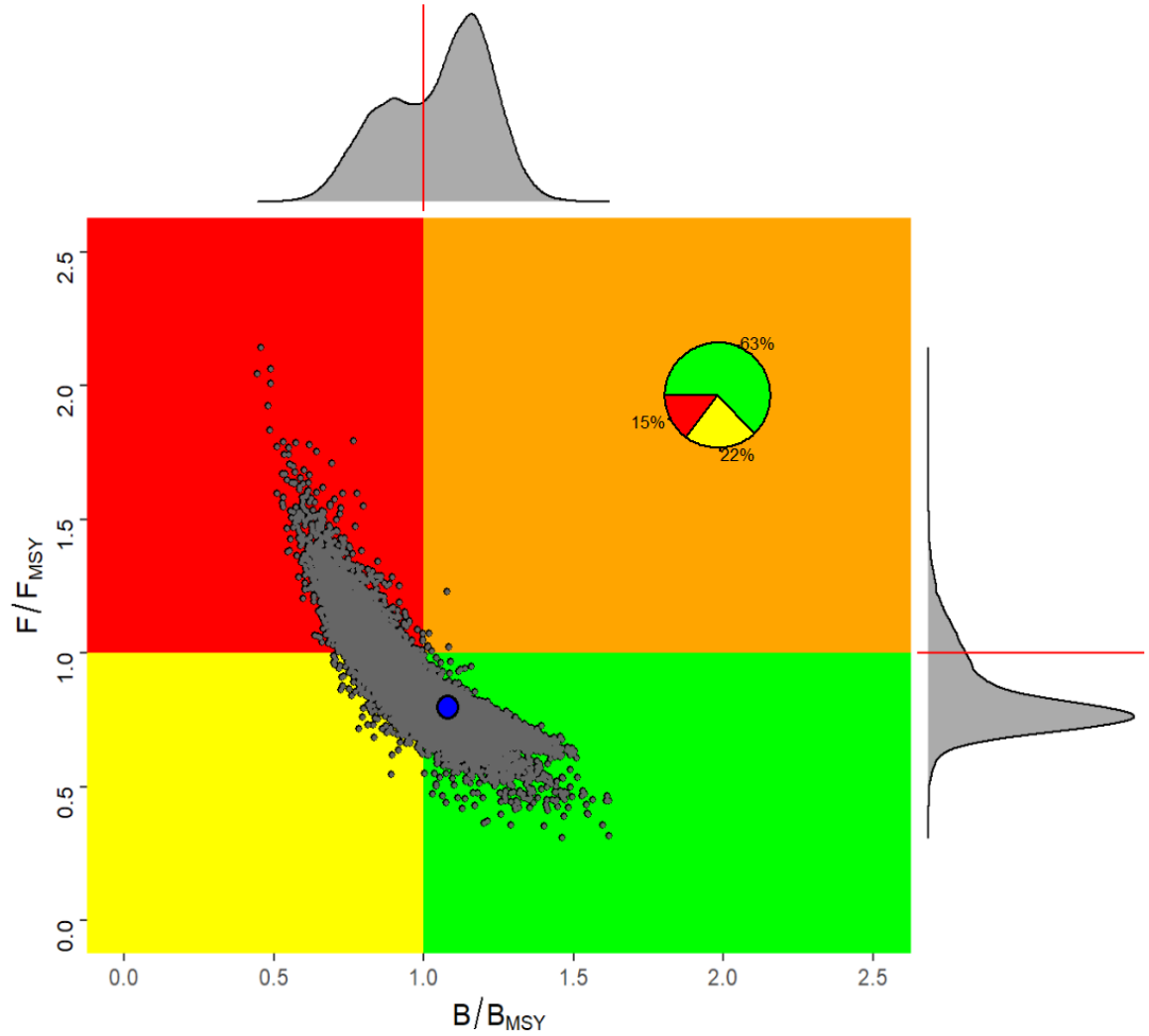
SWO - SWORDFISH



