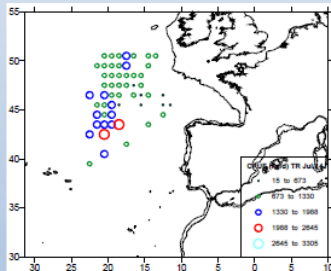
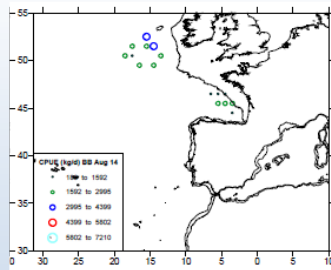


Panel 2: Northern temperate tuna

ALB North Atlantic
 ALB Mediterranean
 BFT West Atlantic

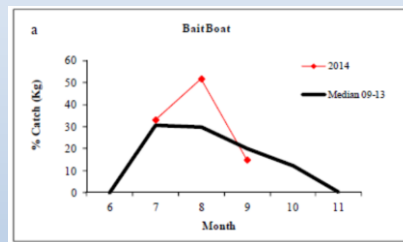
BFT East Atlantic & Mediterranean
 GBYP

Responses to Commission Workplans



Updates on fisheries:

Another year with limited albacore migration into the Bay of Biscay



Fishery stops earlier in the year

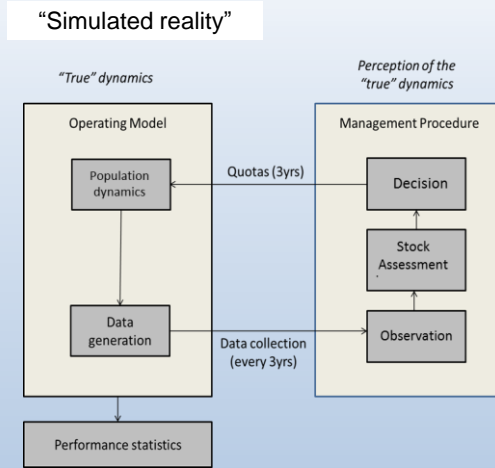
Spanish fisheries update (SCRS/2015/155)





North Atlantic albacore Management Strategy Evaluation

- 1) Identification of management objectives
- 2) Selection of hypotheses
- 3) Constructing OMs
- 4) Defining MP
 - 1) Observation model
 - 2) Stock assessment
 - 3) HCR
- 5) Simulation
- 6) Summary and interpretation through performance stats



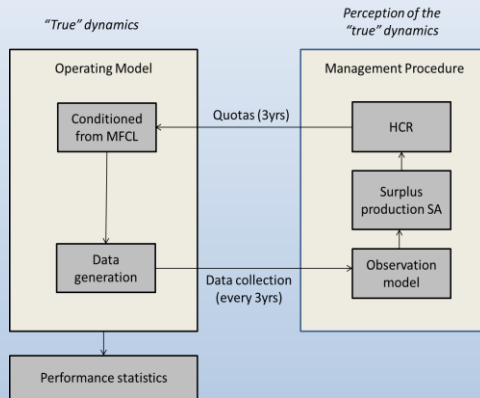
(SCRS/P/2015/032)



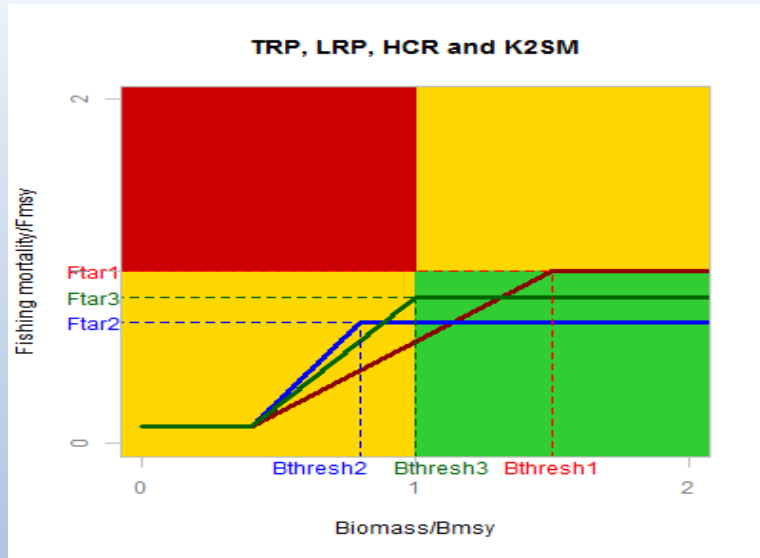
MSE for North Atlantic albacore

Simulation testing

Evaluate how these HCR, applied in combination with a SA model will lead the "true" system, to achieve **management objectives** of high catch and high p-green.



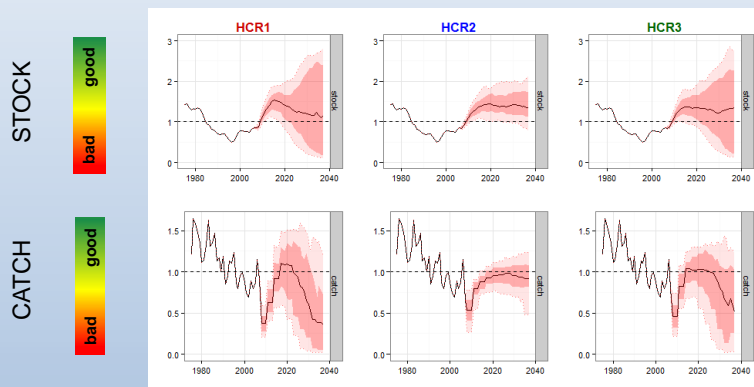
MSE for North Atlantic albacore



5

MSE for North Atlantic albacore

Simulation testing: how the “simulated reality” would evolve when driven by the MP used?



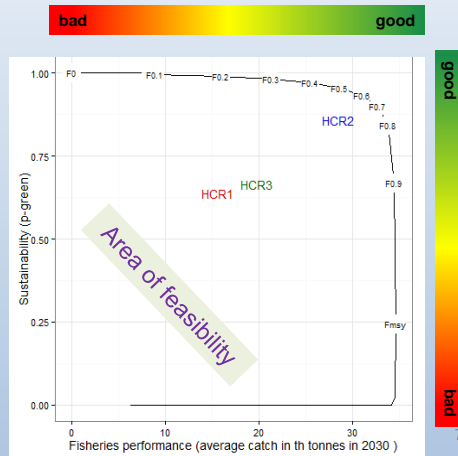
6



MSE for North Atlantic albacore

Simulation testing:
Do HCRs achieve management objectives?

