STECF Study Group SGMOS 10-03

Development of the Ecosystem Approach to Fisheries Management (EAFM) in European waters

**6-10 September 2010, Rennes – France**

Chair : Didier Gascuel

Terms of reference

- Based on the STECF-09-01 report,

- SGMOS 10-03 : develop a feasibility approach

- of implementing some useful ecosystem advices,

- considering two case studies: the North Sea (IIIa, IVa-c, VIId) and the Celtic Sea (VIIe-k)

=> A pragmatic approach based on available data (a test, to know if "we can" and what we can produce),

=> A prospective approach: what has to be changed to improve Ecosystem Approach to Fisheries Management in European Seas
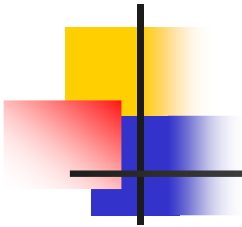
Terms of reference

Ecologists **Economists**

Work
(from data)

Setting up the scene

1. Trends in catches and fishing effort

Synthesising knowledge

2. Stocks synthesis

3. Fleets synthesis

Ecosystem & fisheries diagnosis

4. Ecosystem indicators

5. Economic indicators

Assessing management options

6. Models

Trophodynamic (EwE,…)   Bio-économic (multi-fleet,…)

Prospective on methods and future development

7. Defining "reference ecosystems" ?

8. Format of an annual EAFM report ?

9. How implementing EAFM in European waters ?
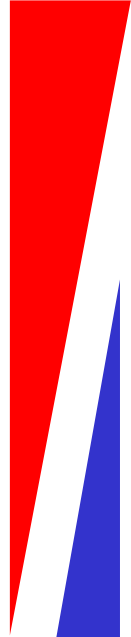
Discus.
(from expert knowledge)
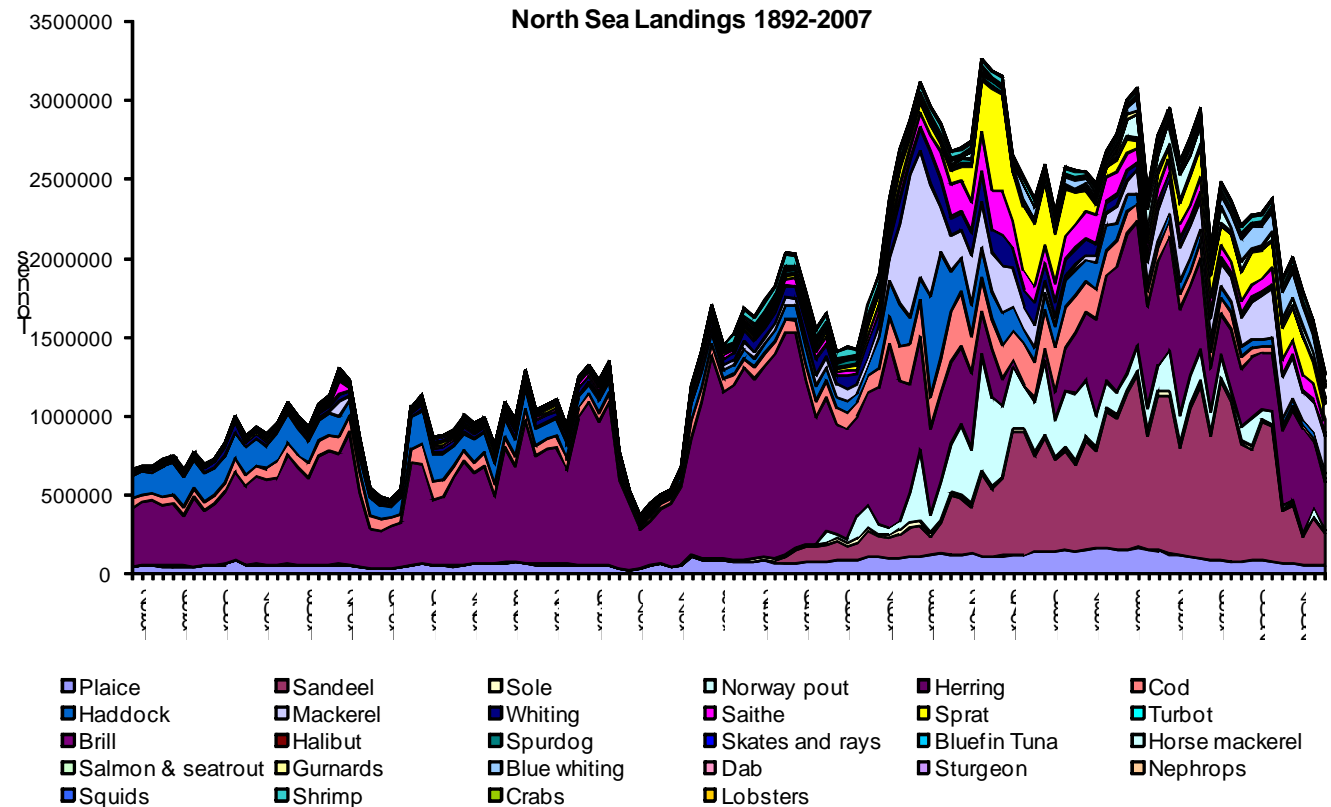
Contents of the presentation

