Mediterranean Swordfish and Eastern-Atlantic Bluefin tuna: recent findings on stock status

Working Group (WG2) on pelagic fishes -ICCAT

ICCAT Secretariat

(October 13, 2016)
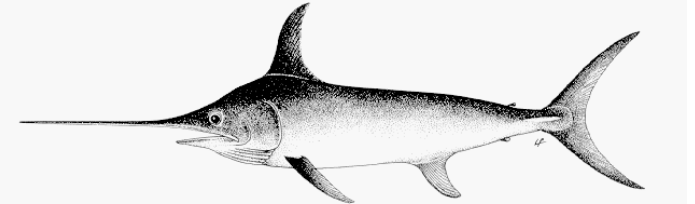
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Swordfish: Background information

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

- Unique stock (limited mixing with the N. Atlantic one)
- Last assessment in July 2016 (also assessed in 2014)
- Management through input control measures (e.g. vessel list, minimum size/weight, fisheries closures)
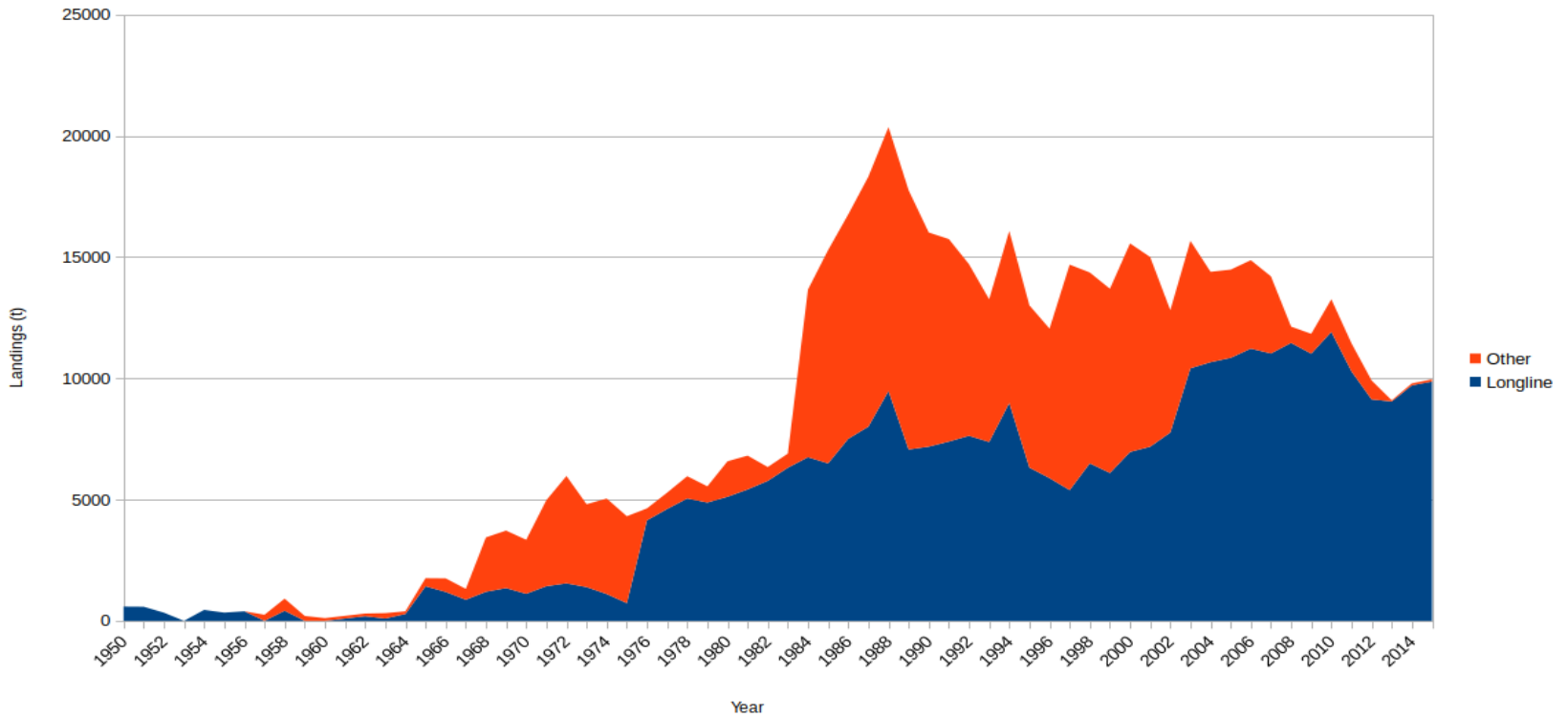

Objective:

