THE STATUS OF THE BLUEFIN TUNA STOCK AND THE ATLANTIC-WIDE RESEARCH PROGRAMME ON BLUEFIN TUNA (ICCAT-GBYP)

SCIENCE FOR SUSTAINABILITY

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ICCAT - GBYP
RAC MED – Malta - 21 September 201

There are still too many things we don't know about bluefin tuna

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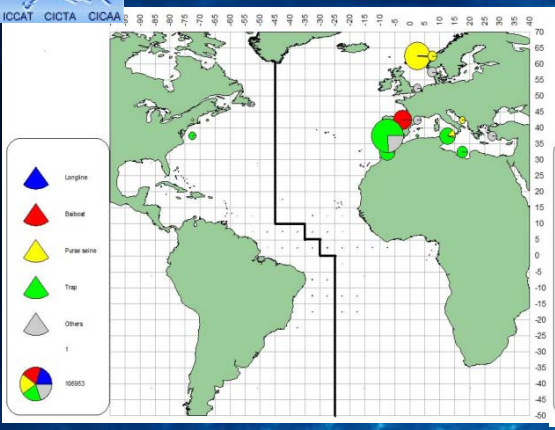
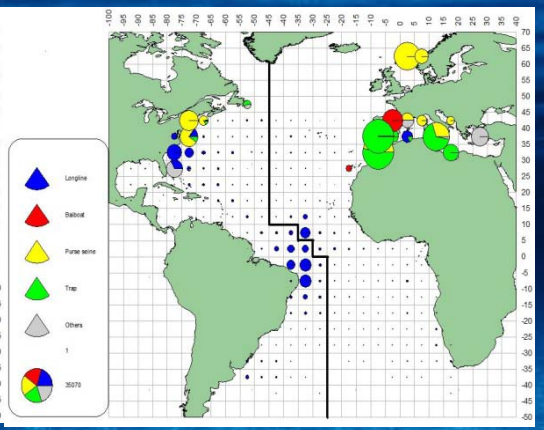
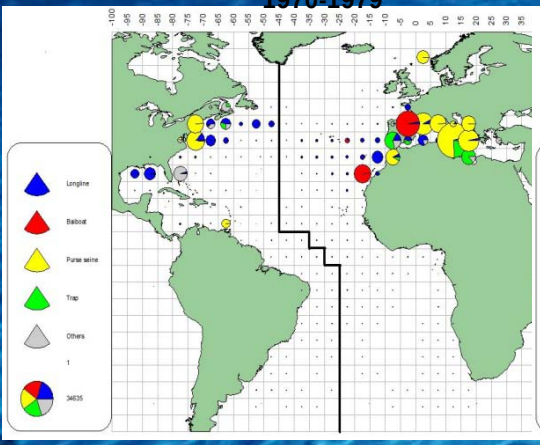
1950-1959