1. A first attempt to develop scientific advices in the frame of EAFM: scientific results for NS and CS

   - Ecosystems health (ToRs 1, 2, 4)

   - Fleet-based analysis (ToRs 3, 5)

2. Recommendations of SGMOS 10-03 for the development of EAFM in European Seas

   - (ToRs 6-9)

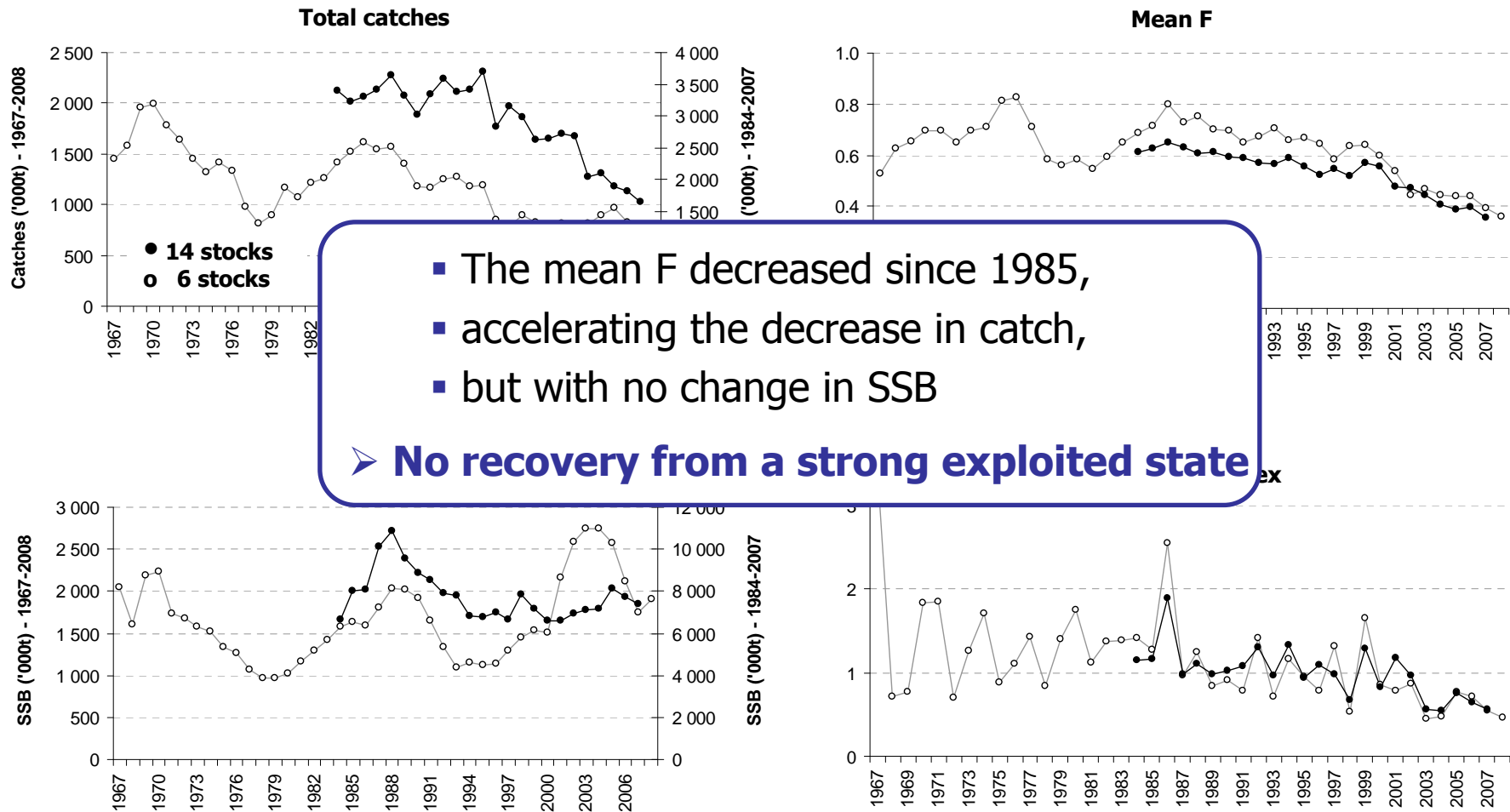# 1.1 Diagnosis on ecosystem health: North Sea