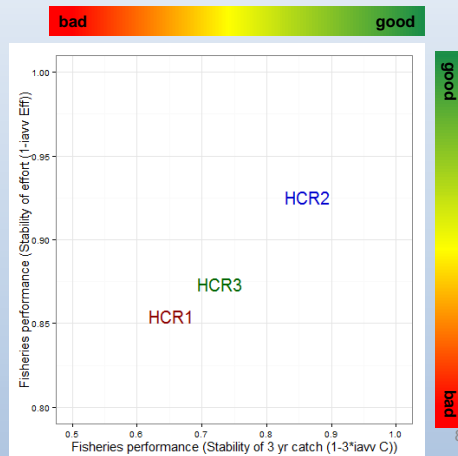
Trade off 1:
Catch vs Sustainability



MSE for North Atlantic albacore

Simulation testing:
Do HCRs achieve management objectives?

Trade off 2:
Stability for industry



MSE for North Atlantic albacore

Simulation testing:
Do HCRs achieve management objectives?

Candidate Performance indicators

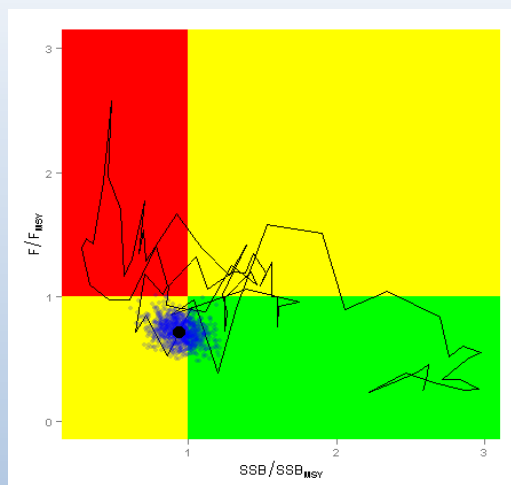
Catch Safety long term timeframes Recovery time
 Short term red overfishing Discount rates
 Stability yellow probabilities

The list of performance indicators will be determined by the complexity of management objectives

9

Stock Status North: MFCL Base Case

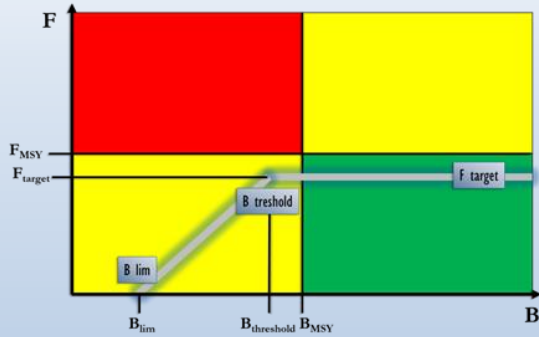
Slightly overfished
 $SSB/SSB_{MSY}=0.94$
 No longer overfishing
 $F/F_{MSY}=0.72$



Projections: North



Constant catch
HCR ($F_{target}=0.7-1$,
 $B_{thresh}=0.6-1$,
 $B_{lim}=0.4BMSY$)



Management recommendations: North

- Current TAC: Recovery by 2019 with 53% prob.
- Example: “high probability”=75% & “as soon as possible”=10y -> 26,260t

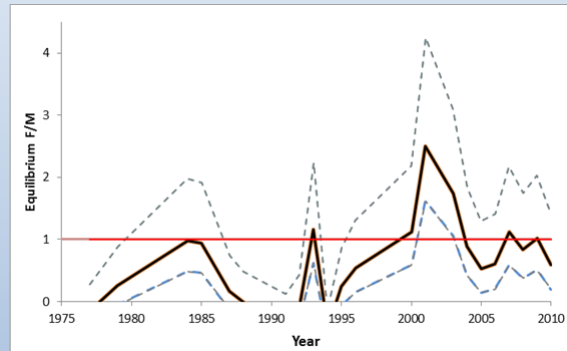


Kobe II Strategy matrix: Future probability of $SSB \geq SB_{MSY}$ and $F < F_{MSY}$ for different combinations of $B_{threshold}$ and F_{target} values

Bthreshold	Ftarget	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Average catch over:	Cumulative catch over:			
																				3 years	5 years	10 years	15 years	20 years
6Bmsy	0.75Fmsy	29	32	36	49	54	57	61	65	68	70	73	75	77	78	80	81	82	84	26,969	139,100	298,575	454,716	620,434
6Bmsy	0.8Fmsy	29	31	35	45	52	55	58	61	64	67	69	71	74	75	77	78	79	80	28,458	146,274	306,335	472,388	642,668
6Bmsy	0.85Fmsy	29	31	33	42	47	52	55	57	59	62	64	67	69	71	72	74	76	77	29,911	153,211	318,349	486,656	662,774
6Bmsy	0.9Fmsy	29	30	30	39	42	46	50	52	54	56	58	60	62	64	66	68	70	71	31,830	159,918	329,637	503,591	680,809
6Bmsy	0.95Fmsy	29	29	20	36	37	39	42	44	48	50	51	52	54	55	56	58	60	61	32,715	166,988	340,221	517,205	696,835
6Bmsy	Fmsy	29	29	0	33	33	0	33	33	0	33	33	0	33	33	0	33	33	0	34,066	172,657	350,123	528,550	710,916
8Bmsy	0.75Fmsy	29	32	42	51	55	59	63	67	70	72	75	76	78	80	81	83	86	88	25,280	133,581	288,139	451,760	618,642
8Bmsy	0.8Fmsy	29	32	41	50	53	56	59	62	66	69	71	73	75	77	78	80	81	83	26,655	140,496	301,820	469,512	641,152
8Bmsy	0.85Fmsy	29	31	39	48	50	53	56	58	61	63	67	69	71	73	75	76	77	79	28,016	147,185	313,734	485,931	661,571
8Bmsy	0.9Fmsy	29	30	35	46	48	50	51	54	56	58	60	62	64	67	69	70	72	73	29,346	153,654	324,930	500,996	679,954
8Bmsy	0.95Fmsy	29	29	23	45	45	46	47	48	49	51	52	54	55	56	58	59	61	63	30,643	159,905	335,420	514,759	696,359
8Bmsy	Fmsy	29	29	1	42	42	0	42	42	0	42	42	0	42	42	0	42	42	0	31,920	165,942	345,222	527,355	710,841
Bmsy	0.75Fmsy	29	35	47	58	62	68	72	75	78	80	83	84	87	90	92	94	96	98	22,629	123,151	277,738	441,651	610,569
Bmsy	0.8Fmsy	29	34	46	56	61	66	71	73	76	78	80	82	85	87	90	92	94	96	23,877	129,456	289,835	458,946	632,882
Bmsy	0.85Fmsy	29	33	45	55	59	63	69	71	74	77	78	80	82	84	87	89	91	93	25,083	135,543	301,142	474,839	653,068
Bmsy	0.9Fmsy	29	33	42	54	56	60	66	68	71	74	75	77	79	81	83	85	87	89	26,260	141,449	311,703	489,542	671,130
Bmsy	0.95Fmsy	29	32	32	52	54	57	62	64	67	70	72	74	76	77	78	80	81	83	27,407	147,079	321,530	502,449	687,000
Bmsy	Fmsy	29	31	21	50	52	11	57	57	5	62	62	5	65	65	3	67	67	2	28,525	152,534	330,547	514,046	700,587