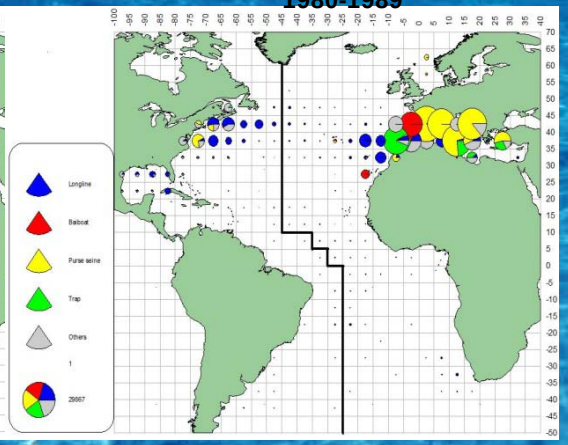
1960-1969



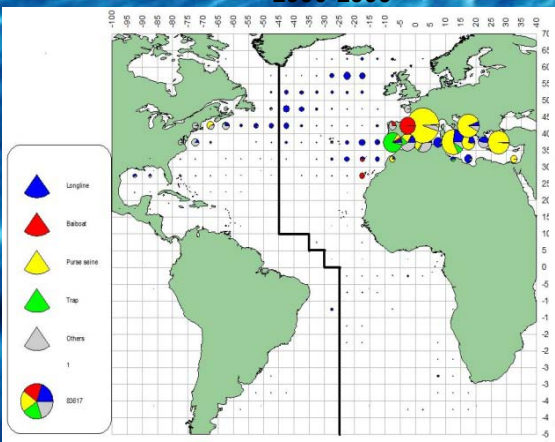
1970-1979



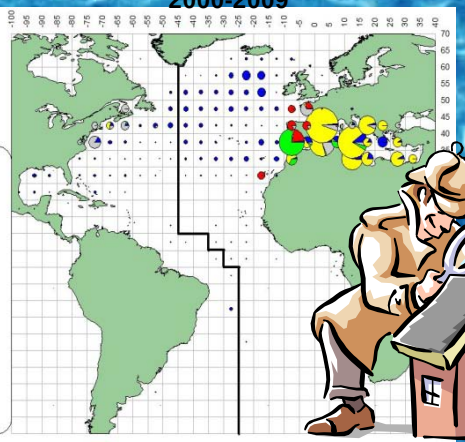
1980-1989



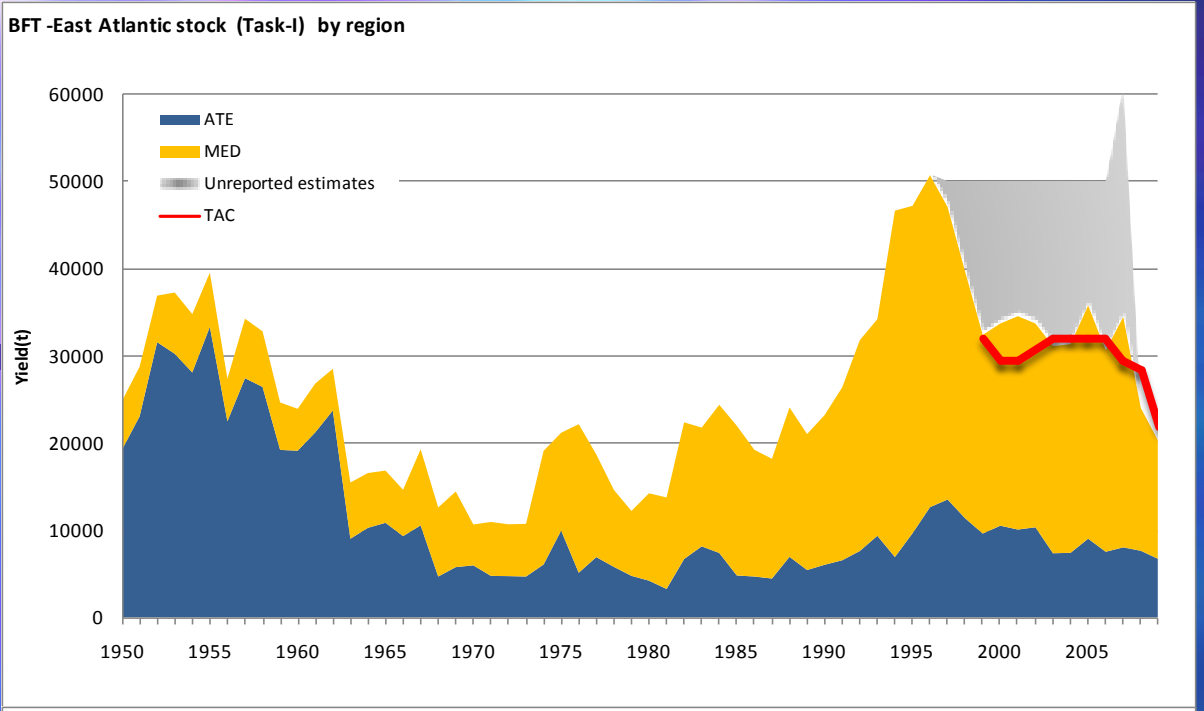
1990-1999

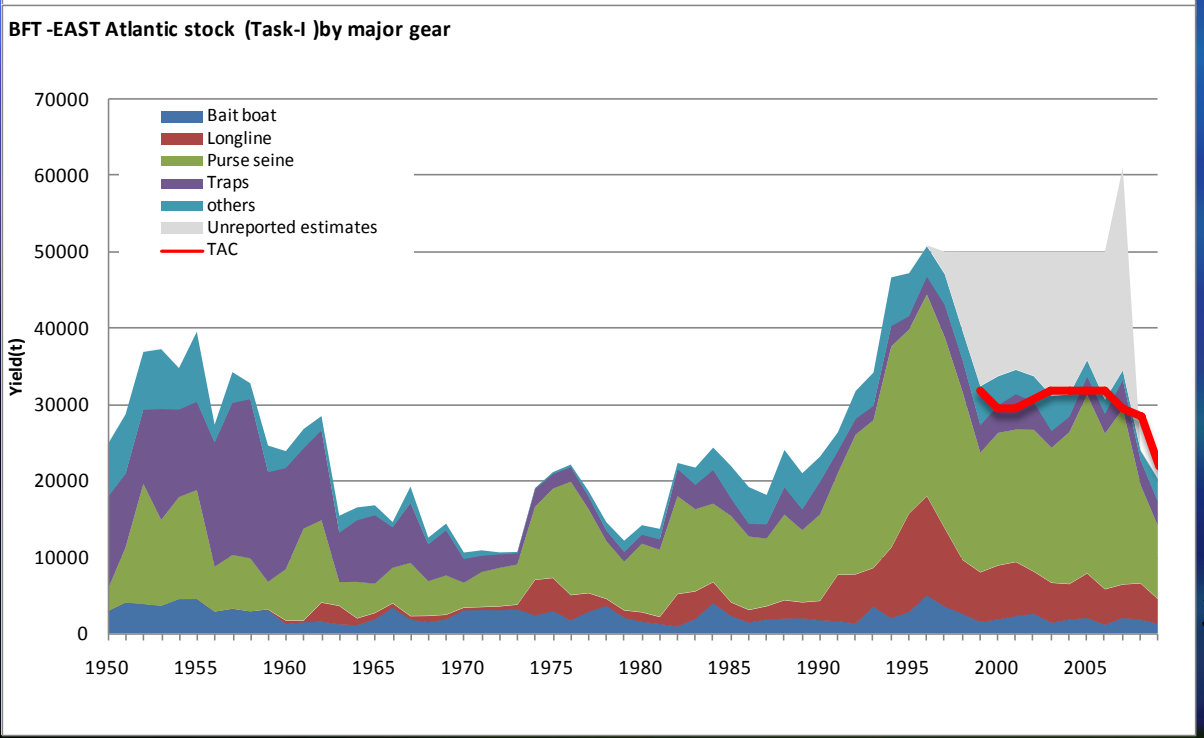


2000-2009

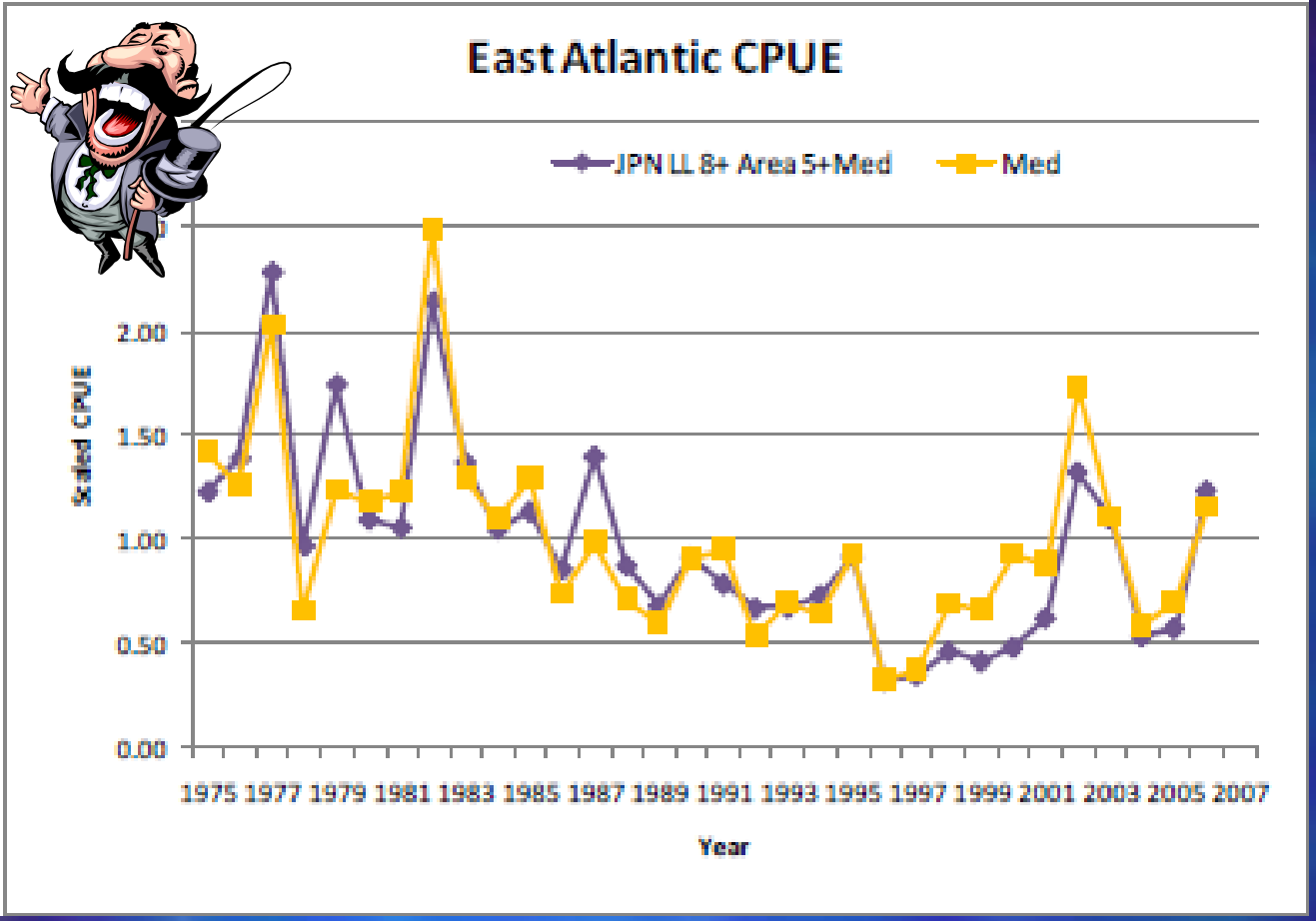


Many aspects of the natural history of bluefin tuna are still to be understood and we are discovering new or old data every day. The mass displacements in various parts of the oceans have various interpretations. Disappearance from some areas was correlated several times with fishery issues, while the oceanographic aspects were not analysed.





Catch data have been considered unreliable by SCRS for several years, while size frequencies, in the best case, were provided partly and these problems affected the reliability of many assessments, increasing the uncertainties.



After the strict enforcement of the bluefin tuna recovery plan some positive indices are showing up.