- **Long term trends in catches from the North Sea** (from Mackinson and Pinnegar)

  - A increasing fishing pressure over a long period

  - A wider range of the ecosystem exploited since the 1960s

  - A two fold decrease in catches since the 1970s

North Sea Landings 1892-2007

Legend: Plaice, Sandeel, Sole, Norway pout, Herring, Cod, Haddock, Mackerel, Whiting, Saithe, Sprat, Turbot, Brill, Halibut, Spurdog, Skates and rays, Bluefin Tuna, Horse mackerel, Salmon & seatrout, Gurnards, Blue whiting, Dab, Sturgeon, Nephrops, Squids, Shrimp, Crabs, Lobsters

1.1 Diagnosis on ecosystem health: North Sea

- Stock synthesis: mean indicators for all assessed stocks

Total catches

Mean F

- 14 stocks
- 6 stocks

- The mean F decreased since 1985,
- accelerating the decrease in catch,
- but with no change in SSB

➢ **No recovery from a strong exploited state**

- Stock synthesis: stocks status and mean trajectory (compared to the "old" precautionary values and the MSY target using $F_{0.1}$ as proxy)
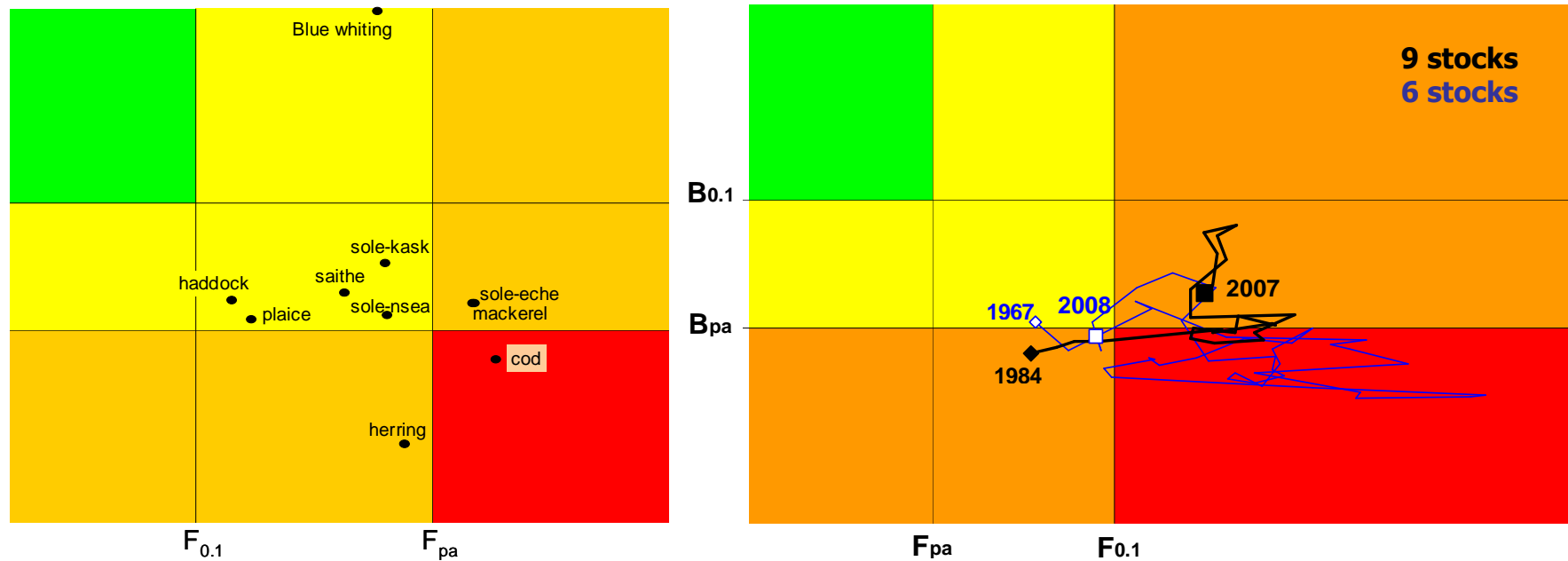
- ➤ All the 10 assessed stocks are overexploited ($F > F_{0.1}$), 4 in an unsustainable state

