

ICCAT SCRS Report ²⁰¹⁶ Panel 2- Temperate tunas North



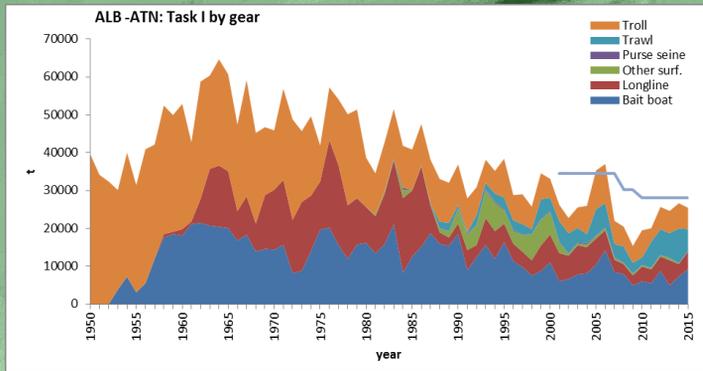
1 Nov 2016 ICCAT Commission Vila Moura

2016 Report of the SCRS Temperate tunas

Activities in 2016

- Summary of recent assessment of Albacore North
- Summary of last stock status for Bluefin tuna
- Responses to the Commission
- General Recommendations and workplan

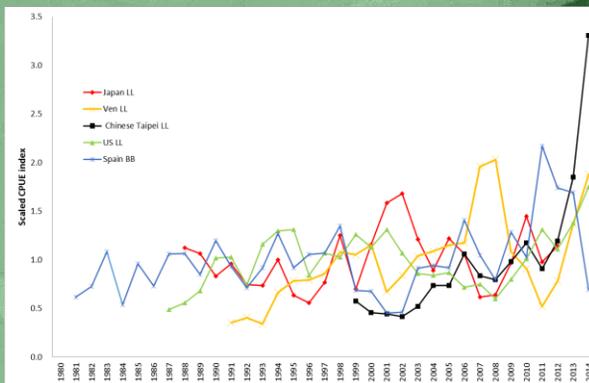
• ALB North: Catches



- Declining catch and effort since peaked in the 1960s.
- Surface gears: >80% annual catch in recent years.
- Catches generally below TAC.

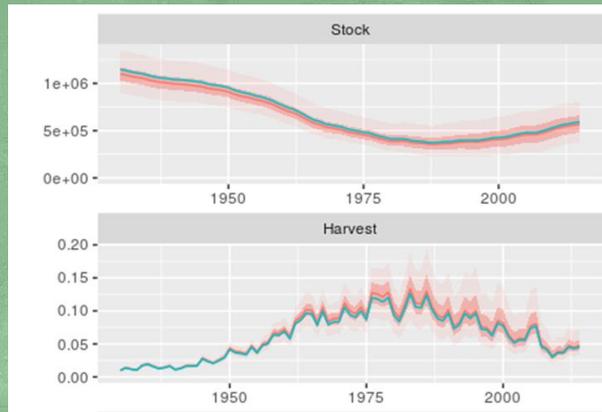
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ALB North: relative abundance



- Noisy signals and sometimes contradictory abundance indices (CPUE)
- In general, upward trends in the last years.

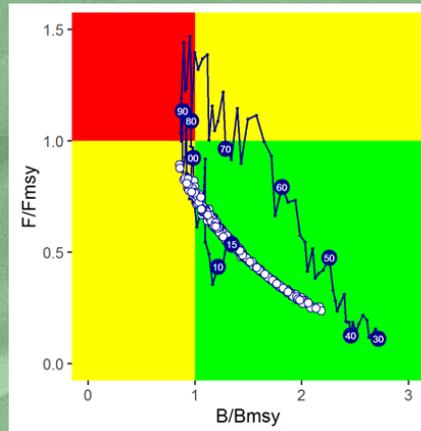
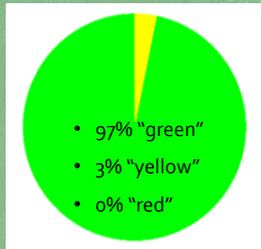
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ALB North: Stock Status
(Madeira 2016)

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ALB North: Stock Status (Madeira 2016)