- CPUEs are increasing in the Mediterranean fisheries
- Japanese longlines are showing increasing CPUEs
- Tuna traps are getting increasing catches
- Most of the purse-seiners got their quota in the last years in a very few days
- The average size is increasing

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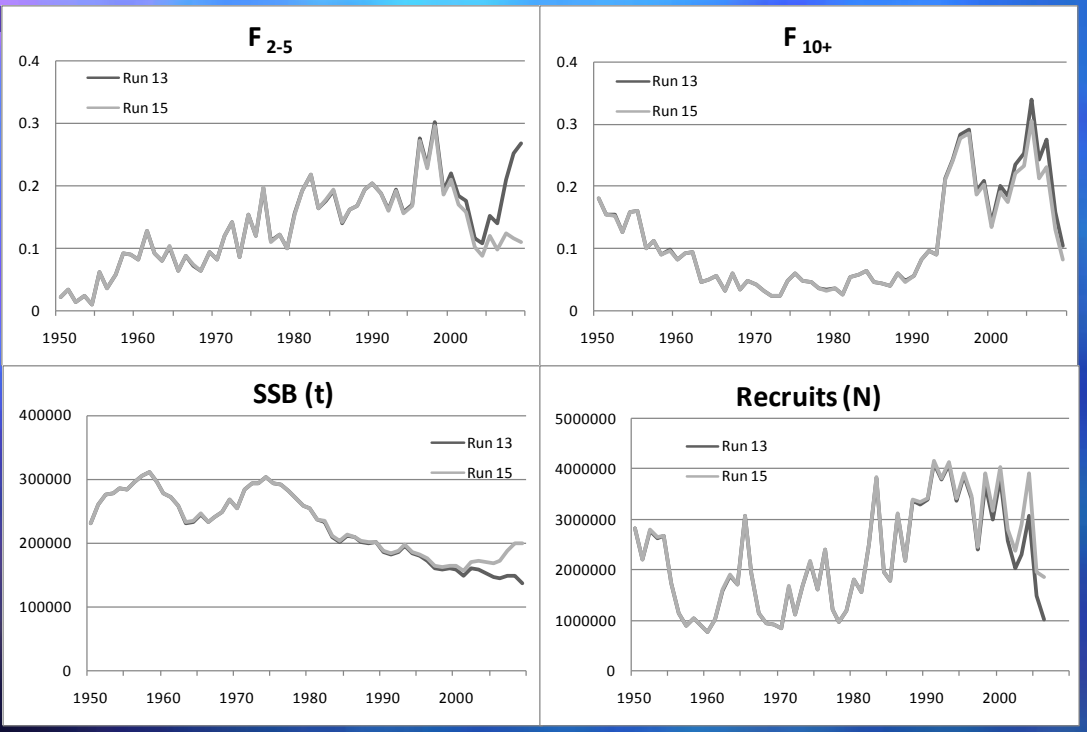
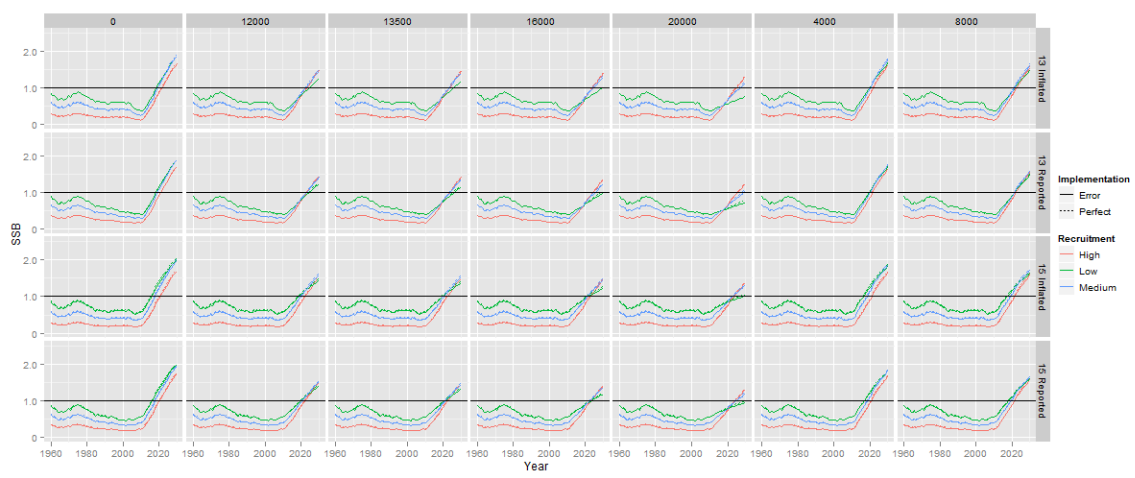
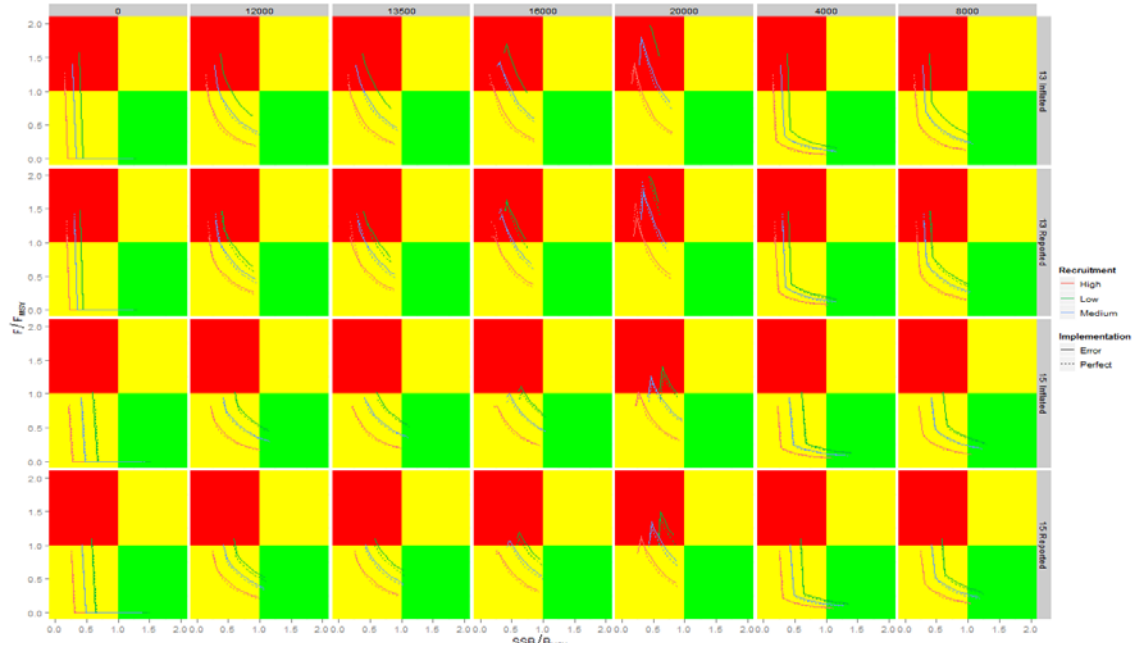
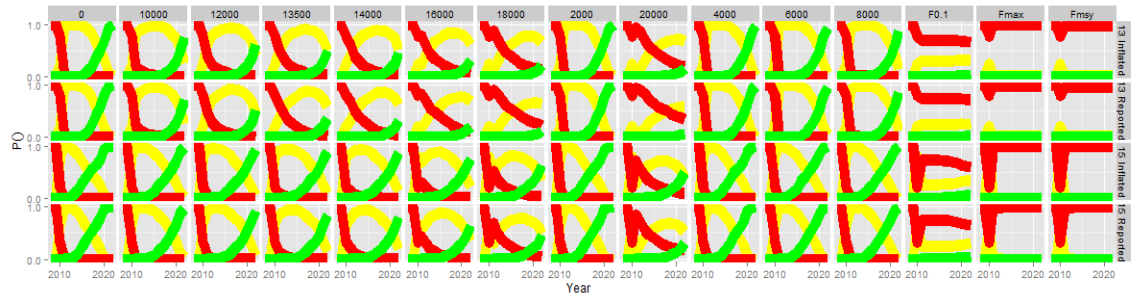
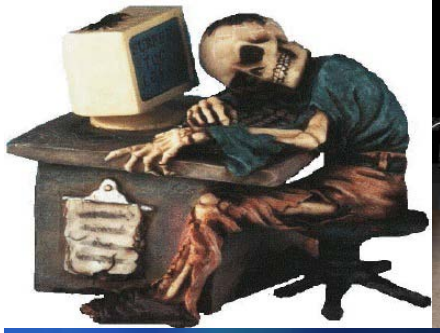


Even if uncertainties are still there, together with the data problems, the effects of the strict enforcement are slowly coming up. According to the last assessment, the spawning stock biomass seems to show signs of recovery and the mortality on adults is slowing down.