- ➤ Low biomass (close to B_{pa} on average)

- ➤ Trajectories have to be monitored in the coming years

- Stock synthesis: stocks status and mean trajectory (compared to the "old" precautionary values and the MSY target using $F_{0.1}$ as proxy)
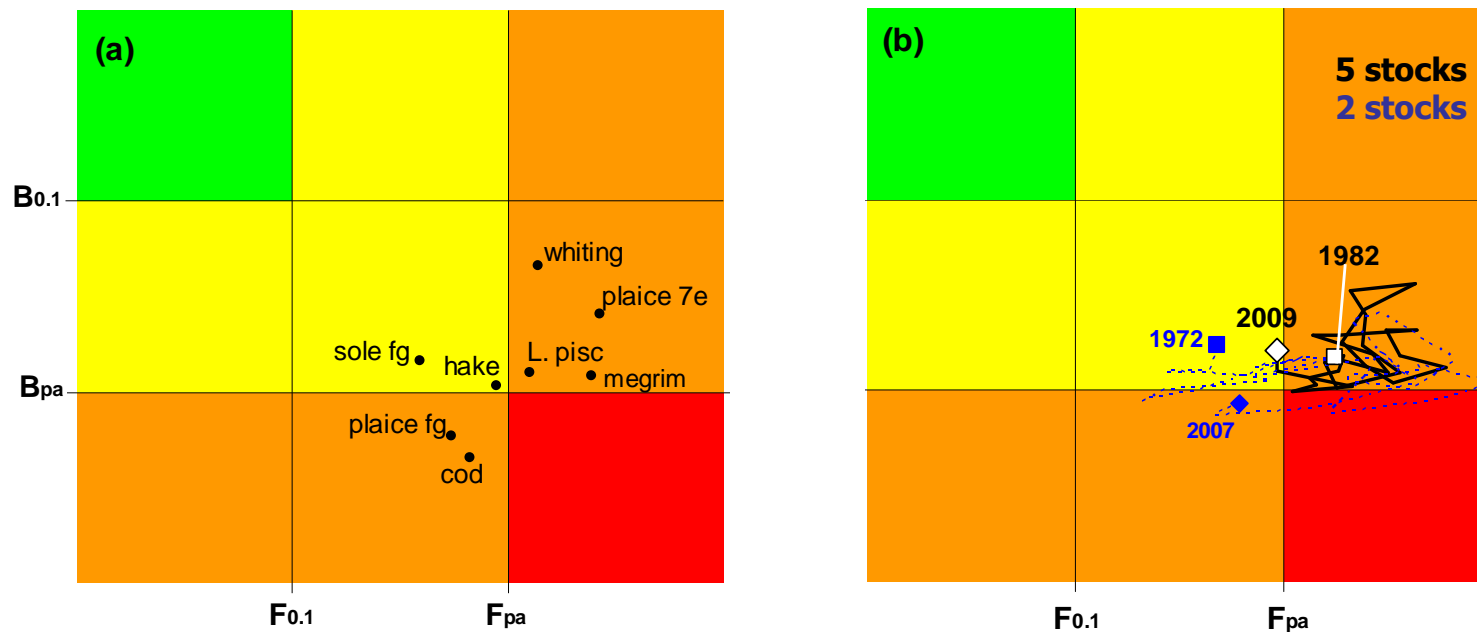