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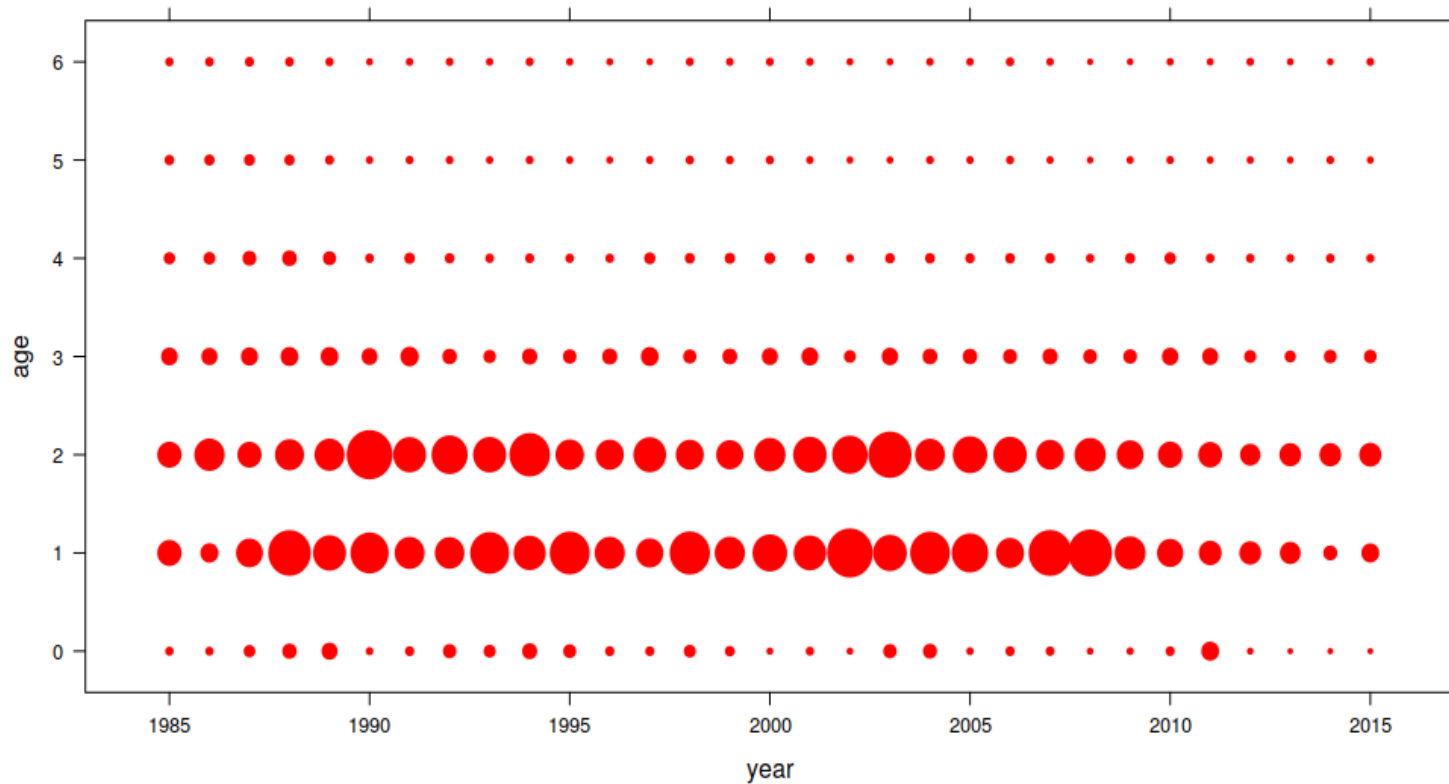
Fisheries

- Main gears: Longlines (surface, mesopelagic) and Gillnets (prohibited since 2012)
- Production around 10,000 t in the recent years, with a peak of 20,365 t in 1988
- Major fisheries (2003-2015): Italy (45%), Morocco (14%), Spain (13%), Greece (10%) and Tunisia (7%)
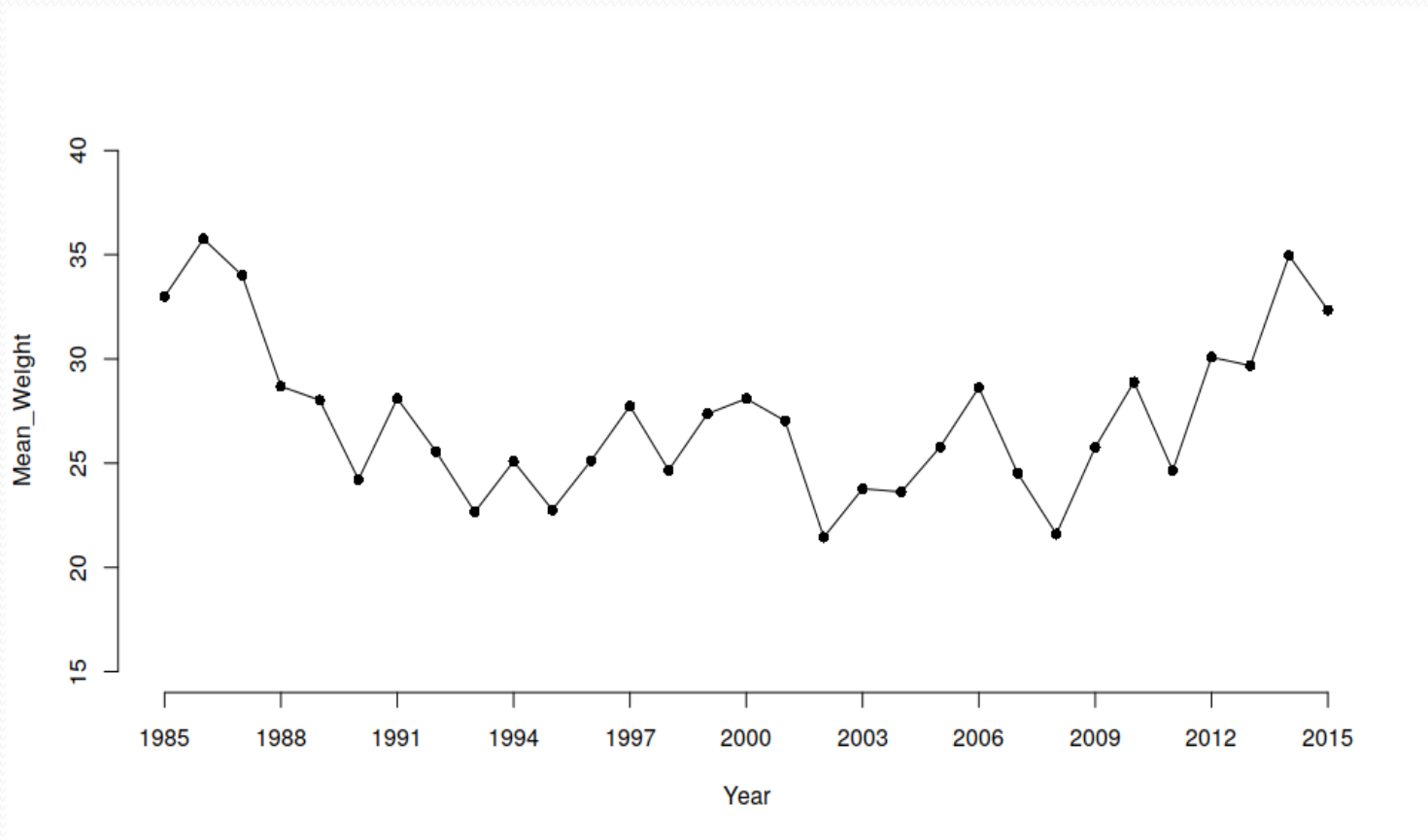
Catch at size