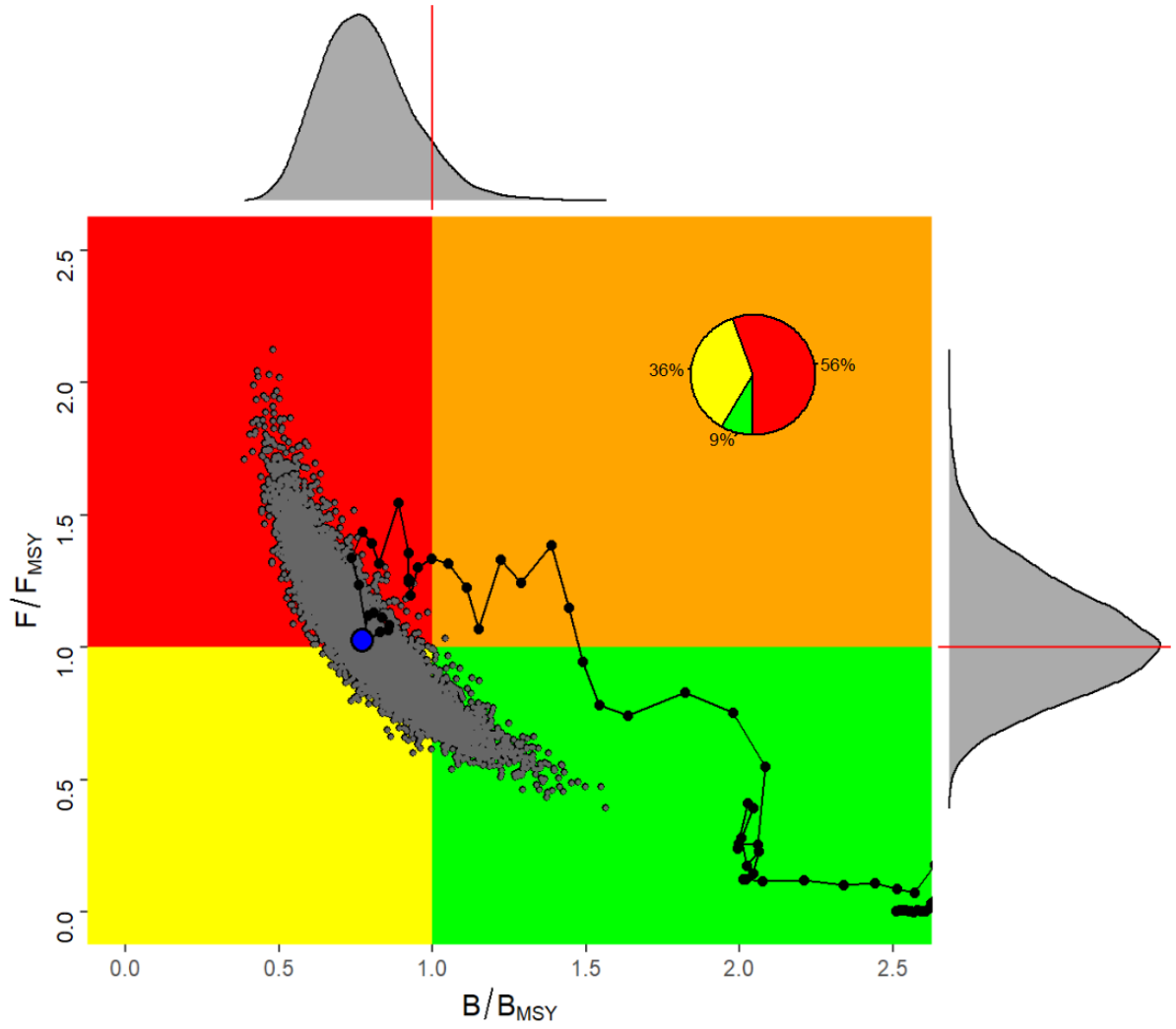
3 stocks

(North Atlantic, South Atlantic, Mediterranean)