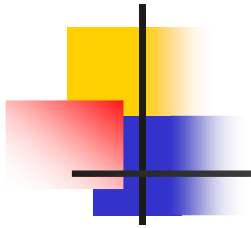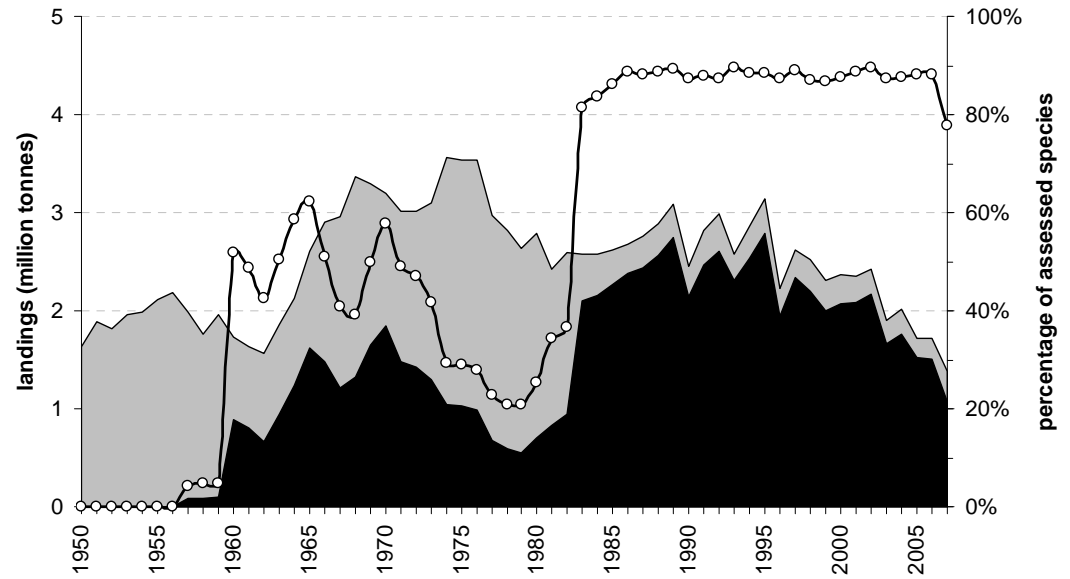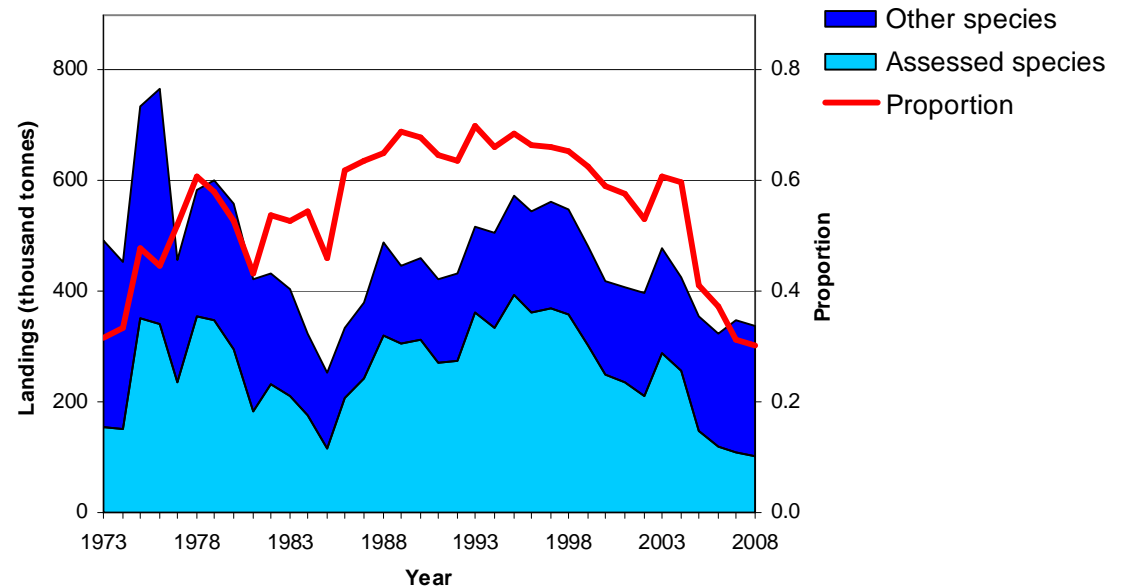

- ➢ All the 8 assessed stocks are overexploited ($F > F_{0.1}$), 6 in an unsustainable state
- ➢ Low biomass (close to B_{pa} on average)
- ➢ Trajectories have to be monitored in the coming years