- Juveniles (<3yr old) dominate the catches (50-70% in terms of numbers)

Catch at size

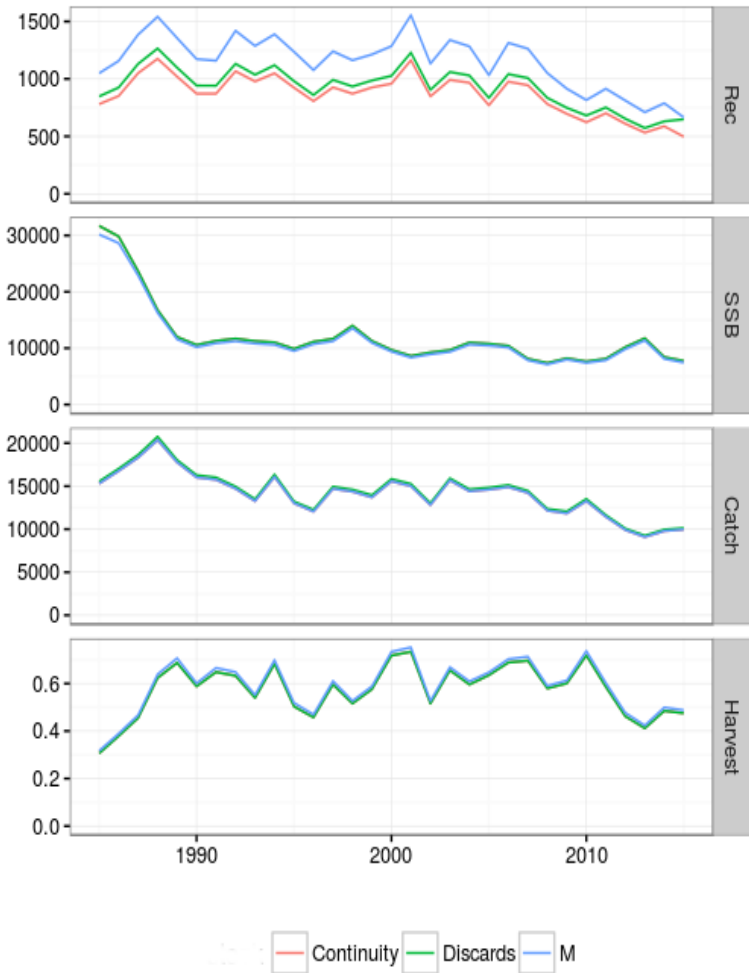- No trend over the past 30 years regarding the mean fish weight in the catches

Indices of abundance (CPUE)