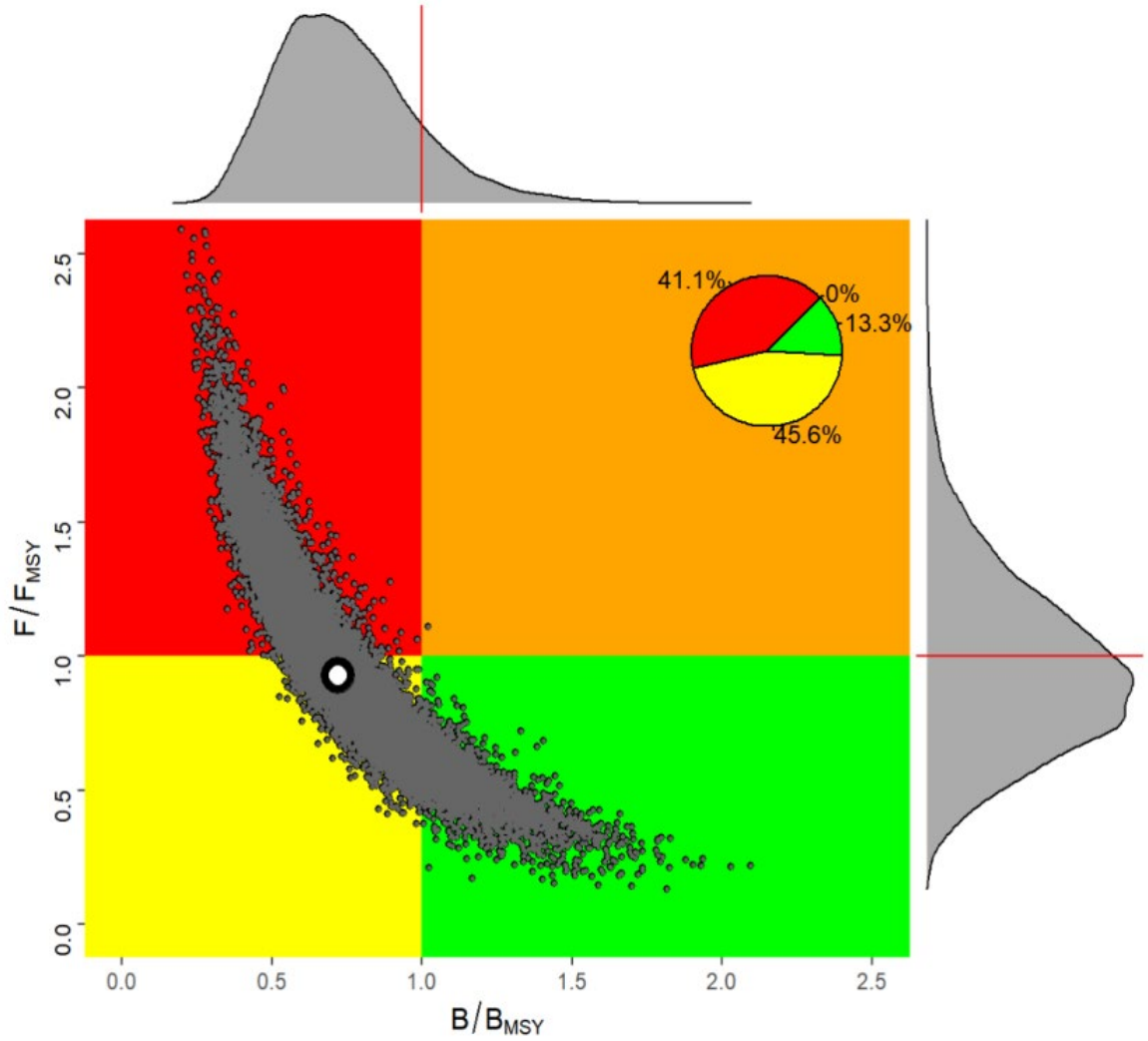
Stock status – Atlantic North



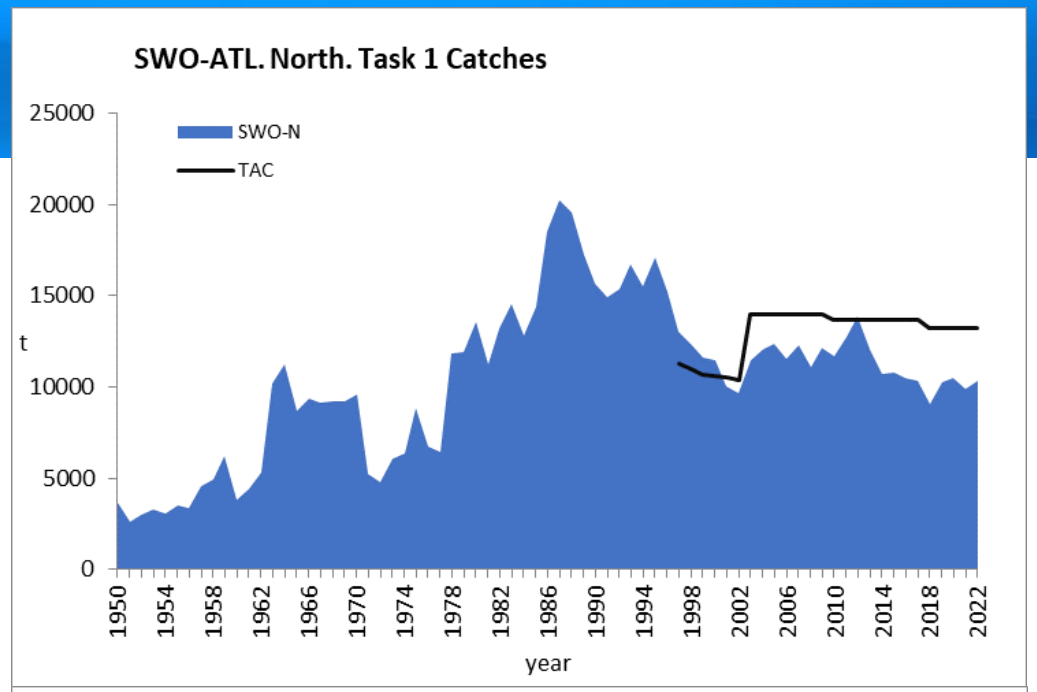
Stock status – Atlantic South

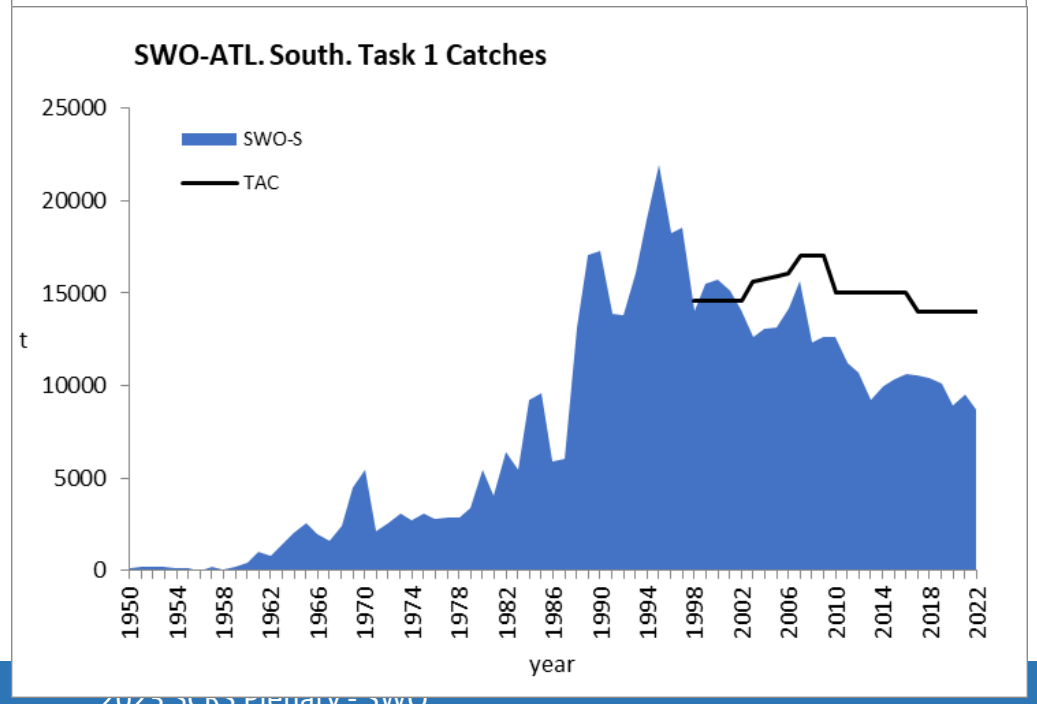


Stock status – Mediterranean

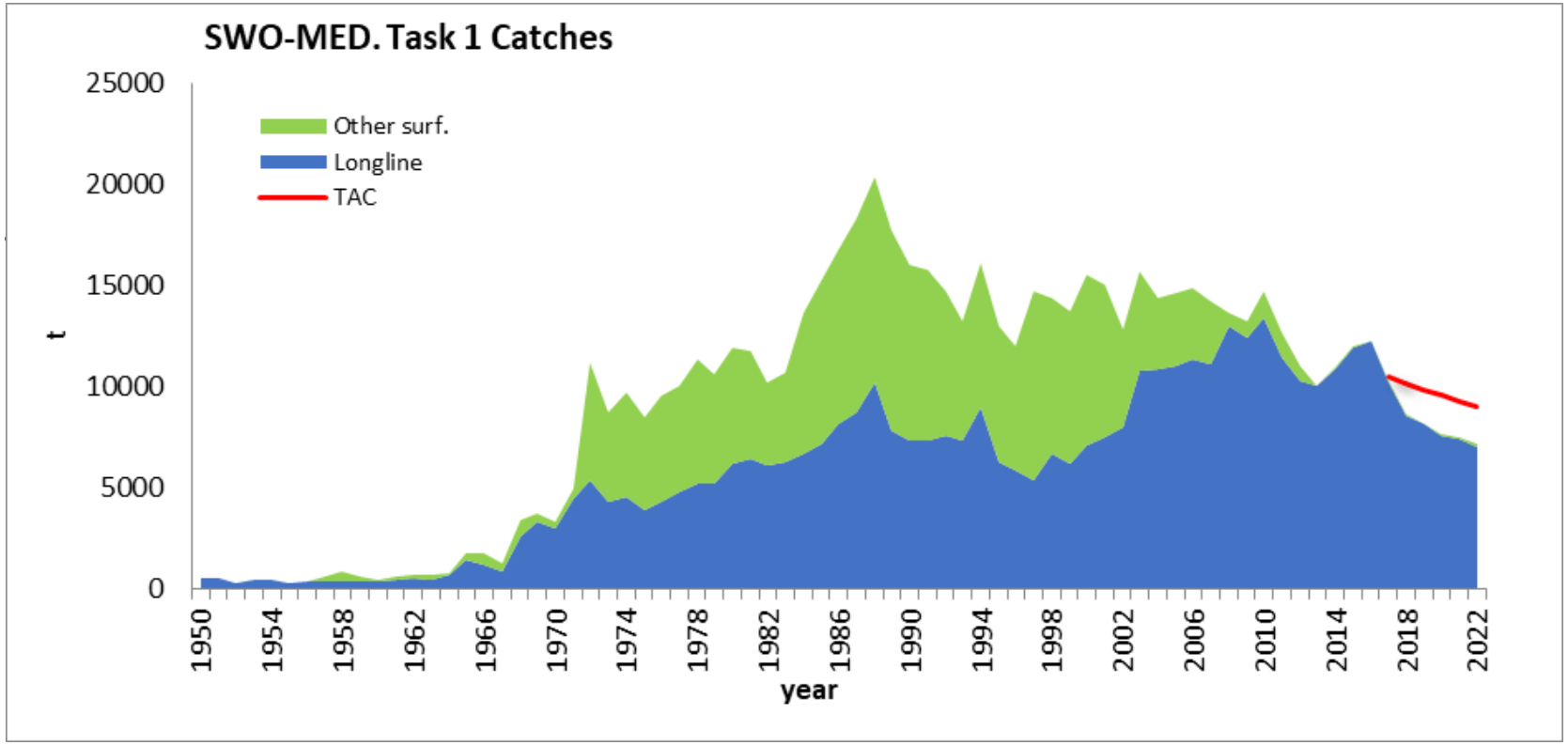


Swordfish Catches - Atlantic





Swordfish Catches Mediterranean



Workplan

- Improvement to CPUEs
- MSE
  - Robustness tests
  - Exceptional circumstance protocol
- SWOYP
- Tagging
- Discard estimation – Partnering with WGSAM