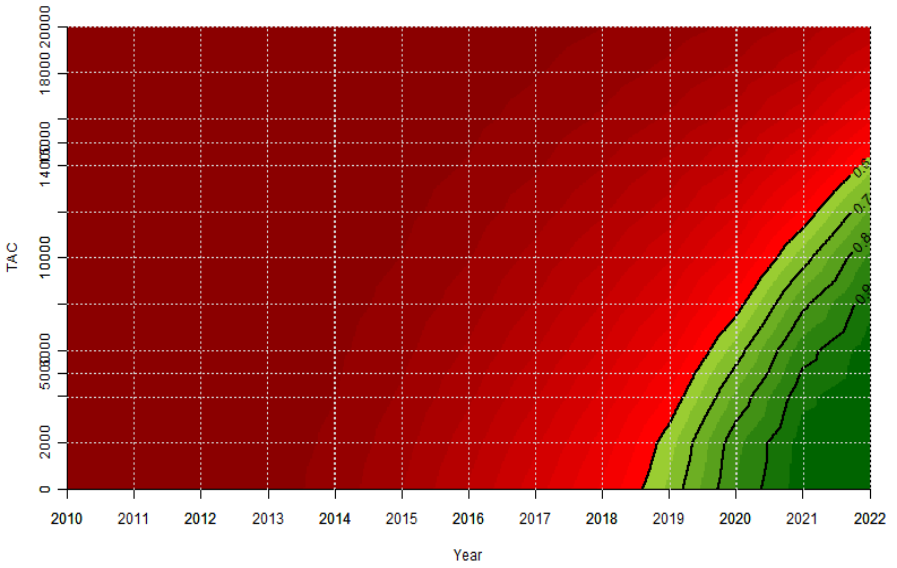






The serious and huge work of several scientists for many months resulted in many complex calculations and hypotheses, sophisticated models and nice coloured figures, providing a slightly positive outlook of the stock within the time frame required.

Finally, it seems that there is a light at the end of the tunnel!



Probability of $F<F_{0.1}$

TAC	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
0	0.00	0.00	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2000	0.00	0.00	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4000	0.00	0.00	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6000	0.00	0.00	0.48	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8000	0.00	0.00	0.48	0.97	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10000	0.00	0.00	0.48	0.89	0.94	0.96	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00
12000	0.00	0.00	0.48	0.77	0.86	0.91	0.93	0.95	0.97	0.98	0.98	0.99	0.99	0.99	0.99
14000	0.00	0.00	0.48	0.61	0.73	0.81	0.85	0.89	0.92	0.94	0.95	0.96	0.97	0.98	0.98
16000	0.00	0.00	0.48	0.42	0.58	0.68	0.74	0.79	0.84	0.87	0.89	0.91	0.93	0.94	0.95
18000	0.00	0.00	0.48	0.26	0.41	0.53	0.62	0.67	0.72	0.77	0.80	0.83	0.86	0.87	0.89
20000	0.00	0.00	0.48	0.14	0.26	0.39	0.48	0.54	0.60	0.65	0.69	0.72	0.75	0.78	0.80
13500	0.00	0.00	0.48	0.65	0.77	0.83	0.88	0.91	0.93	0.95	0.96	0.97	0.98	0.98	0.98

The Commission's objective to reach the BMSY through 2022 with 60% probability seems now possible under the current bluefin tuna recovery plan, even keeping the quota considered by SCRS.

The EC objective of getting a sustainable $F_{0.1}$ before 2020 (>80% possibility) seems also possible.

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BUT THE TOO HIGH UNCERTAINTIES OF THE BLUEFIN TUNA ASSESSMENTS AND SEVERAL MANAGEMENT PROBLEMS IN THE LATE '90s AND IN THE YEARS 2000s HAD CLEARLY SHOWED THE LIMITS OF THE CURRENT SYSTEM

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SINCE 2009, A NEW APPROACH TO THE SCIENTIFIC PROBLEMS

- ICCAT, in 2008, decided to support an ambitious new research programme, with the purpose to provide fishery independent data, to improve the models and the assessments, according to the objectives defined by the Commission.
- SCRS, in 2009, focused the objectives of the programme for the first year and set some other objectives for the following years.
- ICCAT, in 2009, officially adopted the "Atlantic-wide Research Programme on Bluefin Tuna", conventionally ICCAT-GBYP.

THE ICCAT-GBYP IN 2010

The ICCAT-GBYP was started on March 2010

In the first two years, funds were provided by several CPCs: European Community (80%), Canada, Croatia, Japan, Libya, Morocco, Norway, Turkey, United States of America, plus Chinese Taipei and ICCAT.

In addition to these funds, some private entities provided funds or in kind support.

The programme will costs about 19.000.000 € in 6 years, if sufficient funds will be made available

A TRANSPARENT STRUCTURE FOR ICCAT-GBYP

- The Commission decided to establish a GBYP Steering Committee, with 5 members.
- A GBYP Coordinator is responsible for the Programme at the ICCAT Secretariat since March 2010; a coordinator assistant was hired in March 2011.
- GBYP publication policy, editorial and data use rules have been agreed, established and recently updated.
- GBYP Scientific Reports must be submitted yearly to SCRS (see SCRS/2010/135 and SCI/2010/038).
- A GBYP web page is available within the ICCAT site http://www.iccat.int/GBYP/en

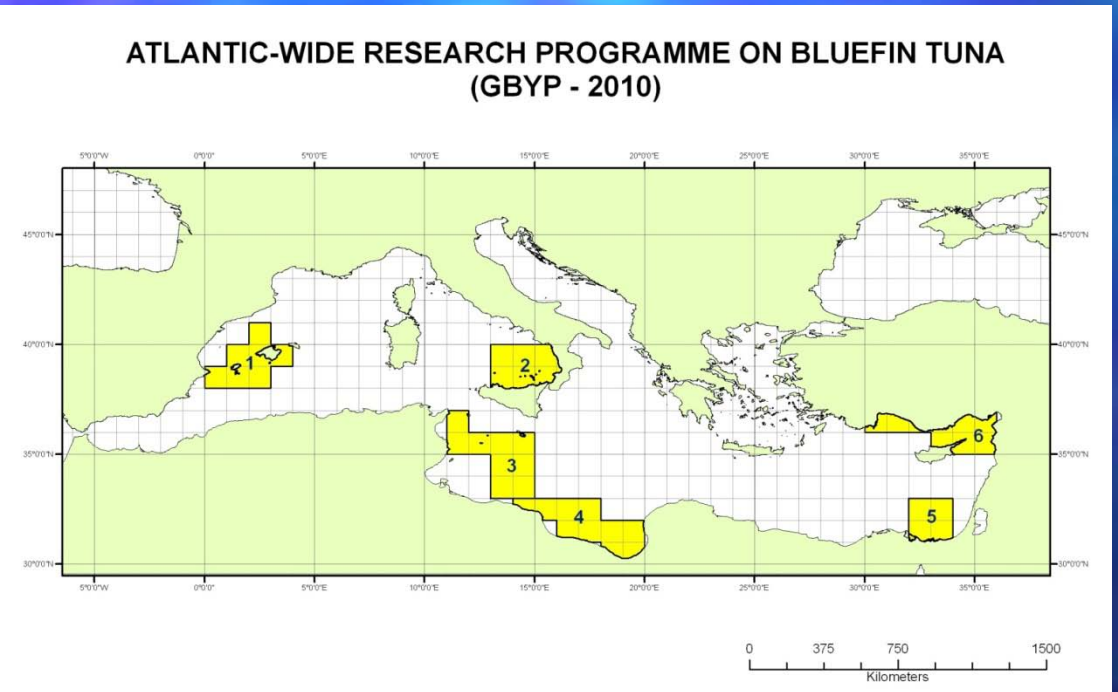
FINALLY WE HAVE BROKEN THE ICE!