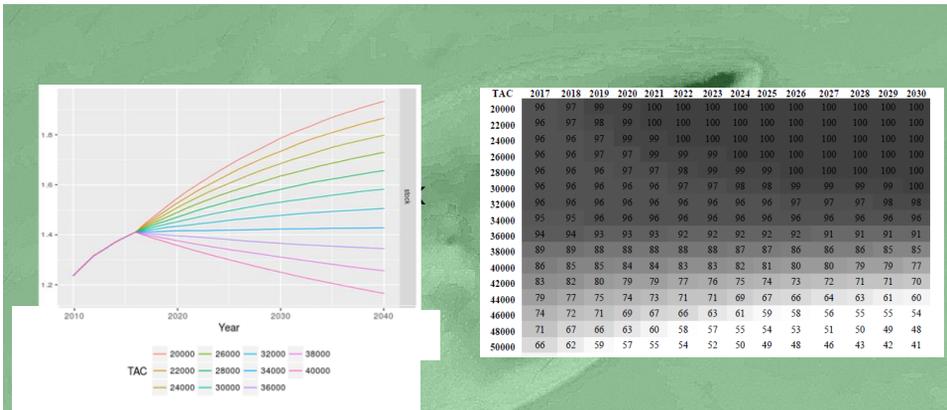


$B/B_{MSY}=1.4$

$F/F_{MSY}=0.5$

MSY= 37,082 t

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- New projections suggest higher sustainable catch levels compared to most of the previous assessments. However, the group has little trust in the absolute biomass estimate while the projections did not fully account for many other sources of uncertainty (i.e. model structure and assumptions) that need further evaluation.
- For those reasons, not much confidence in projections.
- It was decided not to use the K2SM, until more analyses are conducted.

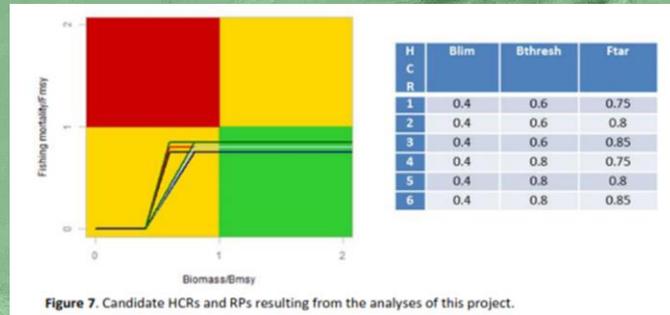
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ALB North: Management recommendations

- Ongoing recovery and stock probably in the green zone.
- The magnitude of the recovery is uncertain, and sensitive to assumptions.
- Current TAC would maintain the long term objectives (Rec. [15-04]).
- The Group is unable to advice on risks associated with an increase in the TAC. Therefore, the Group does not recommend an increase of the TAC. Should the Commission decide to increase the TAC, the Group recommends that this be done with a high level of precaution, and with the requirement for improved monitoring of stock indicators.
- Our ability to monitor changes in stock abundance is currently limited to fishery dependent information and it is desirable to evaluate alternative fishery independent tools to provide improved bases for monitoring stock condition.

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ALB North: MSE



HCRs with $F_{tar} < F_{msy}$ and $B_{thr} < B_{msy}$ allow for reasonably good compromises between sustainability targets and fishery profit and stability, and may have the potential to meet the management objectives as outlined in Rec [15-04]. However, further work is needed to test them under a broader set of assumptions.

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Eastern Bluefin tuna: CPUE indices

- **Bad news**

Increasing difficulties in updating CPUE time series linked to recent management regulations (time/area closure, individual quota/low TAC, minimum size limit)

- Spanish baitboat sold their quota to other fisheries
- Not possible to update the Spanish component of the trap index - since 2013 (Moroccan trap index used)

- **Good news**

- Continuity of Japanese longline index in North East Atlantic seems ensured

2016: Limited update of state of the stock (using realized catch in 2014 & 2015)

	Reported catch	Inflated catch
$F/F_{0.1}$ estimated for 2015	0.37 (0.40)*	0.33 (0.36)*
$SSB/SSB_{F_{0.1}}$ estimated for 2015		
Low recruitment scenario (1970s)	1.83 (1.60)*	1.98 (1.74)*
Medium recruitment (1950-2006)	1.29 (1.10)*	1.30 (1.11)*
High recruitment (1990s)	0.82 (0.67)*	0.7 (0.55)*

number in brackets are the estimates from the 2014 projections

Updated projections (2016)