SWO Responses to the Commission

- North Atlantic
  - ***SCRS shall continue to refine the MSE and test candidate management procedures, Rec. 22-03 para 5***

- South Atlantic
  - ***SCRS shall monitor swordfish Southern Atlantic catch levels and report to the Commission annually, Rec. 22-04 para 2***

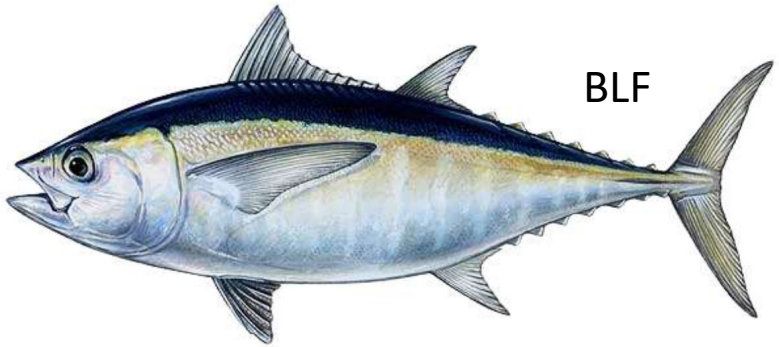
SWO Recommendations with financial implications and other general recommendations

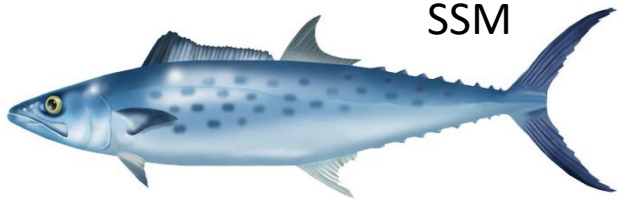
Swordfish	*2024*	*2025*
Tagging		
Electronic tagging, rewarding and awareness	145,000	145,000
Biological studies:		
Reproduction	10,000	10,000
Age and growth	20,000	20,000
Genetic	100,000	70,000
Other (close kin study)	15,000	
Other (updating longline section of ICCAT Manual)	3,000	
Sample collection and shipping	7,000	
Workshops/meetings		
SWOYP technical workshop	25,000	
MSE		
Progress of the SWO MSE	95,000	20,000
TOTAL	**€420,000**	**€265,000**

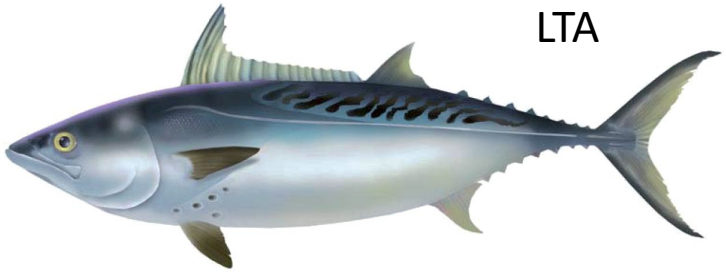
Intersessional meetings in 2024

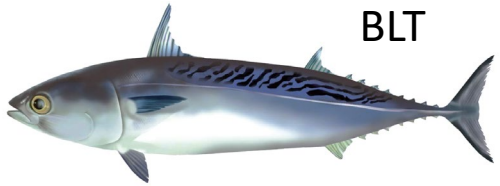
- SWOYP
  - Strategic research plan – ~5 days
  - Technical workshop (ageing, reproduction, genetics) – 5 days (Sec not needed)
- SWO intersessional – 5 days
  - Med CPUE improvements; SWO biology program; size/sex distribution study; MSE (EC protocol; robustness tests); dead discard estimation; environmental effects/climate change study; S-SWO closed loop simulation study; update to the SWO species distribution model; updates to the ICCAT manual
- SWO MSE
  - One day technical meeting
  - One day PA4

SMT – SMALL TUNAS









…and 7 more species

Executive Summaries

- Intersessional Meeting of the Small Tunas Species Group was held in hybrid format from Madrid, Spain between 15-18 May 2023.
- Workshop on swordfish, billfishes and small tuna age reading that took place in Olhao (Portugal), in February 2023
- Workshop on data-limited methods for assessment of small tunas, that was held the previous week, was also presented

Executive Summaries

- Statistics data were update
- Reports and results of studies on biology, growth and length-weight relationships and genetics informing stock structure were also analyzed.

  species chosen in order of importance (tuna (*Euthynnus alletteratus*, LTA), the striped bonito (*Sarda sarda*), the king mackerel (*Acanthocybium solandri*, WAH).

- The Group recognized the importance of building capacity in such approaches.

Small Tunas Year Program SMTYP

ICCAT **SM**all **T**unas **Y**ear **P**rogramme (**SMTYP**) was adopted by the Commission in its 2012 meeting in Agadir (Morocco).