Stock Status Mediterranean: Catch curve

- Data poor
- $F_{cur} \leq F_{msy}$



Workplan: 3 assessment updates

- Update assessment of North, South and Mediterranean stocks
 - North (Commission request): update ASPIC
 - Mediterranean (Strategic plan): update catch curve and catch based MSY
- Develop MSE framework
 - Select candidate MSE
 - Simulation test

Recommendations

- Financial implications:
 - Assessment expert
 - Attendance (using ICCAT funds if required)
- Research:
 - Further elaborate MSE framework.
 - Review biological parameters
 - Environmental and spatial effects on biology and cpue
- Statistics:
 - Improve Mediterranean T1 & T2 statistics
 - Document new T2 series for EU-France in the North Atlantic
 - Improve discard estimates

Western Atlantic Bluefin tuna

September 2015
SCI-019 BFTW Executive
Summary

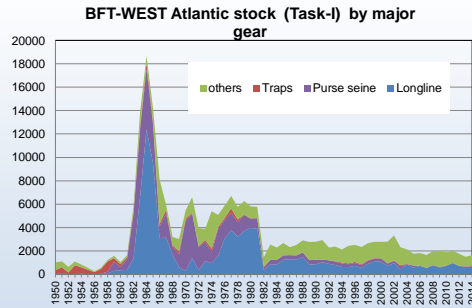


Western Bluefin Highlights

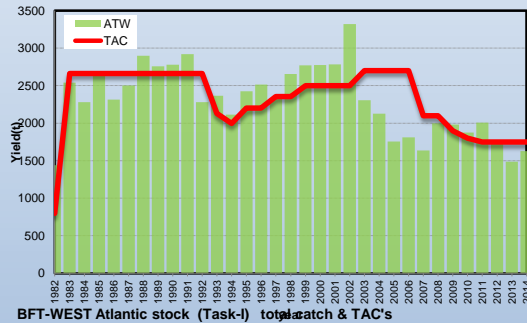
- TAC was revised to 2,000 t for 2015 and 2016 [Rec 14-05]
- Catch in 2014 was 1,626 t (including discards)
- Latest stock assessment : 2014. No new assessment was made in 2015
- The WG reviewed updated fishing indicators this year
- 2 abundance indices were updated
- Several new abundance indices were developed
- On going project to develop new abundance indices combining several members' catch and effort data
- New analyses on recruitment hypothesis

9/28/2015

17



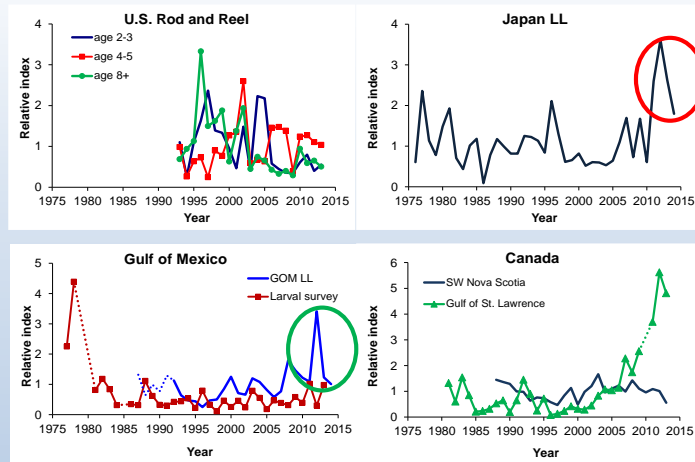
Fishery indicators (catch)



9/28/2015

18

Fishery indicators (abundance indices)



Japanese LL and US LL the Gulf of Mexico showed recent declines from recent higher levels. Japanese indices for 2013 and 2014 are still high in comparison with previous periods

9/28/2015

19

Fishing indicators (NEW abundance indices)

- Two new collaborative indices were constructed during a joint U.S.-Canada data workshop.
 - a combined U.S.-Canada pelagic longline observer index for the Northwest Atlantic.
 - A combined Canada-U.S. rod and reel, handline, and harpoon index
- a fishery independent index based on a herring acoustic survey in the Gulf of St. Lawrence that showed consistent trends with fishery dependent indices in the region.
- These indices are being further developed for the 2016 data preparatory meeting.

9/28/2015

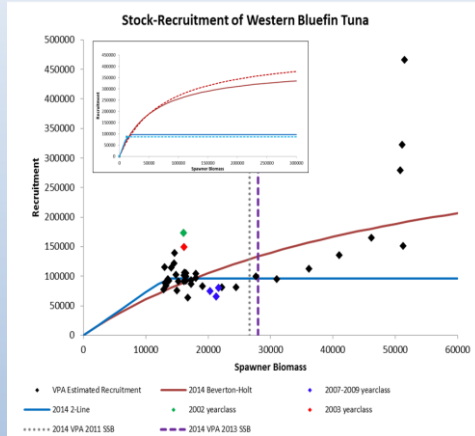
20



State of the stock (2014 assessment)

Two major uncertainties:

- Mixing East-West
- and past and future recruitment levels



the Committee is not in the position to favour one of the two recruitment scenarios.

9/28/2015

21

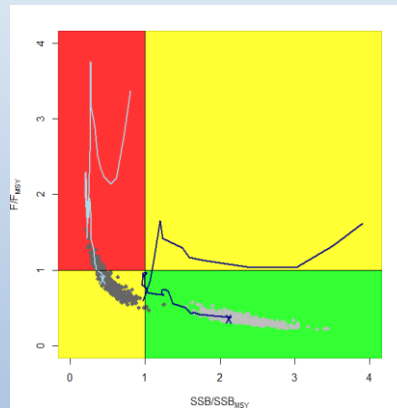


State of the stock



- $B > B_{MSY}, F < F_{MSY}$
- $B > B_{MSY}, F > F_{MSY}, B < B_{MSY}, F < F_{MSY}$
- $B < B_{MSY}, F > F_{MSY}$

a more fruitful course may be to move away from the current high/low recruitment dichotomy and focus instead on adopting biological reference points and developing management procedures that are robust to these recruitment and other sources of uncertainty.