TAC	2016	2017	2018	2019	2020	2021	2022
0 mt	70.0%	77.0%	84.0%	91.0%	96.0%	98.0%	100.0%
2000 mt	70.0%	76.0%	84.0%	91.0%	96.0%	98.0%	99.0%
4000 mt	70.0%	76.0%	84.0%	91.0%	95.0%	98.0%	99.0%
6000 mt	70.0%	76.0%	83.0%	90.0%	95.0%	98.0%	99.0%
8000 mt	70.0%	76.0%	83.0%	90.0%	94.0%	98.0%	99.0%
10000 mt	70.0%	76.0%	83.0%	90.0%	94.0%	97.0%	99.0%
12000 mt	70.0%	76.0%	83.0%	89.0%	94.0%	97.0%	99.0%
14000 mt	70.0%	76.0%	82.0%	89.0%	93.0%	97.0%	98.0%
16000 mt	70.0%	76.0%	82.0%	89.0%	93.0%	96.0%	98.0%
18000 mt	70.0%	76.0%	82.0%	88.0%	93.0%	96.0%	98.0%
19296 mt	70.0%	76.0%	82.0%	88.0%	93.0%	96.0%	98.0%
20000 mt	70.0%	76.0%	82.0%	88.0%	92.0%	95.0%	98.0%
22000 mt	70.0%	76.0%	81.0%	87.0%	92.0%	95.0%	97.0%
24000 mt	70.0%	76.0%	81.0%	87.0%	92.0%	95.0%	97.0%
26000 mt	70.0%	75.0%	81.0%	87.0%	91.0%	94.0%	97.0%
28000 mt	70.0%	75.0%	81.0%	86.0%	90.0%	94.0%	96.0%
30000 mt	70.0%	75.0%	80.0%	86.0%	90.0%	93.0%	96.0%

All uncertainties that were considered in the advice provided in 2014 remain:

- VPA outputs are impaired by the **poor quality of the catch statistics**
- VPA outputs were highly sensitive to technical specifications (F-ratios, Plus Group, selectivity, recruitment and catch levels...)
- Increasing **difficulties to track changes in abundance** through fisheries dependent information (need for fisheries-independent information)
- Lack of scientific information about main Mediterranean fisheries
- Projections calculated only with Continuity run
- High recruitment estimates in 2004-2007 not confirmed

except the values of the catch in 2014 and 2015

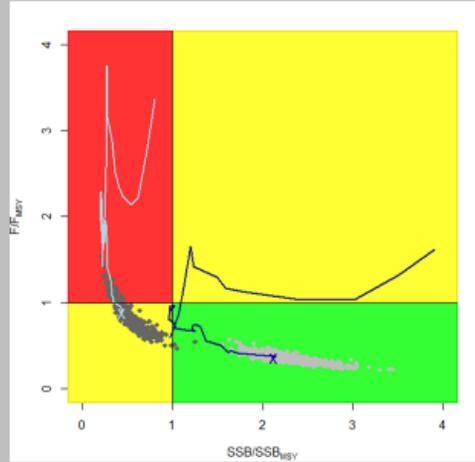
Management recommendations

Having considered the stock indicators, the Committee advises that catches not exceeding TACs in Rec. 14-04 are not expected to undermine the success of the rebuilding plan and are consistent with the goal of achieving F_{MSY} and B_{MSY} through 2022 with at least 60% of probability.

Assessment in 2017 will provide more detailed report on stock status and hopefully confirmation of the extent of the recovery.

Status of Western Stock of BFT (2014)

Stock Trajectory - 2014 Stock Assessment



Stock status sensitive to recruitment assumption

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Stock Status - 2016 Projections

	Low Potential	High Potential
SSB_{2015}/SSB_{MSY}	2.41 (2.05-2.96)	0.48 (0.35-0.72)
$F_{2013-2015}/F_{MSY}$ ¹	0.28 (0.22-0.36)	0.68 (0.37-0.78)
$F_{2013-2015}/F_{0.1}$ ¹	0.48 (0.40-0.58)	0.48 (0.40-0.58)

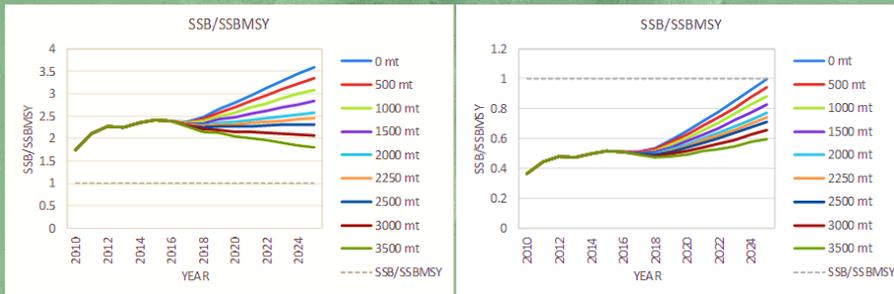
¹ $F_{2013-2015}$ refers to the geometric mean of the estimates for 2013-2015 (a proxy for recent F levels).