Proportion des captures évaluées
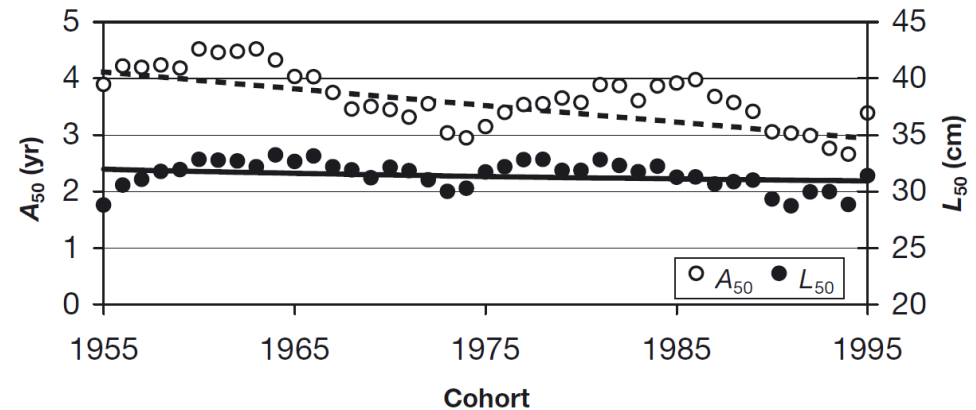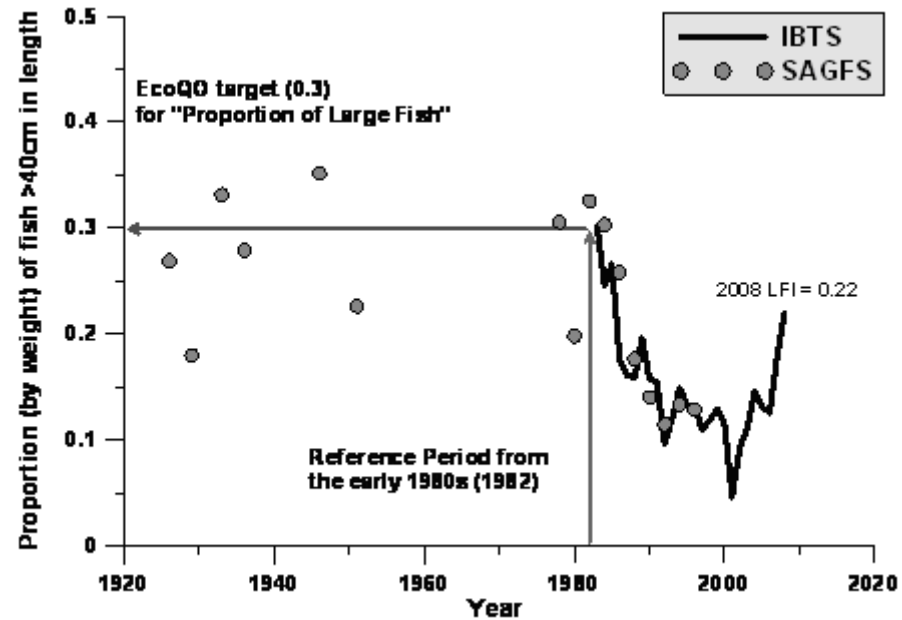
- Mer du Nord

- Mer Celtique

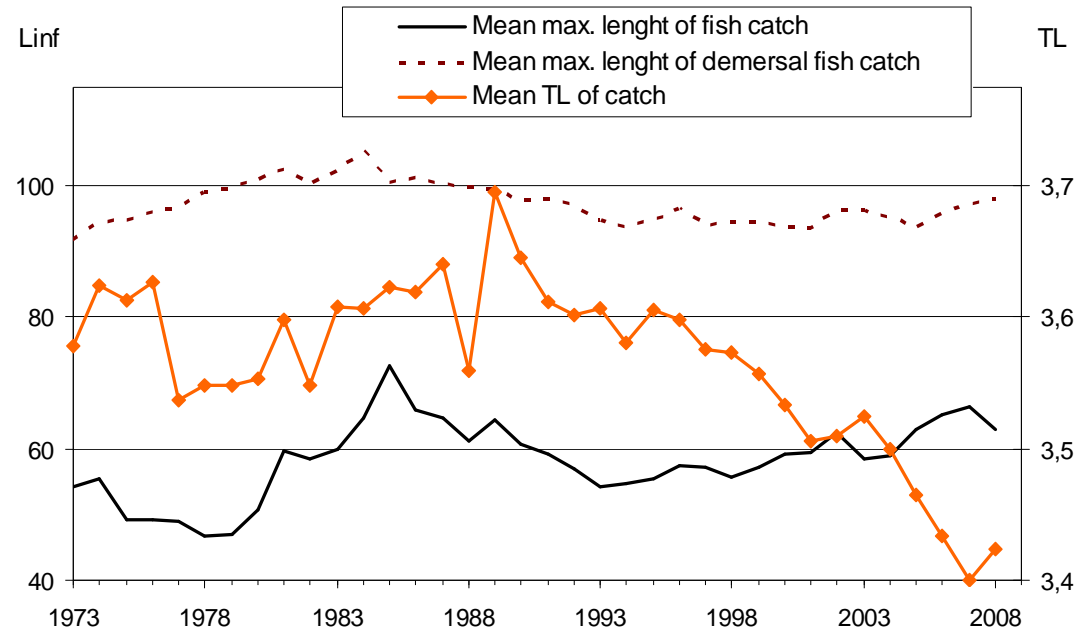# 1.1 Diagnosis on ecosystem health : INDICATORS