9/28/2015

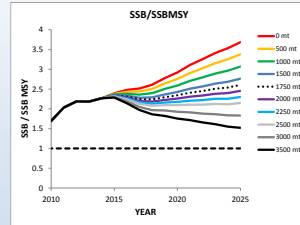
22



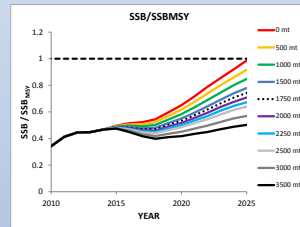
Outlook

- The low recruitment potential scenario suggests the stock is above the MSY level with greater than 60% probability and catches of 2,500 t or lower will maintain it above the MSY level. Constant catches of 2,250 t would result in a short-term minor decrease but with 2019 SSB approximately equal to that in 2013.
- If the high recruitment potential scenario is correct, then the western stock will not rebuild by 2019 even with no catch, although catches less than 2,500 t are predicted to prevent overfishing.

B) 60% probability
Low recruitment potential



B) 60% probability
High recruitment potential



9/28/2015

23



Management recommendations

Available information from the updated abundance indices remains consistent with the rebuilding schedule estimated at the 2014 stock assessment.

There is no change to the advice given last year regarding the implications of various catch levels

Low Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	1.2%	1.4%	1.4%	1.6%	6.0%
1500	1.2%	1.2%	1.2%	1.2%	1.6%
1700	1.2%	1.2%	1.2%	1.2%	1.6%
1750	1.2%	1.2%	1.0%	1.2%	1.6%
1800	1.2%	1.2%	1.0%	1.2%	1.6%
2000	1.2%	1.2%	1.0%	1.2%	1.4%
2250	1.2%	1.2%	0.8%	0.4%	1.2%
2500	1.2%	1.2%	0.6%	0.4%	1.2%
2750	1.2%	1.0%	0.4%	0.4%	1.2%
3000	1.2%	0.8%	0.4%	0.4%	0.8%
3250	1.2%	0.8%	0.4%	0.2%	0.8%
3500	1.0%	0.6%	0.2%	0.2%	0.6%

High Recruitment

TAC (mt)	2015	2016	2017	2018	2019
0	100.0%	100.0%	100.0%	100.0%	100.0%
1500	100.0%	100.0%	100.0%	100.0%	100.0%
1700	100.0%	100.0%	100.0%	100.0%	100.0%
1750	100.0%	100.0%	100.0%	100.0%	100.0%
1800	100.0%	100.0%	100.0%	100.0%	100.0%
2000	100.0%	100.0%	100.0%	100.0%	100.0%
2250	100.0%	100.0%	100.0%	100.0%	100.0%
2500	100.0%	100.0%	100.0%	100.0%	100.0%
2750	100.0%	100.0%	100.0%	100.0%	100.0%
3000	100.0%	100.0%	100.0%	100.0%	99.6%
3250	100.0%	99.8%	99.6%	99.4%	98.4%
3500	99.6%	99.4%	98.6%	97.6%	96.4%

9/28/2015

24

Panel 2: Northern temperate tuna

ALB North Atlantic
ALB Mediterranean
BFT West Atlantic

GBYP

**BFT East Atlantic & Mediterranean
Responses to Commission
Workplans**



GBYP PRIORITIES



The Commission in 2009 set a precise list of research priority actions for the GBYP:

- 1) Data mining and data recovery (**since 2010**)
- 2) Aerial survey (**2010, 2011, 2013 and 2015**)
- 3) Biological and genetic sampling and analyses (**since 2011**)
- 4) Tagging (conventional and electronic) (**since 2011**)
- 5) New modelling approaches (**since 2011**).

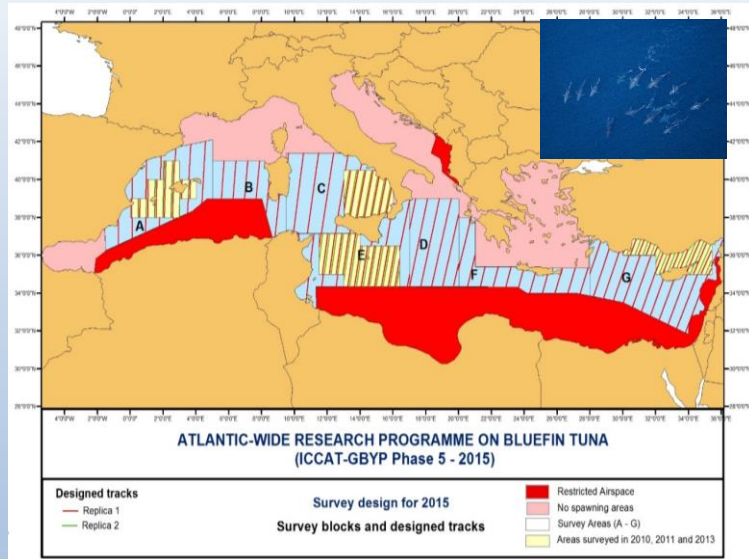




THE AERIAL SURVEY FOR SPAWNERS



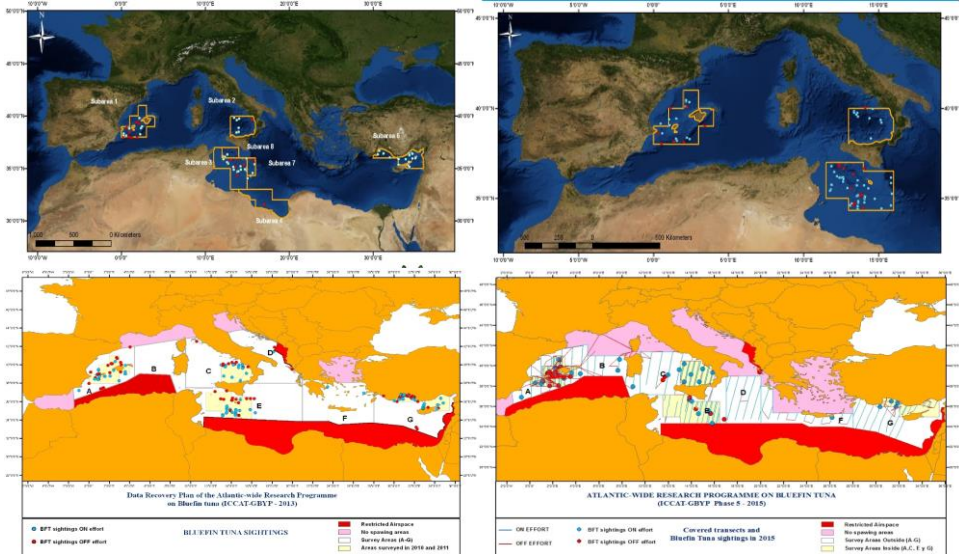
In 2015 it covered more than 60% of the Mediterranean Sea
(> 1.500.000 Km²)