(and we already started working very hard!)

THE ICCAT-GBYP IN THE FIRST TWO YEARS

Aerial Survey Areas

The first goal was to set-up an Aerial Survey on Bluefin Tuna Spawning Aggregations to get an index about the trends of minimum SSB over the years. A preliminary analysis of VMS data and the previous scientific knowledge were used to define the most relevant spawning areas



The Aerial Survey Design, statistically sound, was adapted to the various areas, with several replicates and linear transects.

A standardised methodology (DISTANCE) was adopted.

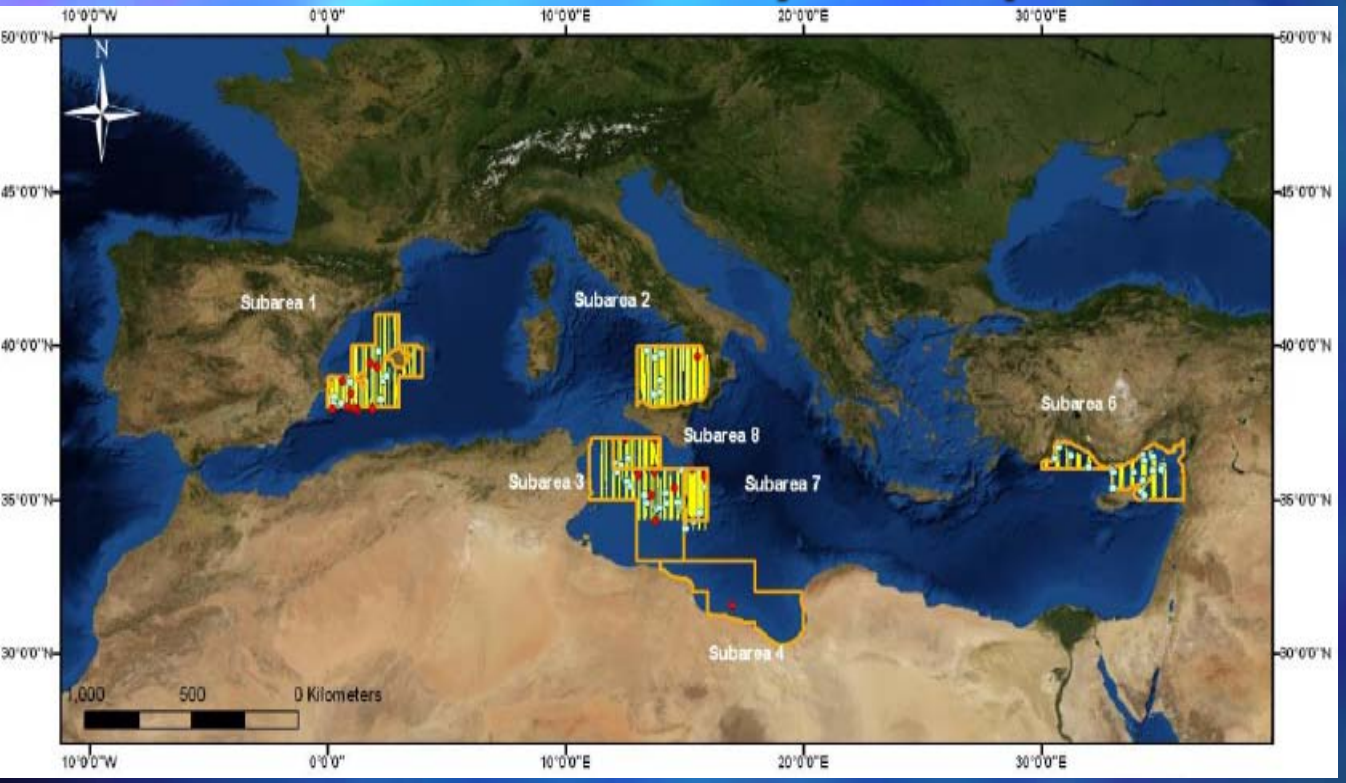
ICCAT-GBYP
Aerial Survey - 2010

Three companies were awarded and 5 different aircrafts were used in the various sub-areas.

A total of 367 flight hours were planned in 2010.

Flight permits have been provided by all Countries concerned, **except Libya, Syria, Tunisia and Egypt.**

THE ICCAT-GBYP IN 2010
Aerial Survey adapted Map



Two new areas were identified, to partly compensate the areas in Libyan, Tunisian and Egyptian waters.
Sub-Area 7 (E Malta – Central Mediterranean) and Sub-Area 8 (Strait of Sicily), and a new adapted design was provided by GBYP on June 10, 2010.

The 2010 aerial survey data were provided on time, with the necessary details. The GBYP provided a contract to a specialised company for carrying out the aerial survey data analysis, and for providing the data prior to SCRS.

ICCAT-GBYP IN 2010
Aerial Survey results

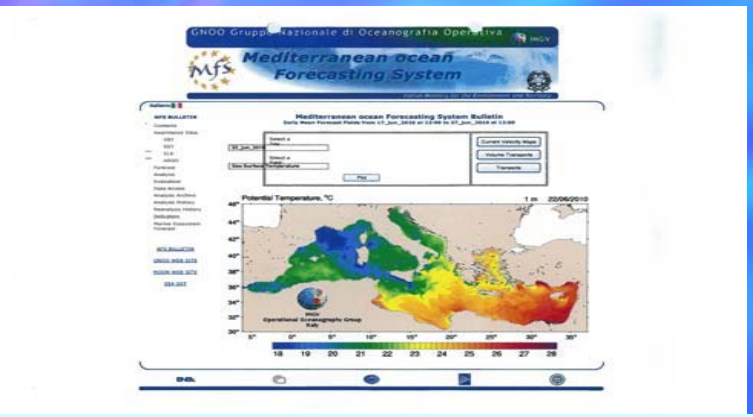
The 2010 aerial survey data analysis has been completed in real time. Many indices have been developed.

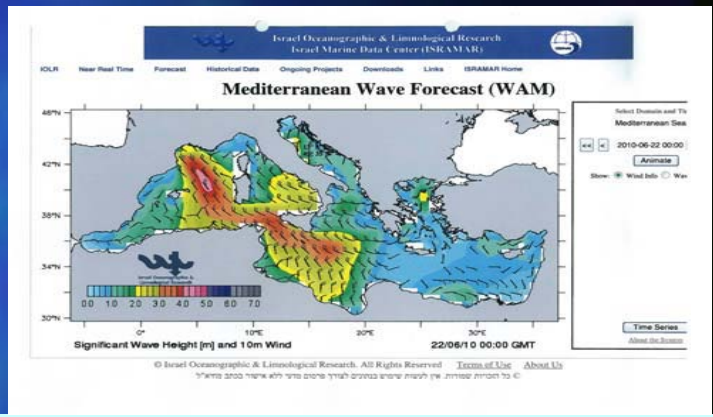
- 251 transects were surveyed, for a total of 30,879 km length and a surface of 138,159 km^2.
- 72 observations were made on transects (others outside duties were not accounted);
- The bft school density was 0.521/1000 km^2, with a peak of 3.054 in area 6;
- The mean bft school size was 88 t, with a peak of 293.2 t in area 6;
- The total minimal estimated weight of SSB observed during the survey was 18,158 t, with a CV of 33% of total weight; the CV was much lower in areas where the survey was conducted in a more stable manner.

Taking into account all the limits and negative environmental conditions in most of the areas during the 2010 aerial survey campaign, the results are very positive and shows the good possibilities of this methodology to detect trends in short/medium time, particularly if surveys will be further improved.