Main objectives :

- To improve historical Task 1 and 2 data
- To collect biological data for small tunas (SMT)
  the growth, maturity and stock structure

Data which are necessary for their **assessment** in the near future

and thus **provide scientific advice to ICCAT** for their management.

Small Tunas Year Program SMTYP

Activities developed in 2022_2023

- Preliminary growth parameters for WAH were also provided
- However, given the difficulties in the work, there are still ongoing analysis and size gaps for the three species to be filled, hence the parameters were not yet fully estimated
- Therefore, the SMTYP shall fill the size gaps and conclude the analysis of growth and reproduction for LTA, BON and WAH and, to prioritize similar studies for other species given their socio-economic importance, for the new cycle of the program.
- Among the small tunas species, frigate (FRI) *Auxis thazard* and bullet tuna (BLT) *Auxis rochei*, were identified of special interest, namely on what concerns the stock structure.

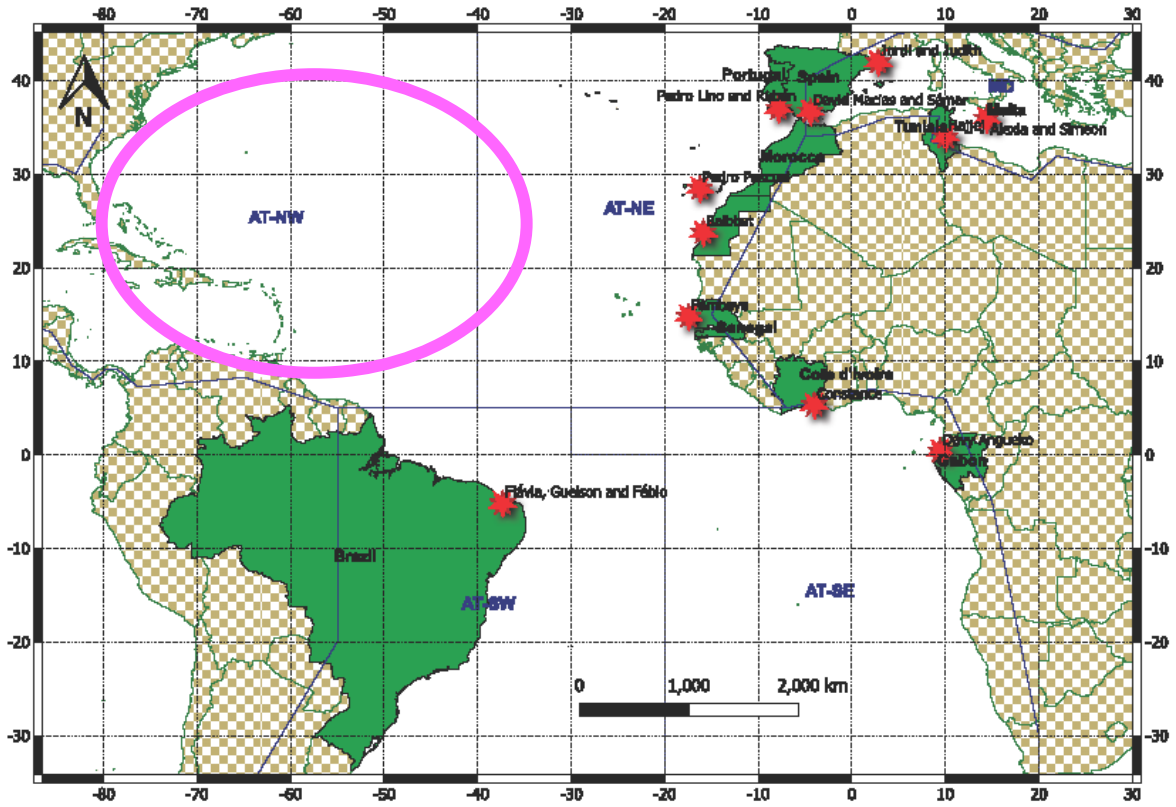
SMT_2023

Small Tunas Year Program SMTYP

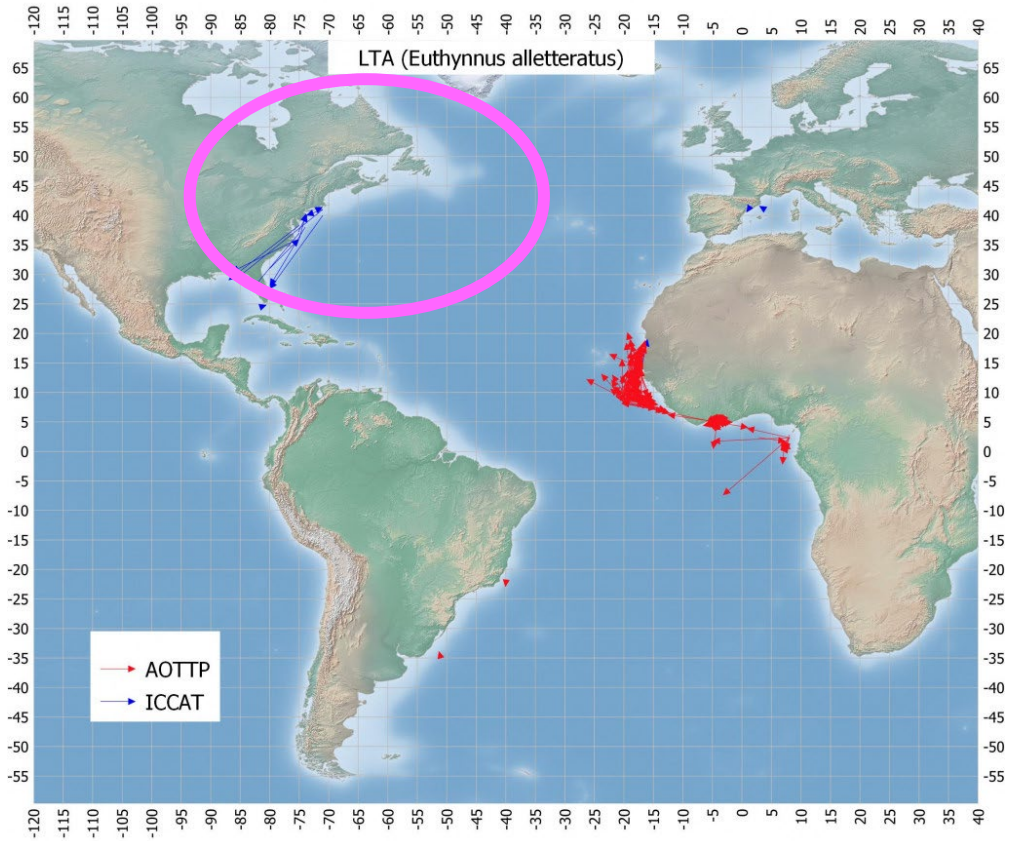
DIFFICULTIES AND CONTINUITY

Gap Sampling

Sampling area



Tagging area

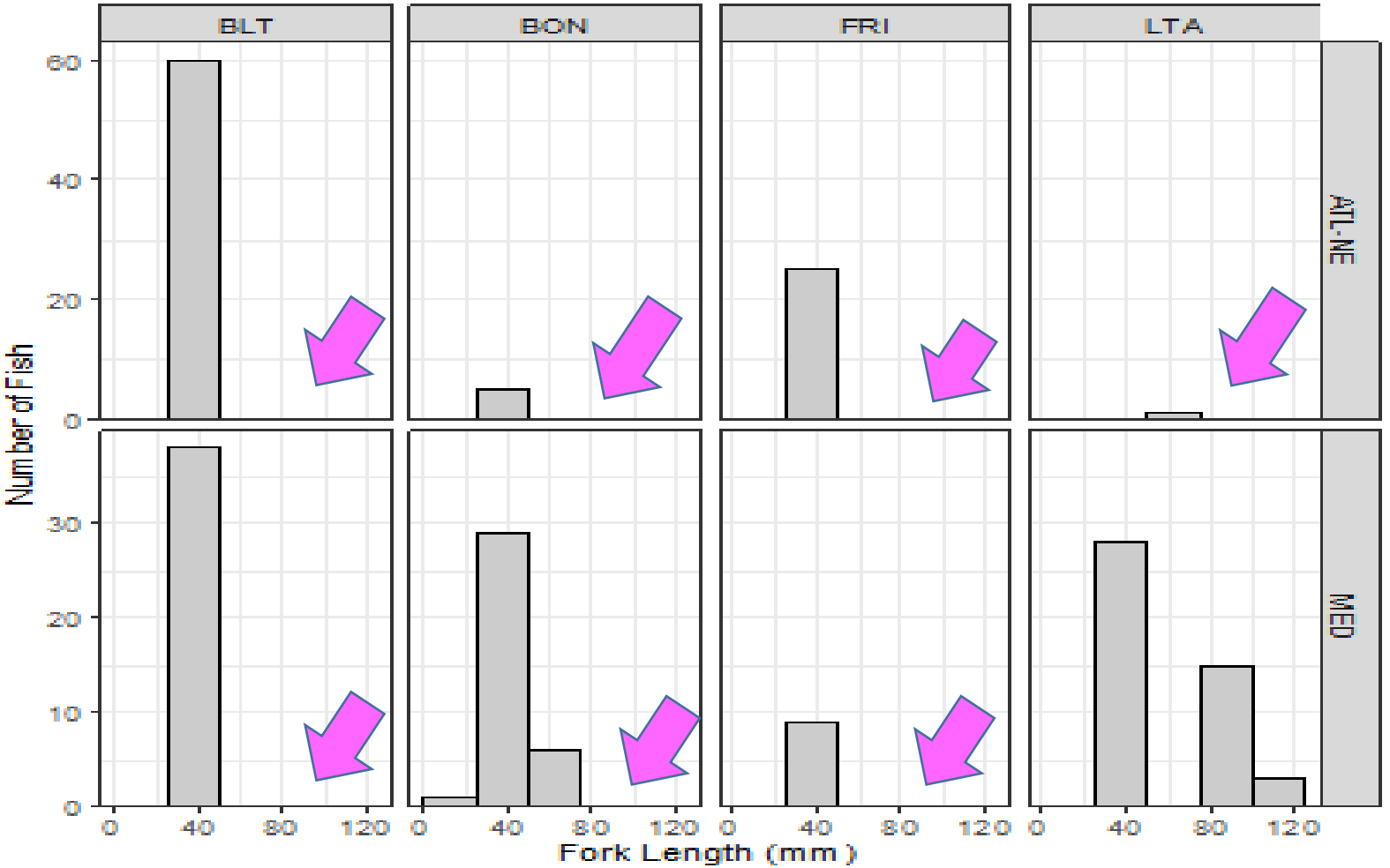


Enlarge the sampling area

SMT_2023

Small Tunas Year Program SMTYP

DIFFICULTIES AND CONTINUITY



Gap size

Figure 1. Histogram by size classes (fork length) for bullet tuna (BLT), BON, frigate (FRI), and LTA by sampled regions.

Work plan 2023-2024

- **Have an intersessional meeting of the Small Tuna (SMT) Species Group in 2025 (5 days)**

  Objectives : organize all the data and information that have been obtained to date, to organize the length and catch position information, to present new life-history information and to review data-limited assessments that might be applied to SMT.

  There would be the workshop on ageing, growth, and reproduction

- **Progress on the biological studies of small tunas**