Aerial surveys 2010-2015

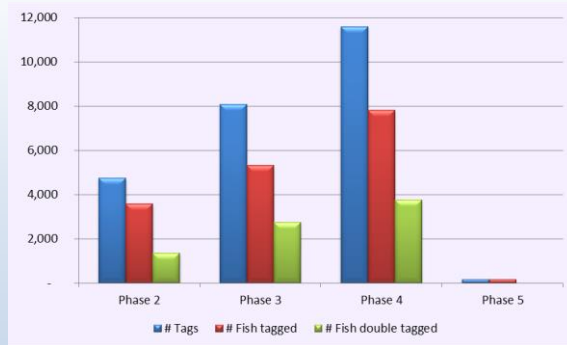


surveys confirmed that most of the sightings are within the areas previously identified as the most relevant spawning





Conventional Tagging: change in emphasis



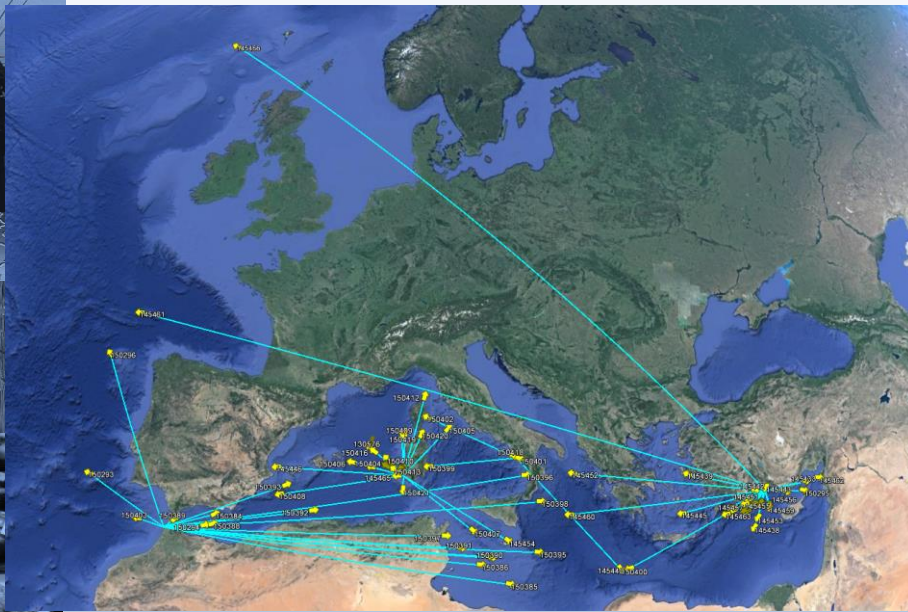
New conventional tag releases reduced drastically

in Phase 5 and 6:

- More electronic tagging
- Continued campaigns of conventional tag recovering
- Examination of genetic tagging

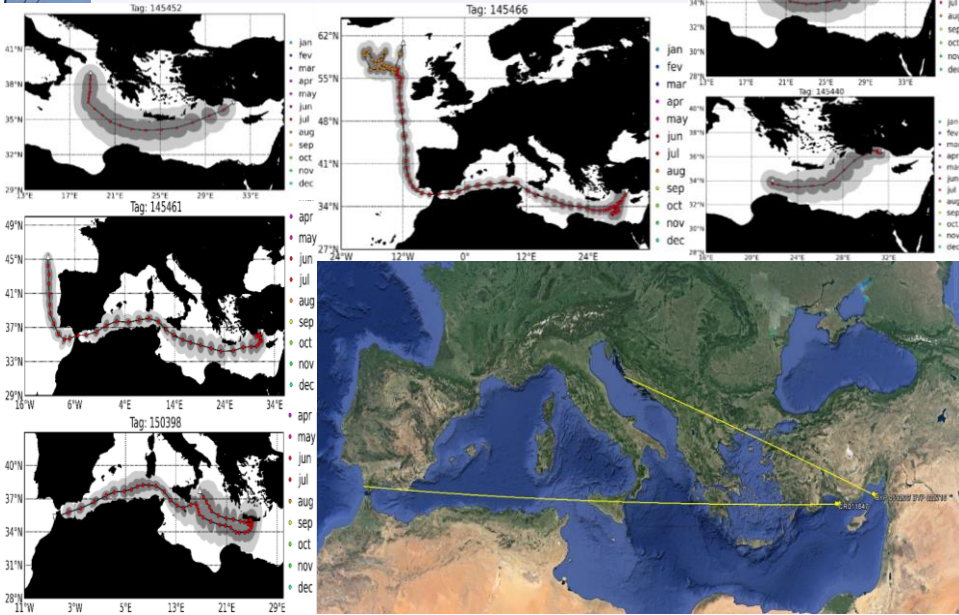


Results of Electronic Tagging 2015 (tags popped off by 16/09/2015)

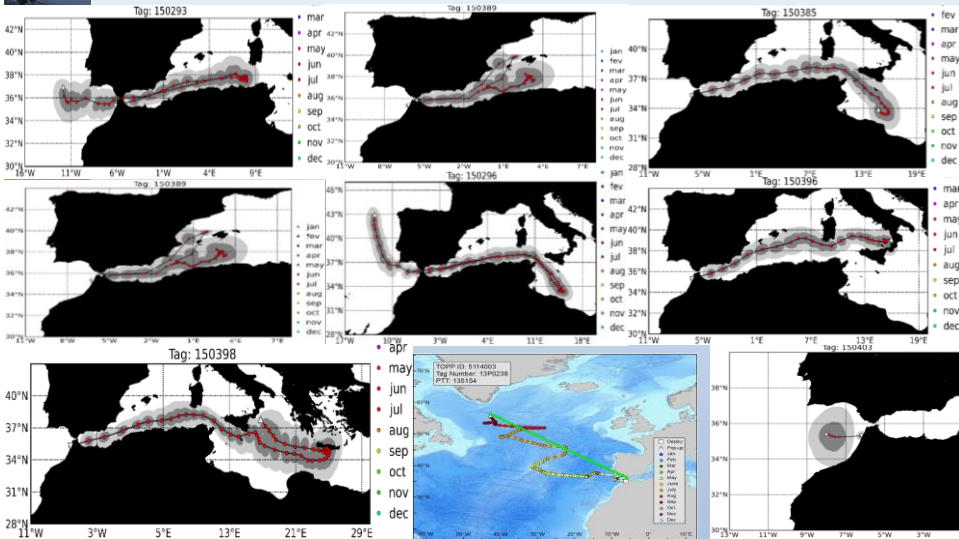




Movements of BFT from the Eastern Mediterranean



Movements of BFT from Morocco





BIOLOGICAL STUDIES

Preliminary results



AGEING STUDIES: Considerable number of otoliths aged, analyzed and been used to develop preliminary age-length keys.