BFTW-Table 1. Estimates of the fishing mortality and the spawning stock biomass relative to the reference point and 80% confidence interval using the updated projections (not from an updated stock assessment that uses updated CPUE, age composition, and other information).

2016 Projections of spawning stock Biomass (SSB)

50% Probability
Low Recruitment

50 % Probability
High Recruitment



Results very similar to 2014 but with a slight improvement.

The stock is above MSY with greater than 60% probability that catches of 2,500 t or lower will maintain SSB above MSY. Catches of less than 2,250 t are estimated to allow SSB to be at or above 2013 levels by 2019 (with 50% probability)

The high recruitment potential scenario suggests the western stock will not rebuild by 2019 even with no catch, although catches less than 2,500 t are predicted to prevent overfishing.

In essence, these analyses resulted in very little change in the projections with only slight changes in the Kobe matrices for the various catch levels.

Management Recommendations (2016)

Updated projections for the west Bluefin tuna stock indicated only slight changes in SSB and F from the 2014 projections. The SCRS considered that the new information received this year did not warrant any change to the advice given in 2014 regarding the implications of various catch levels.

Responses to Commission's requests

18.4 Continue working on the identification of spawning grounds in the Atlantic and Mediterranean and provide advice to the Commission on the creation of sanctuaries, [Rec. 14-04] paragraph 24

The SCRS reiterates its view that spatial spawning closures would provide little population-level benefits while adversely affecting the fishery and that the current suite of season, gear and quota regulations provide sufficient protection of spawning biomass.

Responses to Commission's requests

18.5 Update the Commission annually and prior to the Commission meeting, on any changes of the estimated bluefin catch rates per vessel and gear, [Rec. 14-04] paragraph 43

The Committee did not address this question as there were indications that the impetus behind this request no longer applies and that the request may have been carried over inadvertently from a previous recommendation. Therefore, the Committee reiterates its request to the Commission to confirm that this work is still needed,

Responses to Commission's requests

18.6 Continue to explore operationally viable technologies and methodologies for determining the size and biomass at the points of capture and caging and report to the Commission Rec. [14-04] paragraph 82

Size distribution of the caged bluefin for the 2014 and 2015 is very similar in the two years, with a tri-modal distribution of small fish (75 SFL cm), medium size fish (120 SFL cm) and large size fish (210 SFL cm).

The average time between catch and caging (two days), when the stereo camera video is recorded is about 13 days, ranging from 1 to 31 days. It was noted that during this time the fish is not feeding, plus the stress of the operation would likely reduce the fish condition, reducing the actual biomass of the caged fish compared to the biomass at catch.

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Responses to Commission's requests

18.7 Evaluate the results of the 100% coverage programme using stereoscopical cameras systems or alternative techniques that provide the equivalent precision to refine the number and weight of the fish during all caging operations Rec. [14-04] paragraph 83

- Accuracy on size measures close to 99% when compared to actual fish measurements
- In 2015, the number of stereoscopy camera video reports increased substantially as the full compliance of Rec. 14-04 is in place.

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Responses to Commission's requests

18.8 Evaluate the bluefin tuna national observer programmes conducted by CPCs to report the Commission and to provide advice on future improvements Rec. [14-04] paragraph 88

Due to the disparate reporting formats, and generally poor response to submission of information pursuant to Rec [14-04], the SCRS is not in a position to evaluate these observer programmes as requested by the Commission.

Responses to Commission's requests

18.9 Review the information from BCDs and other submitted data and further study growth rates so as to provide updated growth tables to the Commission, [Rec. 14-04] paragraph 96

Due to time and data limitations it was not possible to revise and update estimates of potential growth rates of bluefin tuna within farms. It is recommended that CPCs continue submitting detailed information of their harvest operations and carry size and weight measure sampling to have appropriated conversion factors for farmed fish and make this available for the SCRS.