THE ICCAT-GBYP IN 2010

Aerial Survey



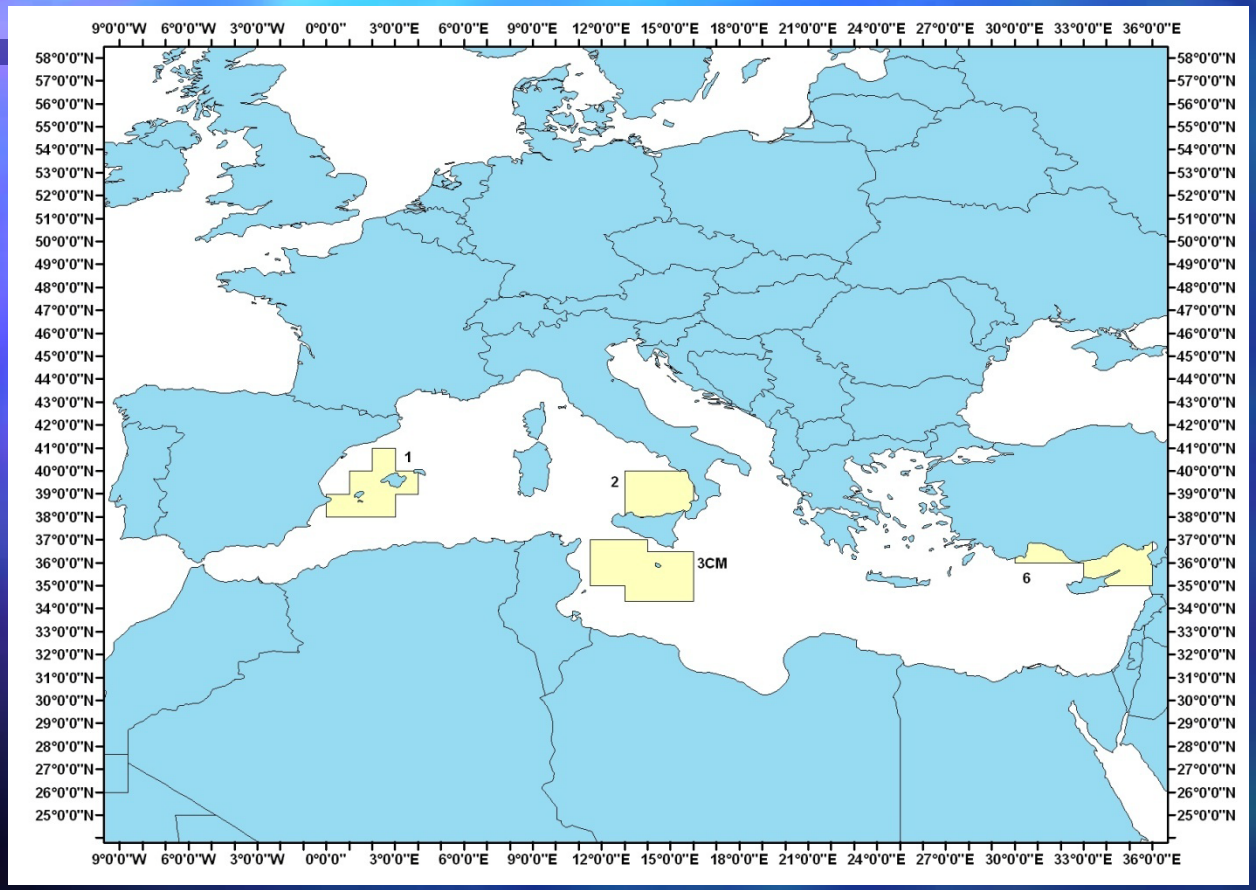


Some basic environmental parameters were monitored: sea-surface temperature (Mediterranean Ocean Forecasting System) and waves (Mediterranean Wave Forecast). This preliminary activity provided a general overview of both temperature and waves in all areas in 2010, but GBYP also got more precise and detailed data sets (0.25°x0.25°) for the surface temperature for a comprehensive analysis.

ICCAT-GBYP
Aerial Survey - 2011

- ✓A 3-days workshop on Aerial Survey was held in February 2011, with the participation of the best aerial survey specialists, to better define the GBYP strategy in year 2.
- ✓New aerial survey designs were provided, under various scenarios.
- ✓Three companies were awarded, with 4 aircrafts.
- ✓A 2-day training for pilots and observers engaged in the GBYP aerial survey was held in May 2011.

THE ICCAT-GBYP IN 2011
Aerial Survey and limits



Due to the geo-political situation in Spring 2011, several hypotheses were studied and finally it was decided to select 4 areas, with a slight modification of the previous year areas, limited to the Area 3CM.
A total of 208 flight hours were planned.
It was decided to slightly delay the starting date to June, with differences in each area.

Syria did not provide the flight permit. Turkey provided the flight permit after the expiry date of the survey. The area south of Malta was slightly reduced due to a temporary prohibition to survey some parts.

ICCAT-GBYP IN 2011
Aerial Survey preliminary partial results

The 2011 aerial survey data analysis is carried out in real time, also with the purpose to identify future survey scenarios.

- Bubble windows were used in a large part of surveys.
- A total of 273 transects were surveyed, for a total of 28,177 km length and a surface of 135,991 km^2 (68% of the total), with 65 observations made on transects (others sightings outside duties were not accounted);
- The bft school density was about 0.189/1000 km^2, with a peak of 3,98 in area 3CM; the mean bft school size was 76,3 t, with a peak of 103 t in area 3CM; the total abundance in the three areas was estimated in 561,369 bluefin tunas;
- The total estimated weight was 46,234 t, 97% in area 3CM;
- The data are very preliminary, partial and provisional, because they are still to be fully analysed.
- It was disappointing the fact that survey was not conducted in the Eastern Mediterranean, preventing a full comparative analysis with 2010 data.

DATA RECOVERY AND DATA MINING - 1

The second goal was to start the Data Recovery Plan, aimed to mine historical data sets, to recover data missing in the ICCAT BFT data base, to improve the quality of already existing data sets by filling the gaps, to deeply analyse VMS & other data.

Three calls were released in 2010 and five bids were awarded in the first year; more than 250,000 new data arrived to the ICCAT data base before SCRS 2010, while other 175,000 auction data were provided as a donation in kind.
These data covers both historical and very recent gaps.

DATA RECOVERY AND DATA MINING - 2

In the second year, it was decided to concentrate most of the efforts on tuna trap data mining, without excluding other fisheries.

Two calls were released and six bids were awarded in the 2011; more than 18,500,000 trap data already arrived to the ICCAT data base before SCRS 2011 after the first round. New sets for 366,190 additional trap data and 7,819 data from other fisheries have been recently provided, but the second round is still active. Trap data include records from the XVI century on, with details on single trap operations: a treasure of information we have to use soon!

GBYP organised also the first Symposium on Trap Fishery for Bluefin Tuna in Tangier, with a high attendance and a considerable number of scientific presentations.

DATA RECOVERY AND DATA MINING

Within the data recovery, GBYP is getting also SST data (from 2000 to 2011) and is carrying out the elaboration of all data coming from the aerial survey on spawning aggregation.

Now, we are hiring a scientist to help the ICCAT Statistical Department in properly inputting all the huge amount of data collected by GBYP in the ICCAT data base, making them available for SCRS purposes.

THE ICCAT-GBYP TAGGING PROGRAMME

A Tagging Design was requested in 2010, with the purpose to carry out an extensive tagging activity in the following years of the Programme.

A specific Call for Tenders was issued on July 2010, to get the tagging design ready for SCRS 2010. After several negotiations, adjusting the needs according to SCRS and GBYP-SC inputs, the final design was provided on February 2011.

THE ICCAT-GBYP TAGGING PROGRAMME

The Tagging Design was finally approved in 2011, limiting the tagging activity in Phase two to traditional tags (5000 specimens), with 40% double tagging, due to budget constrains. A GBYP Tagging Manual was also provided.