GENETIC ANALYSES: clear genetic difference between western Atlantic bluefin tuna and eastern Atlantic bluefin tuna, and mixing between these two stocks occurs to some degree in most of the areas examined;

MICROCHEMISTRY ANALYSES showed that current stock components are well identified; mixing between the two stocks inside the Mediterranean Sea is minimal, even if differences exists in larvae and YOY; it is possible that intra-Mediterranean components can be further discriminated.



MODELLING-MSE APPROACHES



In Phase 5 – 2015, contracted a new Modelling Coordinator (Ph.D. Joe Powers) and a Modelling MSE Technical Assistant (Tom Carruthers).

Team has already developed generic software tools to implement MSE for BFT and other candidate stocks in ICCAT. Such tools are starting to be used on BFT and will be available to the next assessment.



ICCAT GBYP IN NEXT PHASES



The extension of the programme up to 2021 was discussed and considered by the Commission in 2014. In the remainder of phase 5 and on 6 (if continued) the program will:

1. Data recovery and data mining: Seek to recover additional historical data on LL fisheries in the Mediterranean
2. Aerial survey: continuing the survey on spawning aggregations in selected areas. Tagging data from electronic tags can help improve aerial survey estimates. Power analysis will determine the extend by which current surveys can detect changes in abundance.
3. Tagging: electronic tagging should be strongly improved, while conventional tagging will focus on a tag awareness activity to increase recoveries.



ICCAT GBYP IN NEXT PHASES



Biological analyses: sampling shall continued, covering the less sampled areas or areas where recently discovered mixing problems were detected; Analysis of collected samples will be speed up.

Modelling: advance MSE work through collaboration with other ICCAT WG (Methods, Albacore, Tropicals). MSE will help find the best approaches for using fishery independent data and innovative approaches to better quantify uncertainties. The dialog with stakeholders about MSE will continue

ICCAT GBYP Conclusions



The ICCAT SCRS continuously to support the Program and its extension up to 2021.

Although funding remains a challenge and has to be adjusted depending on the contributions received, the program only will survive thanks to contributions from the CPCs and entities which continue to provide funds

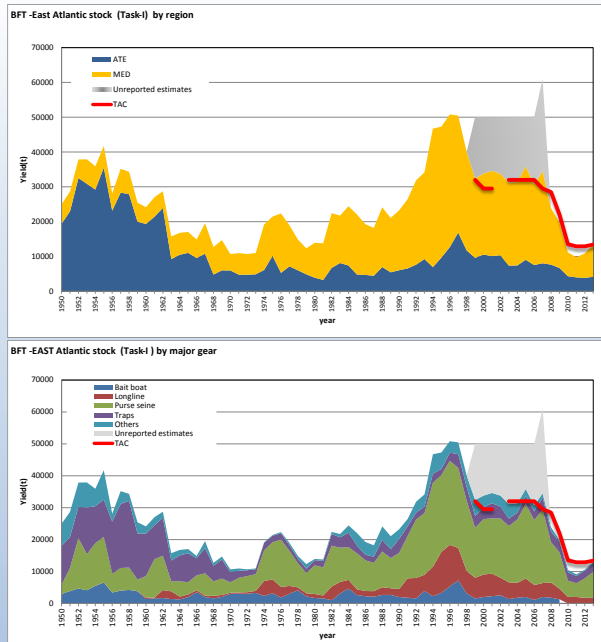
The total necessary budget for Phase 6 is provisionally set again at 2,125,000 Euro.



Eastern Atlantic Bluefin and Mediterranean

Assessed 2014



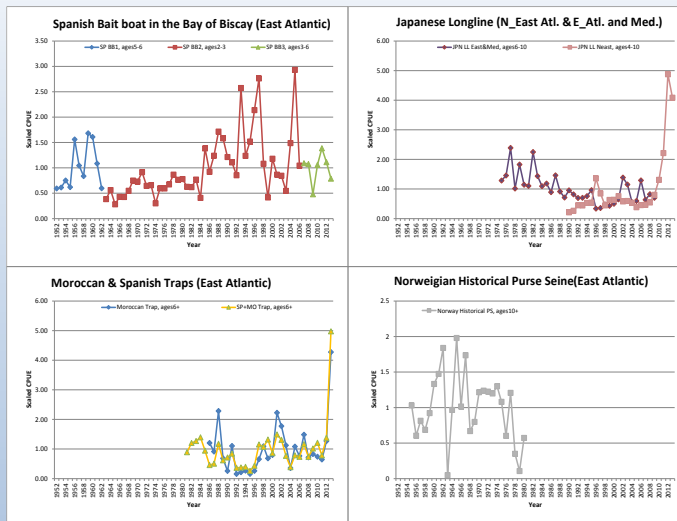


Reported catch

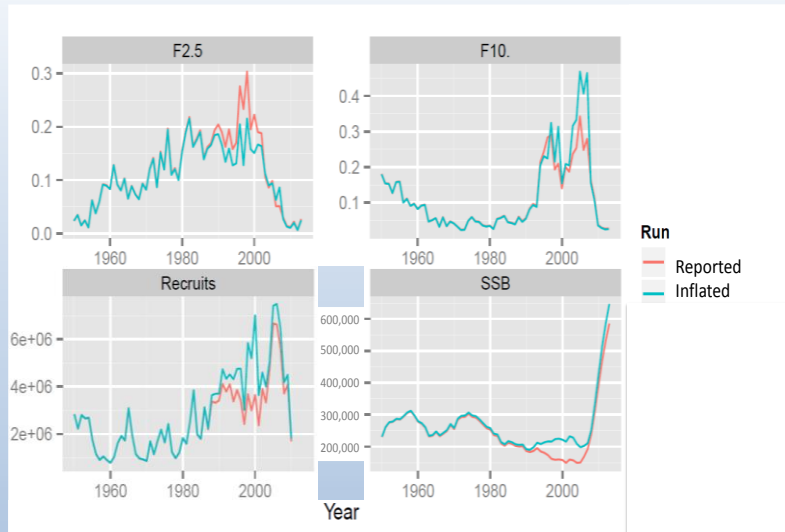
By region

By gear

CPUE indices for the East Atlantic and Mediterranean used in the 2014 stock assessment.