- No overall trend over time on the available standardized indices of abundance (CPUE series)
- No index of abundance available for the major fishery (Italy)
- CPUE series did not cover the earlier years of the reported landings
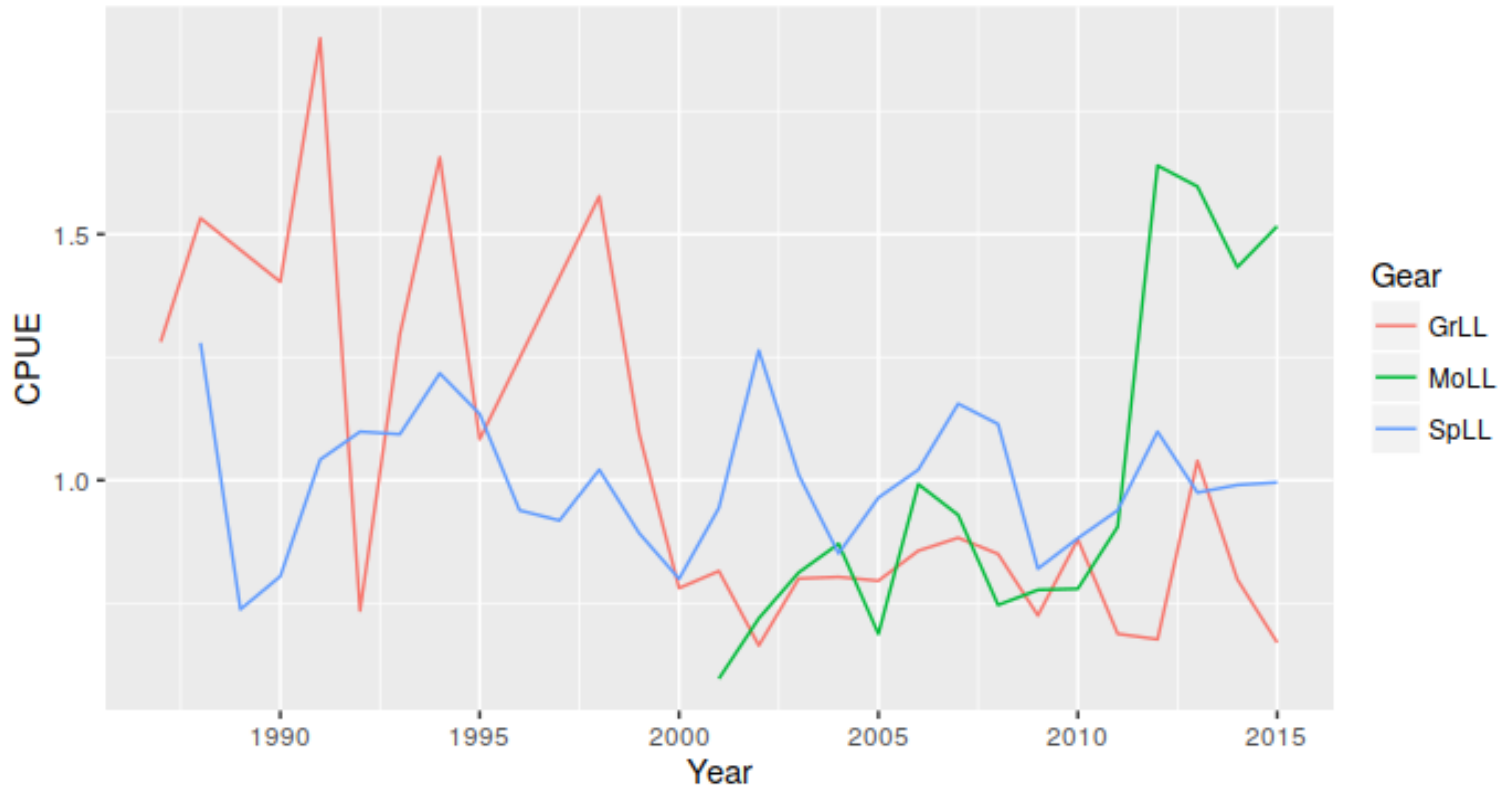
Stock assessment in 2016

Age structured model (XSA)

3 different F scenarios:

- Continuity (similar to 2014 assessment);
- Assuming discard misreporting;
- Natural mortality (M) varying with age

- Recruitment (Rec) declines in the last decade
- Spawning Stock Biomass (SSB) stable at low levels (about 1/3 of that in the mid 1980s), is less 15% of B_{MSY}
- Declining fishing mortality (F) in the last decade, F_{2015} is almost twice the estimated F_{MSY}

Stock status in 2016

100% probability that the stock is overfished and subject to overfishing
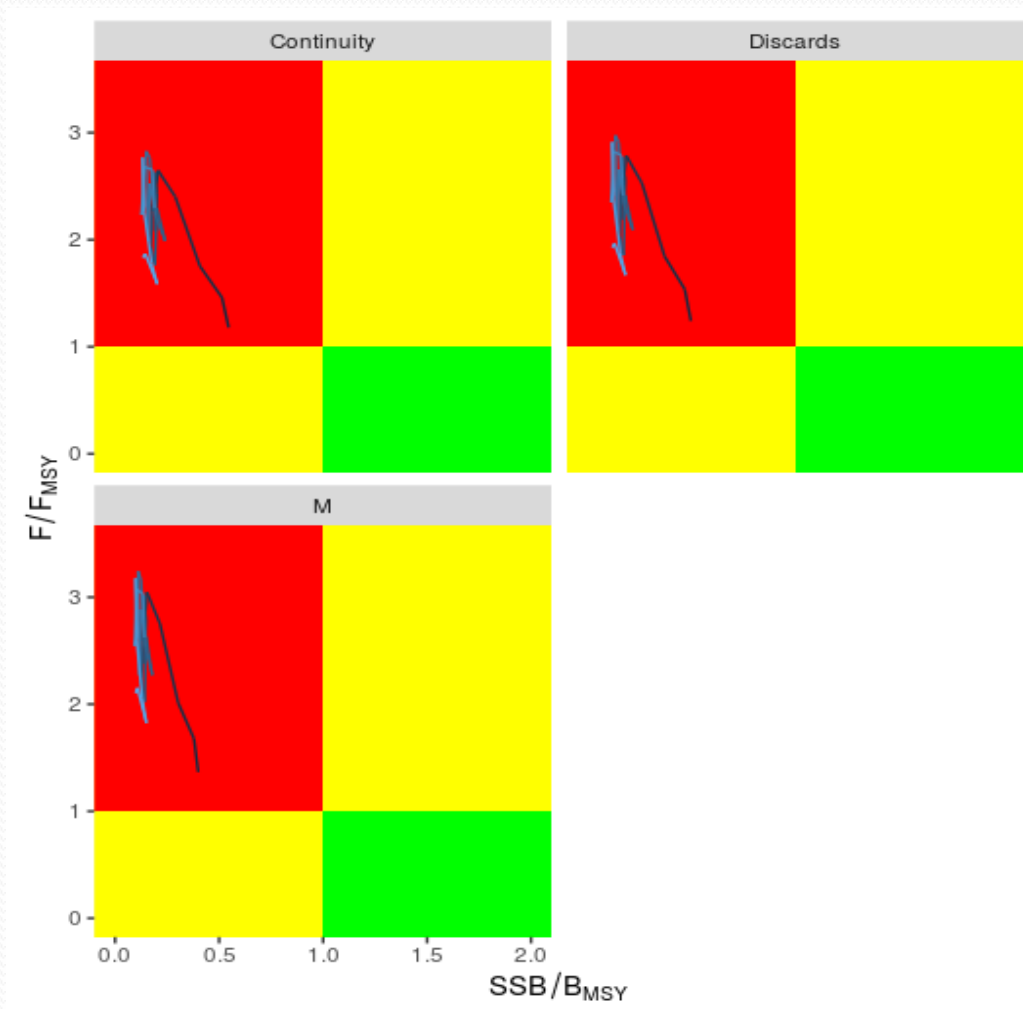
Projections