Area	Methods to be decided	Age1	Age2	Age3	Total	Age4
Bay of Biscay	Bait Boat	585	835	580	2000	75 (Archival tags)
Gibraltar/Atlantic	Bait Boat/Trap	585	835	580	2000	
Balearic Islands/Gulf of Lions	PS	585	835	580	2000	
Central Mediterranean	PS/Trap	875	1250	875	3000	75 (Archival tags)
Eastern Mediterranean	PS	875	1250	875	3000	

GBYP organised a dedicated operational meeting on bluefin tagging in February 2011, for specifically defining all operative details of the programme.

THE ICCAT-GBYP TAGGING PROGRAMME

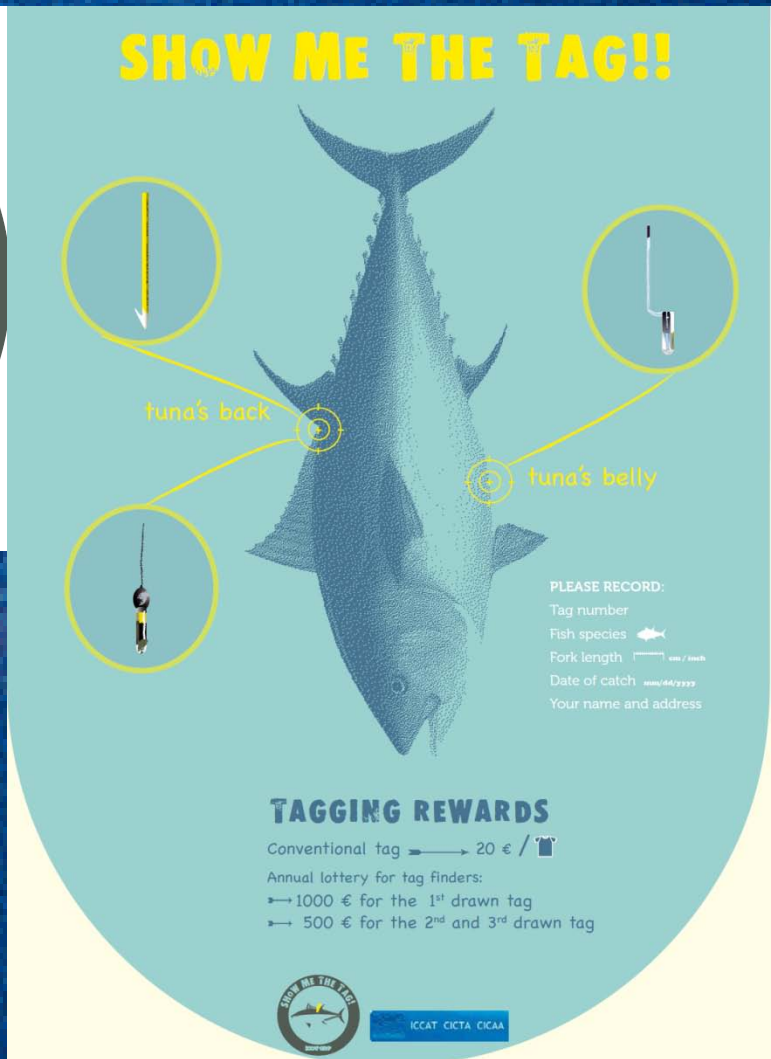
An additional tagging activity, with miniPATs, was carried out in May, in Moroccan traps, thanks to the support of the tuna trap industry, the Moroccan Fishery Authority, the IEO, the INRH and the WWF Mediterranean Programme, demonstrating that GBYP is the right framework to promote these cooperative activities. These tags are providing very exiting results.

The GBYP 2011 tagging activity will be completed before the end of 2011.

THE ICCAT-GBYP TAGGING PROGRAMME

GBYP is also launching an international awareness and rewarding campaign, with an associated strategy.

The logo, the slogan and the posters were recently awarded. T-shirts are on the way.



The rewarding campaign includes T-shirts, 20 € ordinary reward, a special annual ICCAT lottery (1000€ 1st, and 2 of 500€), high rewards for electronic tags.

ICCAT-GBYP BIOLOGICAL SAMPLING

GBYP organised a dedicated operational meeting on Biological Sampling in February 2011, for specifically defining all operative details of the programme.

The biological sampling activity started in 2011, after the approval of the GBYP Sampling Design, awarded to INRH.

The biological and genetic sampling and analyses was awarded to a Consortium of 13 Institutes from 8 Countries. The activities shall be completed within 2011, but a part of the analyses will be carried out next year. The GBYP activity will be complementary of EC-DCR (or the opposite!)

ICCAT-GBYP MODELLING APPROACHES

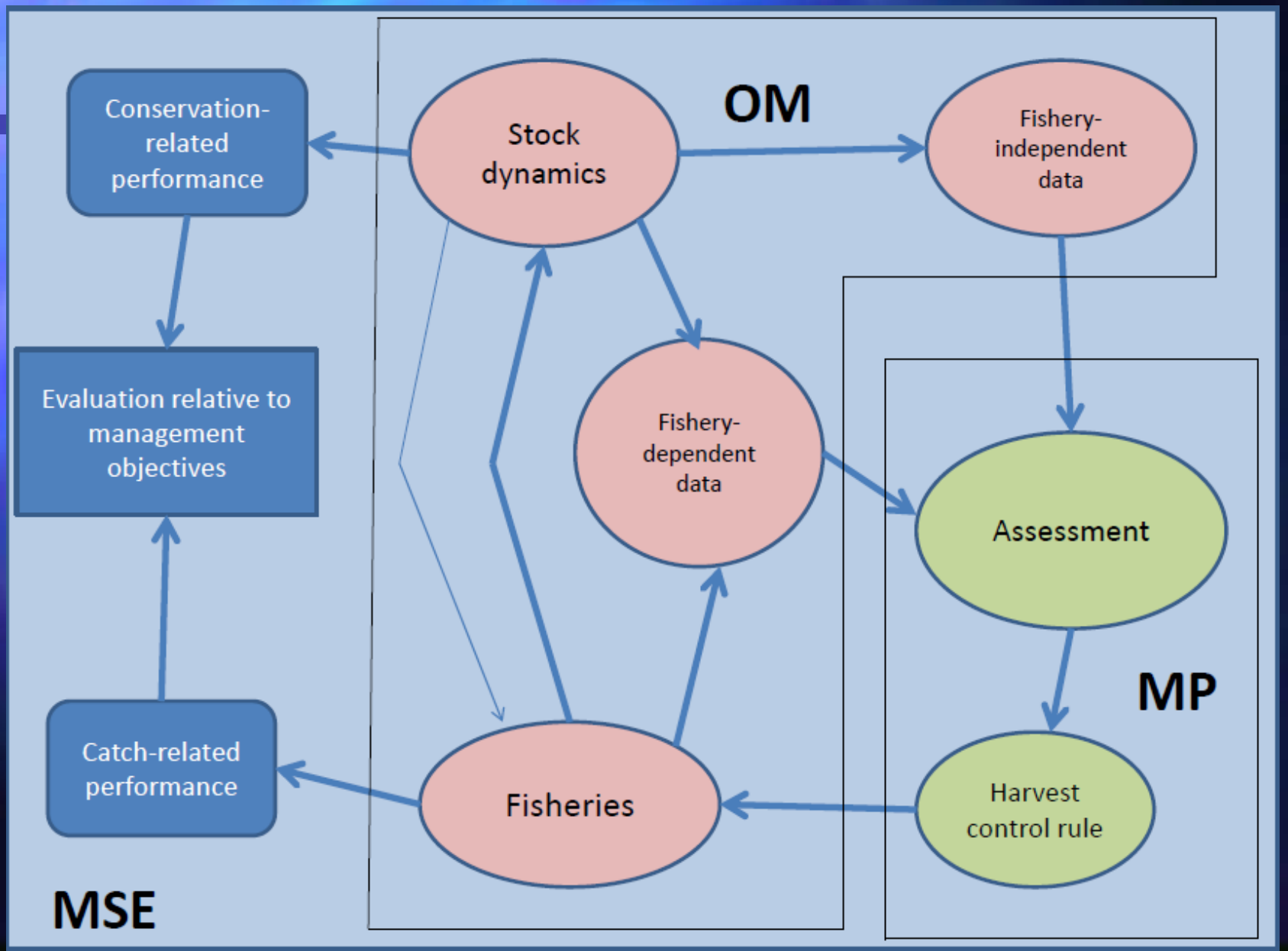
The original GBYP put the modelling trials in year 3, but it was decided to anticipate some activities to 2011.