Stock indicators (fishing mortality, Recruitment and SS)



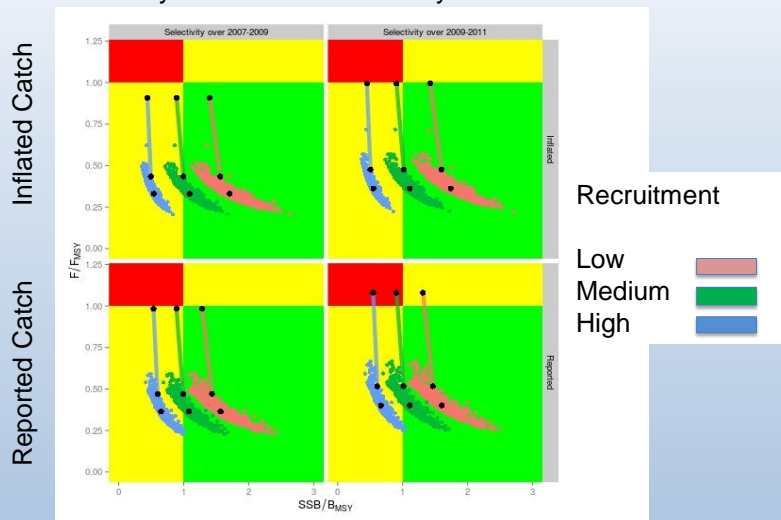
Malta ICCAT 2015

Panel 2: Northern temperate tuna

41

Stock status as a function of recruitment, catch and selectivity scenarios

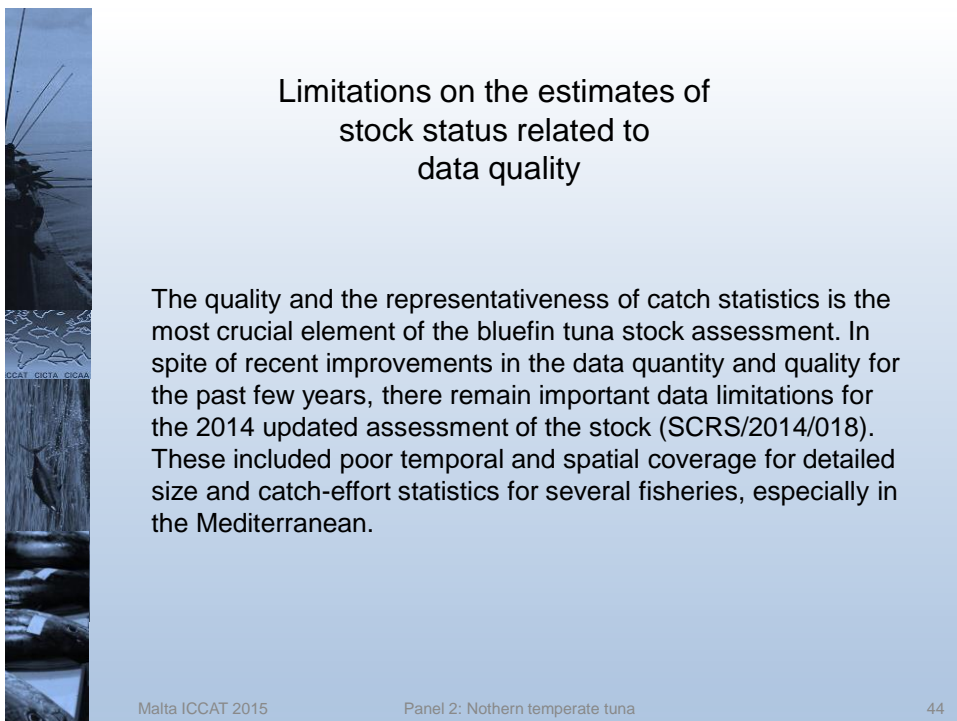
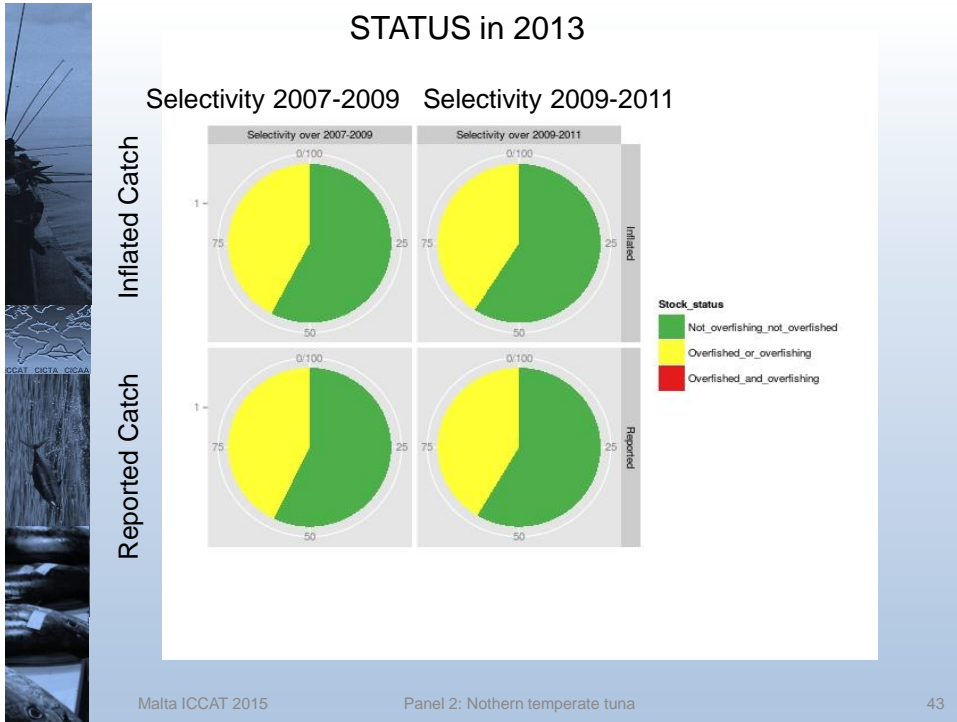
Selectivity 2007-2009 Selectivity 2009-2011