Three F scenarios:

- Current F (blue)
- $F = 0.8 \times F_{Cur}$ (red)
- $F = F_{MSY}$ (green)

Projections

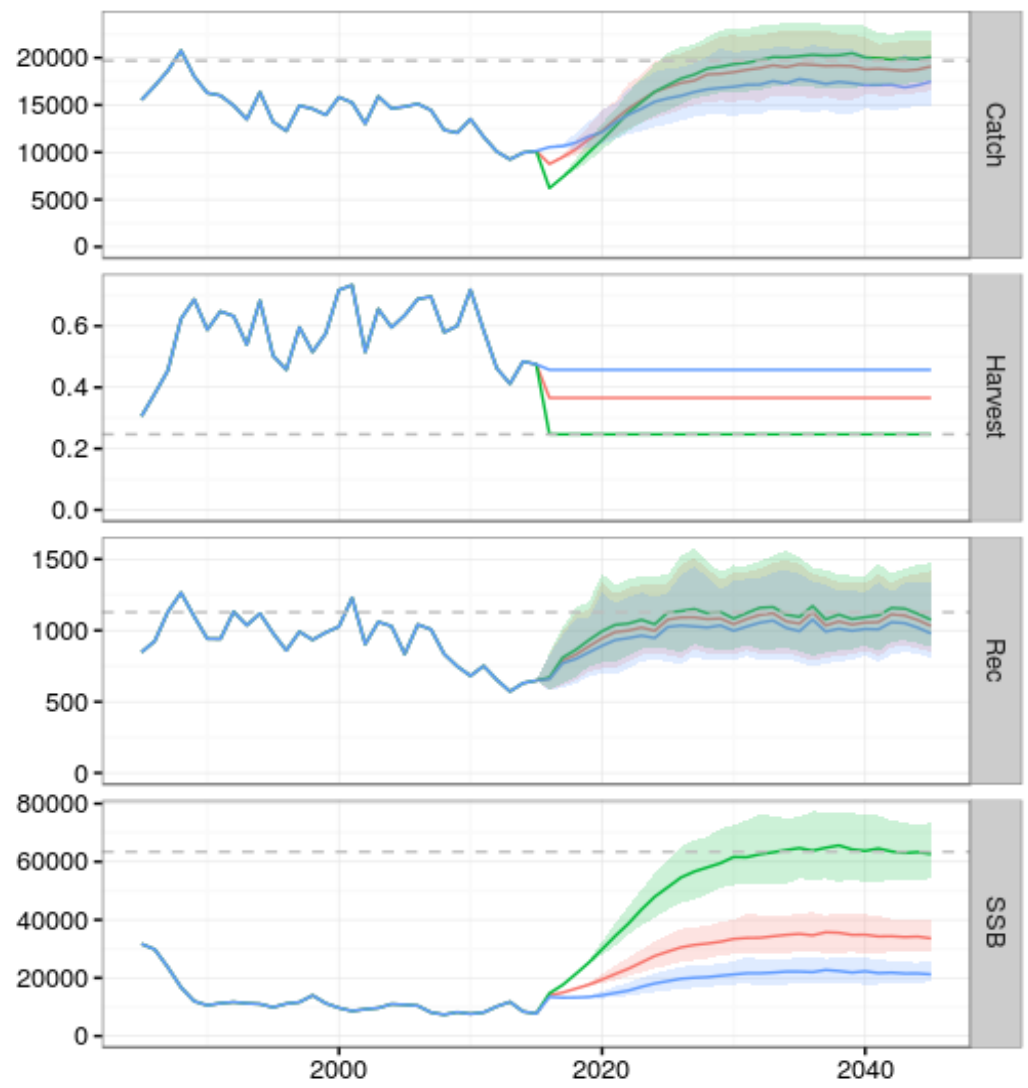Kobe II Strategy matrix showing probabilities (%) of being in the green quadrant by year for each level of fishing mortality. F_{Cur} refers to the current F (2015)

F multiplier		F/F$_{cur}$	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
0	F$_{MSY}$	0	0	0	0	0	100	100	100	100	100	100
0.25	F$_{MSY}$	0.14	0	0	0	0	7	100	100	100	100	100
0.5	F$_{MSY}$	0.29	0	0	0	0	0	10	69	96	98	100
0.75	F$_{MSY}$	0.43	0	0	0	0	0	1	3	20	53	72
1	F$_{MSY}$	0.57	0	0	0	0	0	0	0	2	4	8
1	F$_{Cur}$	1	0	0	0	0	0	0	0	0	0	0
0.8	F$_{Cur}$	0.8	0	0	0	0	0	0	0	0	0	0

Catches corresponding to F levels, need to be examined in conjunction with the above table. F_{Cur} refers to the current F (2015).