A Call for tender was issued for three small contracts and two bids were awarded (a. Risk analysis to identify the main perceived sources of uncertainty related to assessment and advice, and b. Develop new assessment and advice based on new data sets collected by GBYP. Other work was developed by a small group of SCRS scientists.

The very first outputs were presented during the ICCAT WG meeting in June-July 2011. The results will be presented to SCRS in October 2011.

ICCAT-GBYP MODELLING APPROACHES

We have a lot of work to be done!



THE ICCAT-GBYP IN 2010-2011

Plus, GBYP is making a lot of contacts, with the purpose to increase knowledge, consensus, cooperation, participation and awareness about the GBYP activities.

17 meetings have been attended in 2010 and 13 in 2011.

THE ICCAT-GBYP IN 2011-2012

- We are facing the results of the world economic crisis and the GBYP had to adapt the research needs to the available funding; the Steering Committee adopted a minimum and reduced contingency plan for two Phases (2010-2011 and 2011-2012), hoping that Phase 3 funding might possibly be revised in the very next future, to approach the original budget (in brackets) which is still considered the necessary figure.
- **Budget Phase 2 (2010-2011): 2.502.000 Euro (originally 3.476.075 Euro)**
- **Budget Phase 3 (2011-2012): over 2.500.000 Euro, tbd (originally 6.353.876 Euro)**

THE ICCAT-GBYP IN 2011-2012

Reduced minimum budget

- **Coordination,** including the Steering Committee and recruiting two support staff (1 G2.1 and 1 P.2) (443,000 € in Phase 2 and 448,980 € in Phase 3)
- **Biological sampling** (reproductive studies, otoliths, vertebrae and/or spines for ageing studies). Biochemical and genetic analyses to investigate mixing and population structures (505,000 € in Phase 2 and 490,000 € in Phase 3).
- **Data mining and data recovery** (including information from farms, factories, auctions, observers and VMS data, including re-elaboration of existing data, elaboration of aerial survey and environmental data, and a Tuna trap data Symposium in 2011) (149,000 € in Phase 2 and 123,000 € in Phase 3).

THE ICCAT-GBYP IN 2010-2012

Reduced minimum budget

- Aerial surveys (on spawning concentrations, possibly extended to other areas, a training course for the staff concerned in 2011 and 2012 plus a workshop) (465,000 € in Phase 2 and to be defined in Phase 3)
- Extensive tagging to update the stock parameters (following a tagging design), conventional tagging, possibly including PIT tagging, electronic tagging in Phase 3 and tag recovery & reporting strategy and awards (890,000 € in Phase 2 and 965,000 € in Phase 3).
- Modelling (a workshop on modelling approaches and the first set of modelling trials) (40,000 € in Phase 2 and 90,000 € in Phase 3).

THE ICCAT-GBYP IN 2012

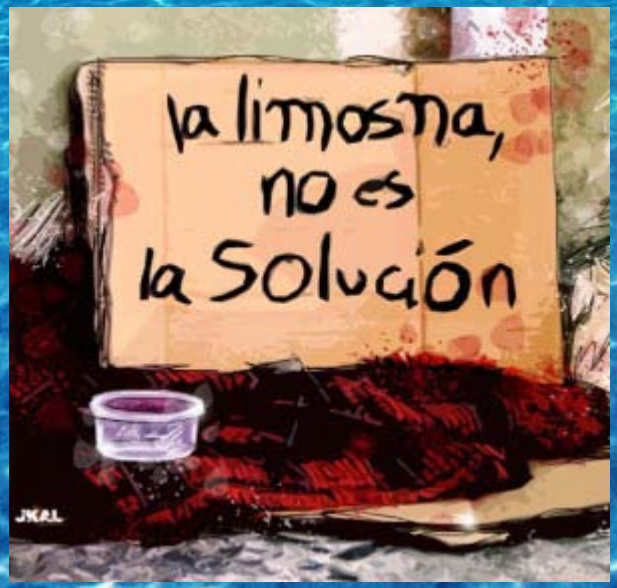
Reduced minimum budget

We still have to redefine the budget for 2012, which seems heavily depending on the choice we should do about the aerial survey strategy. This difficult decision will be taken at the very next SCRS, but it seems difficult to explain that if some sophisticated products are needed because current available data are not reliable, then appropriate funding shall be provided.

THE ICCAT-GBYP IN 2012

Reduced minimum budget

The amount of money needed by GBYP for developing new indices and analysis is more than reasonable if compared with the real costs and the value of this important natural resource. It is even lower than the amount of money necessary to routinely collect basic fishery data. We would like to provide very serious and neutral data to the system, but we need the necessary funds.



However <u>we are deeply and sincerely grateful to all the entities which provided funds so far</u>, because we understand the difficulties in this period of economic crisis.

THE ICCAT-GBYP IN 2012

NEED OF A MORE ADEQUATE LEGAL REFERENCE FRAMEWORK FOR RESEARCH

The GBYP is a very complex activity and we absolutely need at least some legal provisions to properly carry out our job:

a) The establishment of "RESEARCH MORTALITY ALLOWANCE" of about 20 tons per year for the all duration of the GBYP field activity, which can be used to properly sample fish and for tagging activities;

b) The official derogation from the minimum size limits for GBYP research activities;

c) The possibility to use any type of fishing gear and tool during a GBYP official research activity, even during the closing season.

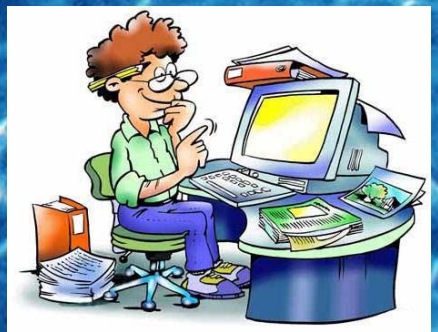
Without these provisions, it will be extremely difficut to to fulfil our obligations.

THE ICCAT-GBYP IN 2010-2015

Phase 1 to Phase 6

All these efforts have the final goal to:

- **Improve our understanding of the Atlantic bluefin tuna stocks;**
- **better model key biological processes: growth, stock-recruitment relationship, etc.**
- **improve assessment models including mixing between various areas**
- **improve the operating models for more rigorous management options testing.**



THE FUTURE OF ICCAT-GBYP

After these first two years, we proved that it possible:

- **working all together for the same goal;**
- **strongly improving the bft data base;**
- **remarkably improving the biological and natural history knowledge on bft;**
- **getting reliable fishery-independent data;**
- **working on new modelling approaches;**

But.....

- **we need a different budget approach;**
- **we need more time to detect reliable trends based on aerial survey data;**
- **we need even more cooperation by all CPCs and stakeholders.**

WE ALL HAVE THE SAME GOAL

We all need a healthy population of Bluefin tuna

Only under this condition we can sustainably exploit this important fish resource, maintaining the biodiversity, providing proteins to humans, labour to fishers and a widespread economy.


ICCAT CICTA CICAA
Bluefin tuna must become an icon of sustainability

THANKS!

ICCAT-GBYP : SCIENCE FOR SUSTAINABILITY