  Objectives: Consortium led by Brazil (Fundação Apolônio Salles de Desenvolvimento Educacional - FADURPE) was established to continue studies. The program is ongoing and currently covers different activities related to biological studies

Work plan 2023-2024

- **Updating and/or applying the Data-Limited Models:**

  Objectives: The Committee started applying data-limited methods in 2016 and, although the Committee has improved in applying a range of models, the robustness still needs to be evaluated before they can be used to provide management advice.

  A second workshop on Data-Limited models should be held in early 2024

- **Revision of small tunas length-weight (L/W) relationships at stock level:**

Work plan 2023-2024

- **Calibration and adopting internationally agreed maturity scales:**

  Objectives: During 2020 ICCAT Workshop on Small Tunas Biology Studies for Growth and Reproduction, studies on SMT on growth and reproduction, including drafting protocols and training of sample processing and analysis of maturity stage, were carried out. However, the Committee feels that further work is still needed as regards the calibration and adopting internationally agreed maturity scales for *Acanthocybium solandri*, *Auxis rochei*, *Auxis thazard*

  A workshop on maturity would be held, preferably toward the end of 2024.

Work plan 2023-2024

- **Updating the biological meta-database:**

  Objectives: In 2016, the SMT Species Group started a biological meta-database. The Committee recognized the importance of continuously updating this database as new biological information becomes available, also developing criteria for replacing existing parameters when available. Such information is then provided to update the SMT Executive Summaries and will eventually be used for both qualitative and quantitative assessments for the different species and stocks.

Small Tunas Year Program SMTYP

i) conducting additional sampling aiming to fill the specific gaps of the biological samples for estimating the growth and maturity parameters of BON, LTA, and WAH

ii) collecting samples for FRI and BLT in the Atlantic Ocean and the Mediterranean Sea for stock structure studies;