F multiplier		F/F$_{cur}$	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
0	F$_{MSY}$	0	0	0	0	0	0	0	0	0	0	0
0.25	F$_{MSY}$	0.14	1684	2306	3011	3843	4723	5666	6550	7409	8217	8865
0.5	F$_{MSY}$	0.29	3278	4275	5374	6640	7937	9299	10597	11752	12860	13771
0.75	F$_{MSY}$	0.43	4786	5949	7203	8639	10028	11505	12962	14164	15353	16151
1	F$_{MSY}$	0.57	6214	7363	8594	10006	11300	12734	14198	15309	16406	17106
1	F$_{Cur}$	1	10624	11198	12670	13577	14439	14924	15801	16242	16468	16352
0.8	F$_{Cur}$	0.8	8826	9939	11786	13204	14464	15287	16465	17206	17746	17711

Synthesis

High uncertainty on future recruitment levels makes projections and stock status estimates questionable:

- If recruitment can return to the 1980s and 1990s levels, then the stock is severely overfished and will require long recovery times before it reaches B_{MSY} (basic scenario assumed in projections).

- If the recruitment tendency is an artefact of the estimation process (e.g. underestimation due to discarding), then current recruitment may be underestimated. The stock could recover faster than in case above, if undersized fish mortality is reduced

- If recruitment has changed because of a regime shift or changes in ecological conditions, then current stock productivity may be lower than in the 1990s and current reference points do not represent current stock conditions

SCRS management recommendation

- **Substantial decreases in harvest rates** so that responses from the population can be detected

- **Increase monitoring** of landings and discards

- The impact on swordfish recruits of the albacore fisheries operating during the swordfish fishery, **closure needs to be taken into account**

Bluefin tuna: Background information

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

- Two stocks: West and East-Med (mixing in Central North Atlantic and extensive migrations)

- Homing behaviour

- Last assessment in 2014 (projections updated in 2016)

- Management through input control measures (e.g. TAC, minimum size/weight, fisheries closures)
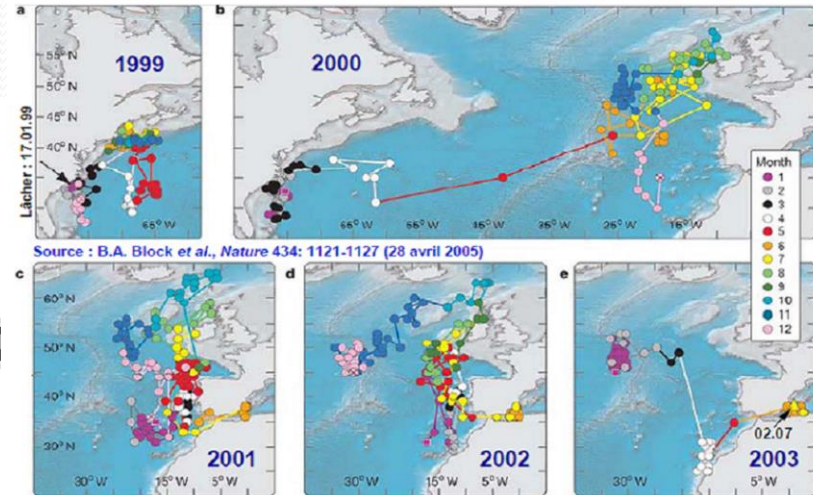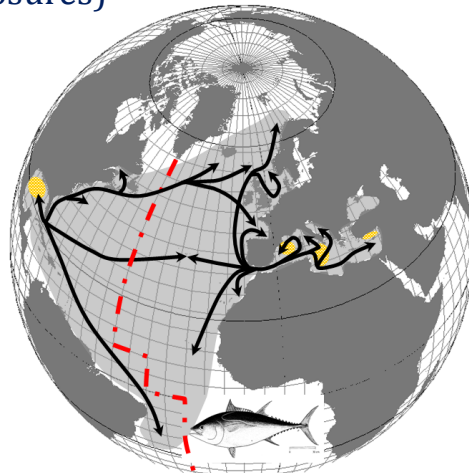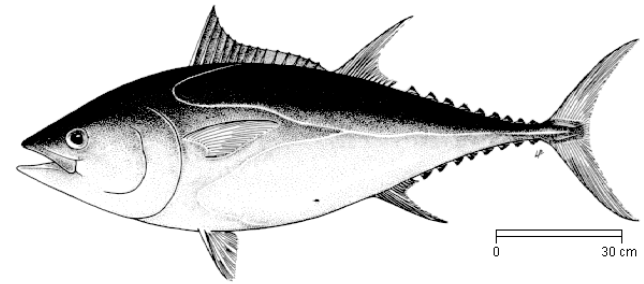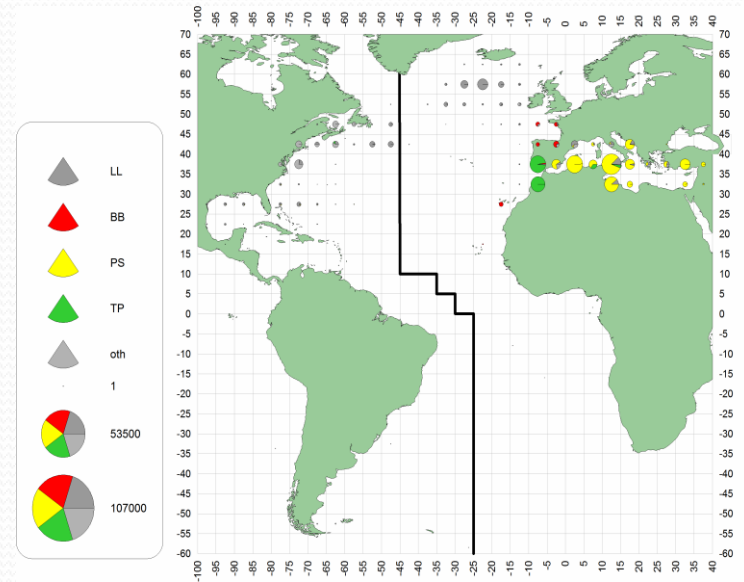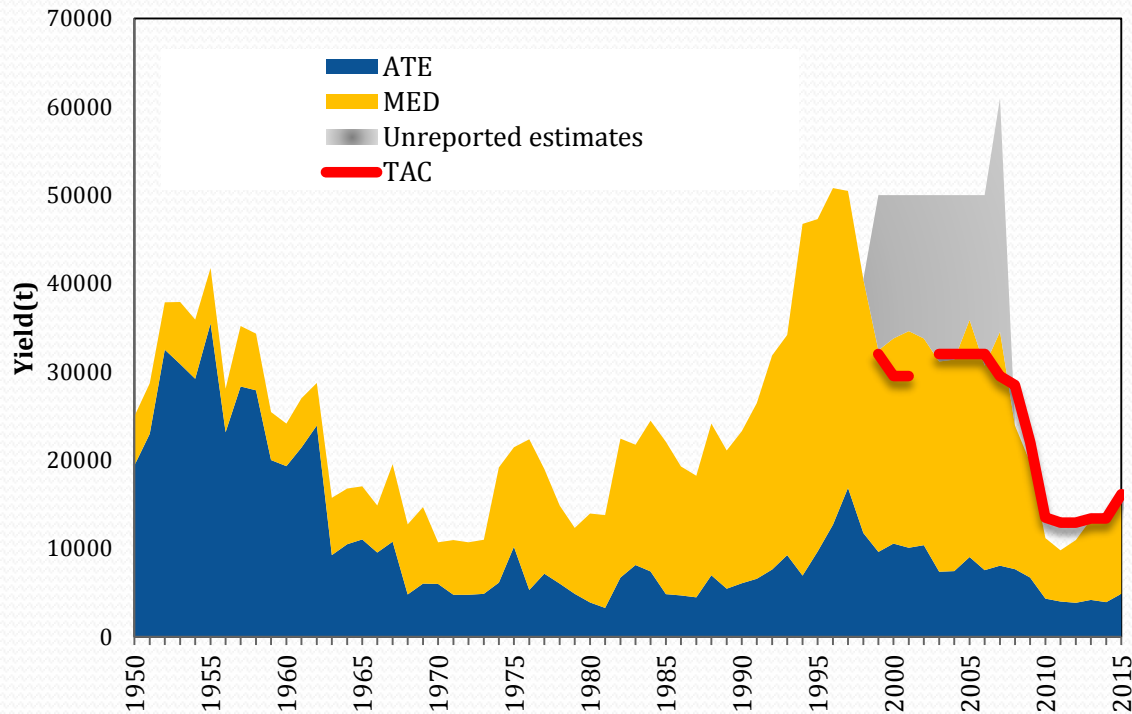