Responses to Commission's requests

18.10 Provide guidance on a range of fish size management measures for western Atlantic bluefin tuna and their impact on yield per recruit and spawner per recruit considerations; and also comment on the effect of fish size management measures on their ability to monitor stock status, [Rec. 14-05] paragraph 27

The Committee was unable to conduct any new bluefin tuna yield per recruit analysis to address this particular question during the 2014 stock assessment meeting due to time constraints and, therefore, it reiterates the response provided to the Commission in 2012.

The Committee indicated that, if the Commission still requires these analyses, it will evaluate the impact of adopting alternative larger size limits that take into consideration the age of maturity of western bluefin tuna, on the yield per recruit and spawner per recruit.

Responses to Commission's requests

18.13 Request from the Panel 2 intersessional meeting (Japan): SCRS clarification by the Commission regarding the use of algorithms for the purpose of bluefin tuna caging operations in Mediterranean Sea during May-June period

The new relationship:

$$RWT = 2.8684 \times 10^{-5} \times SFL^{2.9076}$$

where, RWT corresponds the round weight in kilograms and SFL to the straight fork length in centimetres, likely represents the most appropriate weight at size for fish caught in the Mediterranean Sea during the months of May and June, and the Committee recommended that this relationship be used to estimate the biomass at catch from stereoscopic camera system recordings.

Responses to Commission's requests

18.14 Request from the Second Meeting of the Working Group of Fisheries Managers and Scientists in support of the WBFT Stock Assessment: SCRS to explore options/proposals for the development of new fishery independent indices of abundance and the improvement of existing bluefin tuna indices

- The Committee was successful in producing a dataset of 99,054 individual longline sets over the years 1992-2015 from the Gulf of Mexico and the Atlantic Ocean north of 30°N latitude and west of 45°W
- Next step is to account for the very different target and non-target fishing strategies of each CPC.
- The Committee agreed that new fishery independent Canadian acoustic survey may prove useful for 2017 stock assessment.

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GBYP Context: objectives

- Improve basic data collection
- Improve understanding of key biological and ecological processes
- Improve assessment models and provision of scientific advice on stock status



GBYP Context: 2016 Activities

- Completing Phase Six
- Cost-benefit analyses of tagging activities
- Power analyses and cost-benefit analysis for the GBYP aerial surveys,
- Second Review of the GBYP Programme



Historical data recovery



Tuna factory Isla Gomera 1934

Example register from tuna factory I. Gomera

Example register from tuna trap in Sicily

SCRS 2016/150

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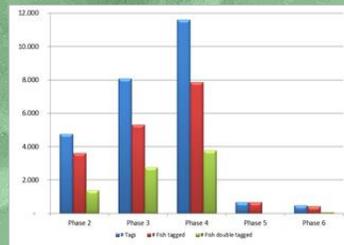
Conventional tagging

Releases of conventional tagged BFT suspended during Phase 6 but recovery efforts continue

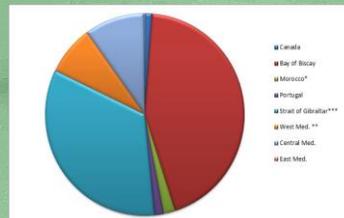
17,819 fish tagged;
428 tag recovered

recovery rate for conventional tags: 1.54

Numbers of released fish

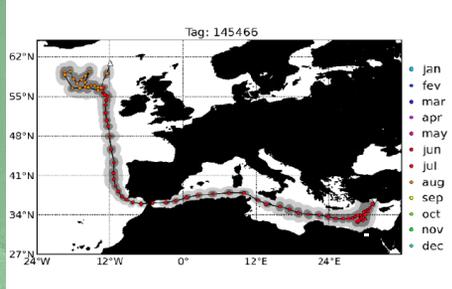


Location of released fish



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PSAT Tagging



BFT from the Eastern Med migrate out to the NE Atlantic and back into the Med

Consolidation of Historical PSAT data for whole Atlantic to support estimates of mixing east – west

770 PSAT tagged fish

Table 1. Cooperators that have provided electronic track data for Atlantic bluefin tuna.