Malta ICCAT 2015

Panel 2: Northern temperate tuna

42



Outlook: probabilities of $F < F_{MSY}$ and $SSB > SSB_{MSY}$

TAC	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	63	67	73	80	89	94	98	99	100
2000	63	67	73	80	88	94	97	99	100
4000	63	67	72	79	87	93	97	99	100
6000	63	67	72	79	87	93	97	99	100
8000	63	67	72	79	86	92	96	98	99
10000	63	67	72	78	86	92	96	98	99
12000	63	67	72	78	85	91	95	98	99
13500	63	67	71	77	84	91	94	97	99
14000	63	67	71	77	84	90	94	97	99
15000	63	67	71	77	84	90	94	97	99
16000	63	67	71	77	83	90	94	97	99
18000	63	67	71	76	83	89	93	96	98
20000	63	67	71	76	82	88	93	96	98
22000	63	67	70	76	82	88	92	95	97
24000	63	67	70	75	81	87	91	94	97
26000	63	67	70	75	80	86	90	94	96
28000	63	67	70	75	80	85	89	93	95
30000	63	66	69	74	79	84	89	92	95

Malta ICCAT 2015

Panel 2: Northern temperate tuna

45

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current reported yield (2013)	13,333 t	
	Reported catch	Inflated catch
Maximum Sustainable Yield ¹		
Low recruitment scenario (1970s)	23,256 t	23,473 t
Medium recruitment scenario (1950-2006)	33,662 t	36,835 t
High recruitment scenario (1990s)	55,860 t	74,248 t
$F_{0.1}^{2,3}$	0.07yr ⁻¹	0.07 yr ⁻¹
$F_{2013}/F_{0.1}$	0.40	0.36
TAC (2013 - 2015) 13,400 t - 13,400 t - 16,142 t		

Malta ICCAT 2015

Panel 2: Northern temperate tuna

46



Effects of current regulations

While current controls appear sufficient to constrain the fleet to harvests at or below TAC, the Committee has not assessed the current fishing capacity and remains concerned about current capacity which could easily harvest catch volumes well in excess of the rebuilding strategy adopted by the Commission.

Results from the enforcement of minimum size regulations under [Rec. 06-05], seem to have led to positive effects:

- much lower reported catch of younger fish
- significant increase in the annual mean-weight
- higher abundance or higher concentration of small bluefin tuna in the north-western Mediterranean
- improved yield-per-recruit levels in comparison to the early 2000s
- greater recruitment to the spawning stock biomass due to higher survival of juvenile fish.



Management recommendations

- [Rec. 09-06] provides the scientific basis for the Commission to establish a recovery plan
- Not exceeding TACs in Rec. 14-04 are not expected to undermine the success of the management plan
- The Committee was not able to provide the Commission with a robust advice on an upper bound for the TAC
- In equivalent situations, other scientific fora have similarly recommended moderate increases of the TAC.
- Such stepped increases should be reviewed annually by the Commission on the advice of the SCRS

Responses to Commission's requests

- | | | |
|------|--|----|
| 19.3 | The SCRS shall 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 | P2 |
| 19.4 | 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. | P2 |
| 19.5 | Evaluate the results of the 100% coverage programme using stereoscopic 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 | P2 |
| 19.6 | Evaluate the bluefin tuna national observer programmes conducted by CPCs to report to the Commission and to provide advice on future improvements, [Rec. 14-04] paragraph 88 | P2 |
| 19.7 | Evaluation of data deficiencies pursuant to [Rec. 05-09]. | P2 |

19.3 The SCRS shall 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

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

Due to time constraints the Committee was unable to address this question, although it noted that these catch rates have not been updated since 2010. Therefore, the Committee requests confirmation from the Commission that this work is still needed, in which case it could be addressed at the next data preparatory meeting and SCRS species group.



19.4 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

Background: Rec. 14-04 paragraph 82 requests CPCs to take the necessary measures and actions to better estimate both the number and weight of bluefin tuna at the point of capture and caging and report the results to the SCRS.

- Since 2014, CPCs with bluefin tuna farms have been submitting size and weight measures of Bluefin tuna at caging operation using stereo camera video and technical details of the camera systems used in the farms.
- A number of studies related to the use of the stereoscopic camera were presented to the SCRS.
- These studies conclude that stereoscopic cameras have been demonstrated as viable technologies to measure BFT numbers and weight at capture and caging.



19.5 Evaluate the results of the 100% coverage programme using stereoscopic 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

Background: [Rec. 14-04] paragraph 83 requests all farming CPCs to submit annually to the SCRS, by 15 September, the results of this programme which uses stereoscopic cameras systems or alternative techniques. The SCRS should evaluate such procedures and results and report to the Commission by the Annual meeting in accordance with Annex 9 of the Rec. [14-04].

Studies have confirmed:

- Accuracy of size measurements
- Ability to collect large number of size measurements
- During the caging period growth can be significant but variable

The committee continues to see value in such data collection, however, its value would increase if a standardized protocol for the use of these systems



19.6 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

Background: [Rec. 14-04] paragraph 88 states each CPC shall ensure coverage by observers, issued with an official identification document, on vessels and traps active in the bluefin tuna fisheries.. For the scientific aspects of the programme, the SCRS shall report on the coverage level achieved by each CPC and provide a summary of the data collected and any relevant findings associated with that data. SCRS shall also provide any recommendations to improve the effectiveness of CPC observer programmes.

Data collected under these programmes has been submitted to the Secretariat. A form presented to the Sub-committee on Ecosystems in 2014 has been adopted for observer data submission. This form could be used for CPCs with observer programmes for bluefin tuna, possibly with modifications to deal with confidentiality issues.



19.7 Evaluation of data deficiencies pursuant to [Rec. 05-09]

The Commission expressed in [Rec. 05-09] for the SCRS to evaluate: “the effect of the data deficiency(ies) on the Commission’s ability to determine the status of the stock(s) and on the effectiveness of the ICCAT conservation and management measures”.

- Present for many types of information that informs stock assessments
- More common for bycatch than for target stocks
- MSE can allow comparisons between the performance of assessments with data deficiencies or without them.

BFT Workplan

SCRS has identified constraints on next stock assessment:

Good progress has been made on improving the data available for the next assessment but there are still a lot of data to be processed. Specifically the complete data set of:

- market statistics,
- tag recoveries,
- genetics

These data cannot be processed in time for a 2016 assessment. Additionally, the new modeling framework has not yet been fully developed.

Proposed actions for BFT:

1. Update the scientific advice at the species group meeting preceding the 2016 SCRS plenary based on (a) revised forecasts that take into account the actual catches in 2014 and 2015 and (b) updated fishery indicators (as prescribed by Rec. [12-03], paragraph 50).
2. Evaluate evidence for the existence of the extraordinary 2004-2007 recruitment years for the eastern Atlantic and Mediterranean population
3. Conduct an Intersessional workshop that builds on the previous Joint Canada/U.S meeting to investigate approaches for combining raw catch/effort data.
4. Advance the work of the Core Modelling group and the dialog meeting with support of the GBYP
5. Inter-sessional Data Preparatory Workshop in June or July 2016 (6 days)
6. Next assessment with new data and new population models in 2017.