Source : B.A. Block et al., Nature 434: 1121-1127 (28 avril 2005)

Objective:

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

Fisheries

- Main gears: Purse-seine, taps and longlines
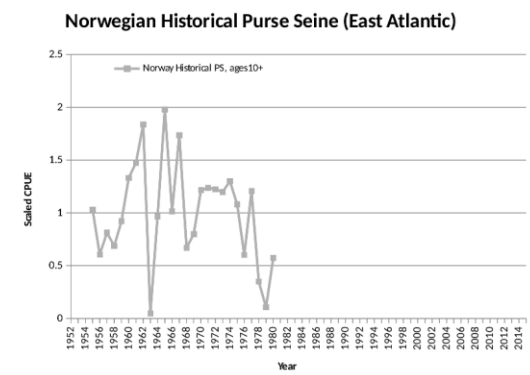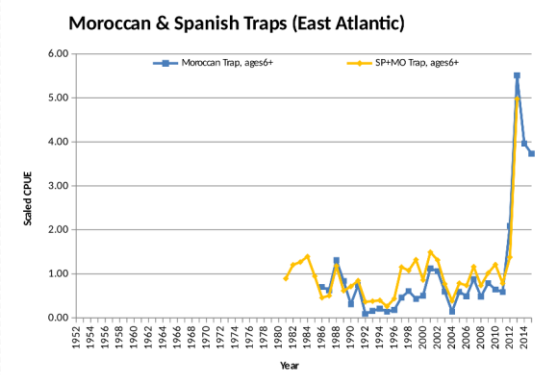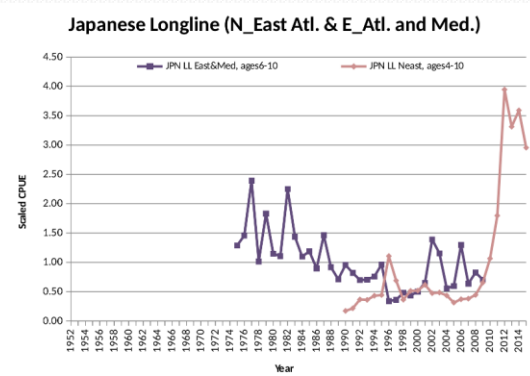- Production around 16,000 t, with a estimated peak of 50,000-61,000 t between mid-1990's-2007
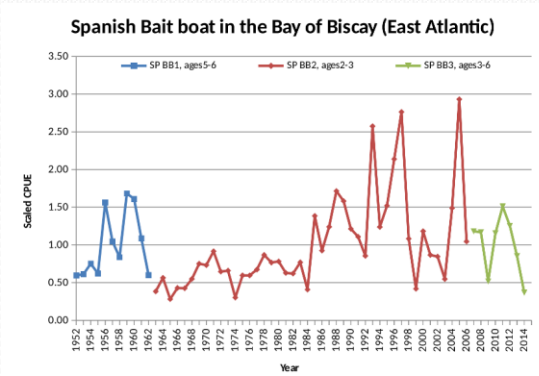

Geographic distribution of bluefin tuna catches per 5x5 degrees and per main gears from 2010 to 2014

Indices of abundance (CPUE)

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
- Impossible 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

Spanish Bait boat in the Bay of Biscay (East Atlantic)

Japanese Longline (N_East Atl. & E_Atl. and Med.)