Investigator	# Tags
AZTI Tecnalia (AZTI)	20
Grande Bluefin Year Programme (GBYP)	134
Department of Fisheries Oceans (DFO)	48
DFO - Acadia National Park (Acadia)	37
DFO - Duke University (Duke)	15
Instituto Espanol de Oceanographica (IEO)	13
Large Pelagics Research Center (LPRC)	316
National Oceanic Atmospheric Administration (NOAA)	31
Natural Resource Damage Assessment (NRDA)	24
Universidad de Cadiz (UCA)	46
WWF	86

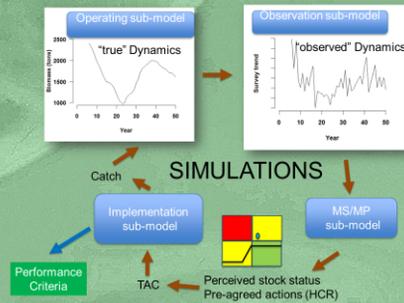
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BFT Core Modelling group: next generation of stock assessment models and MSE

Move away from catch-at-age data and VPA

- Finer spatial resolution
- Run much faster than previous multi-stock Models

Developed a multi-stock, spatial, quarterly, statistical catch-at-length model

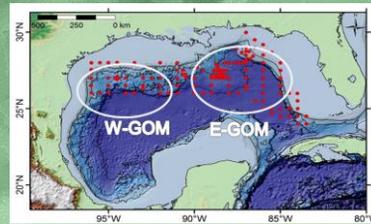


2016 GBYP larval workshop objectives

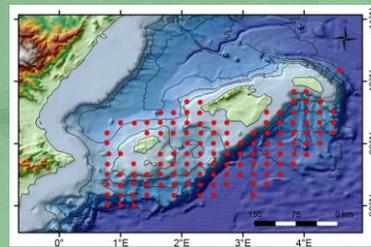


- Reinforce collaboration between scientists working on early life history of BFT
- Review state of larval abundance indices with the view of evaluating feasibility of implementing a Med-wide larval index

Gulf of Mexico (NOAA)



Balearic Islands (IEO)

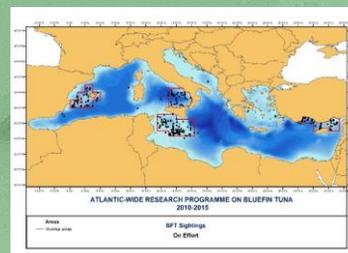
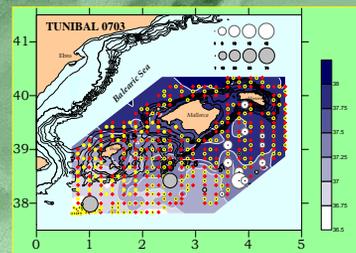


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2016 GBYP larval workshop outcomes

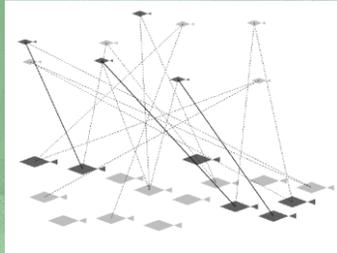
Med-wide larval index:

- current Balearic index is a good initial proxy and might be a base for building a more developed one, specific for each spawning area
- An international project is needed to sample all major spawning areas (great challenge – logistics and funding)



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Feasibility of close-kin genetic tagging



Big fish – adults
Small fish – juveniles

Black – sampled
Grey - unobserved

Close-kin implementation is feasible but challenging:

an appropriately-designed and carefully-implemented sampling program, and investment on genotyping should provide the close-kin data required to:

- disentangle stock structure,
- selectivity,
- fecundity-at-age,
- mortality,
- adult abundance

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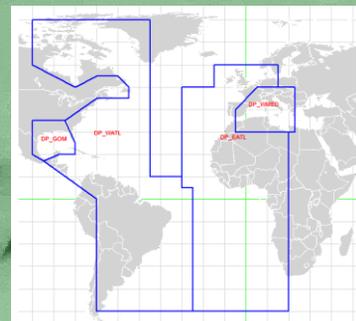
MSE BFT Model

Data used to develop model

- Catch (year x subyear x area x fleet)
- stock of origin (subyear x area x age group)
- electronic tagging (subyear x area x age group)
- length composition data (year x subyear x area x fleet)
- relative abundance indices (year x subyear x area)

Simulation structure:

- 2 stocks
- 45 years
- 2 subyears
- 2 fleets
- 4 areas
- 25 ages
- 3 movement age groups, 0-2, 3-8, 9+



Conclusions

- The project has achieved many of its goals, particularly with regard to biological data collection, an opinion shared with the external review of the project.
- The project has played an important role in improving the knowledge and information available for bluefin tuna in the Atlantic Ocean.
- Promising new research:
 - Close-kin
 - Larval indices
 - Developing of MSE