iii) determining the growth and reproduction parameters for BON, LTA, and WAH;

iv) refining the stock structure analysis for WAH, BON, and LTA and determinate the stock structure analysis for FRI and BLT; and,

v) investigating genetic species differentiation between FRI and BLT.

Recommendations

- Continuing with the ICCAT SMTYP research program activities in 2024 to further improve the biological information (improving geographical coverage for growth, maturity and stock identification) to fill the remaining gaps of the three species (WAH, LTA, BON) and continue the sampling for Auxis thazard (FRI) and A. rochei (BLT) (Financial Implication)

Recommendations

- Conduct a 2nd regional workshop (in person, 5 days) on the application of data-limited methods to assess small tuna stocks: Following the workshop held in May 2023, the Committee recommended that the second part of the in-person workshop be held to advance research and application of data-limited methods to some small tuna species. This workshop should be held in 2024, involving the same instructors that organized the 1st Workshop and experts that successfully completed it.

((Financial Implication)

Recommendations

- Workshop (in person, 5 days) on maturity staging (reproduction) in 2024 for small tuna stocks: This workshop would allow for calibration and adopting internationally agreed macroscopic and microscopic maturity scales for the new studied small tuna species. (Financial Implication)

- Workshop (in person, 5 days) on ageing in 2025 for small tuna species: This workshop would allow for calibration and adopting internationally agreed methodologies to advance on the new studied small tuna species. (Financial Implication)

Recommendations

Small Tunas	*2024*	*2025*
Biological studies:		
Reproduction	5,000	7,500
Age and growth	5,000	7,500
Genetic	5,000	7,500
Other (if any, identify)		
Sample collection and shipping	**7,500**	10,000
Workshops/meetings		
2nd Workshop of data-limited methods to assess small tuna stocks	25,000	
Capacity building on small tuna ageing		30,000
Equipment		
TOTAL	**€47,500**	**€62,500**