Moroccan & Spanish Traps (East Atlantic)

Norwegian Historical Purse Seine (East Atlantic)
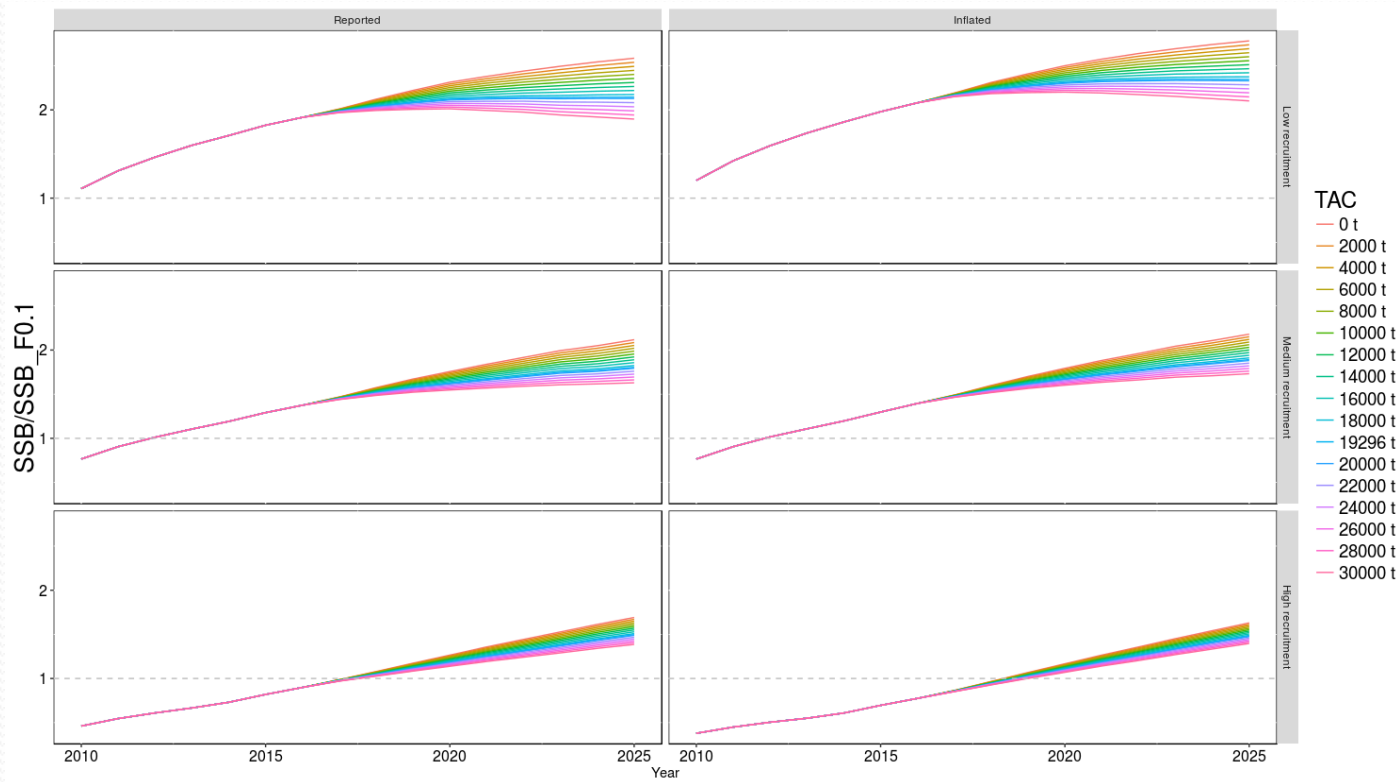
Projections

- Projections suggest E-BFT biomass would continue to increase in future
- BUT the indices for large fish declined for those years.
- Projections appear to be rather optimistic

Outlook

Results integrated over the 3 recruitment scenarios (low, medium and high), the 2 catch scenarios (reported and inflated) and with the estimated selectivity pattern over 2009-2011 (as in 2014)

TAC	2017	2018	2019	2020	2021	2022
0 t	77%	84%	91%	96%	98%	100%
2000 t	76%	84%	91%	96%	98%	100%
4000 t	76%	84%	91%	95%	98%	99%
6000 t	76%	83%	90%	95%	98%	99%
8000 t	76%	83%	90%	94%	97%	99%
10000 t	76%	83%	90%	94%	97%	99%
12000 t	76%	83%	89%	94%	97%	99%
14000 t	76%	82%	89%	93%	97%	98%
16000 t	76%	82%	89%	93%	96%	98%
18000 t	76%	82%	88%	93%	96%	98%
19296 t	**76%**	**82%**	**88%**	93%	96%	98%
20000 t	76%	82%	88%	92%	95%	98%
22000 t	76%	81%	87%	92%	95%	97%
24000 t	76%	81%	87%	92%	95%	97%
26000 t	75%	81%	87%	91%	94%	97%
28000 t	75%	81%	86%	90%	94%	96%
30000 t	75%	81%	86%	90%	93%	96%

According to the 2016 updated projections and above specifications, East-Mediterranean stock would be **neither overfished nor under overfishing** with 60% of probabilities by 2022

Thanks for your attention