- **Exemple de quelques indicateurs**

  - Proportion des grands poissons

  - Taille et âge de maturité (plie NS)

- **Exemple de quelques indicateurs**

  - Taille moyenne des captures (CS
  - Niveau trophique moyen des captures (CS)

  - Taille maximale moyenne (IBTS Q1, Kattegat & Skagerrak)
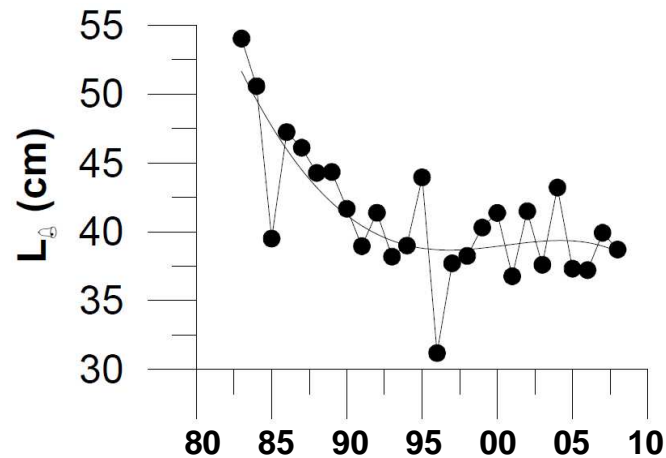
1.1 Diagnosis on ecosystem health

- Gathering results on ecosystem indicators

Code	Ecosystem indicator	N.S.	C.S.
1	**Conservation status of fish species**	☹	n.a.
2	**Proportion of large fish**	😐	n.a.
3	**Mean maximum length of fishes**	😐 ☹	😐
4	**Size at maturation of exploited fish species**	☹	n.a.
5	**Distribution of fishing activities**	?	n.a.
6	**Aggregation of fishing activities**	?	n.a.
7	**Areas not impacted by mobile bottom gears**	?	n.a.
8	**Discarding rates of commercial species**	n.a.	n.a.
9	**Discarding rates in relation to landed value**	n.a.	n.a.
10	**Fuel efficiency of fish capture**	n.a.	n.a.
	Mean Trophic level of catch	n.a.	☹

- Few indicator's estimates are currently available

- Methods are still improving

- In the CS: strong decrease in the mean TL of catch

- In the NS: while the fishing pressure is decreasing, several indicators are still deteriorating

1.1 Diagnosis on ecosystem health - **Conclusion**

- SGMOS 10-03 WG considers that the North Sea ecosystem cannot be qualified as being exploited sustainably. The decrease of the fishing pressure has not been important enough and/or long enough to allow recovery of the ecosystem from the highly exploited state.

- The Celtic Sea ecosystem appears to be globally overexploited (6 among the 8 assessed stocks outside of the limits defined by the precautionary approach)

1.2. Fleet-based analysis in the North Sea

- Selection of the main fleet segments operating in the ecosystem from the JRC database (call for AER)

- Indicators of the economic performances (from AER 2010)

- Preliminary results due to the lack of data (some MS did not report properly)

- Some great contrasts between fleet segments

Total Income (million Euros)

GVA (million Euros)

Operating cash flow (million Euros)

Profit / loss (million Euros)
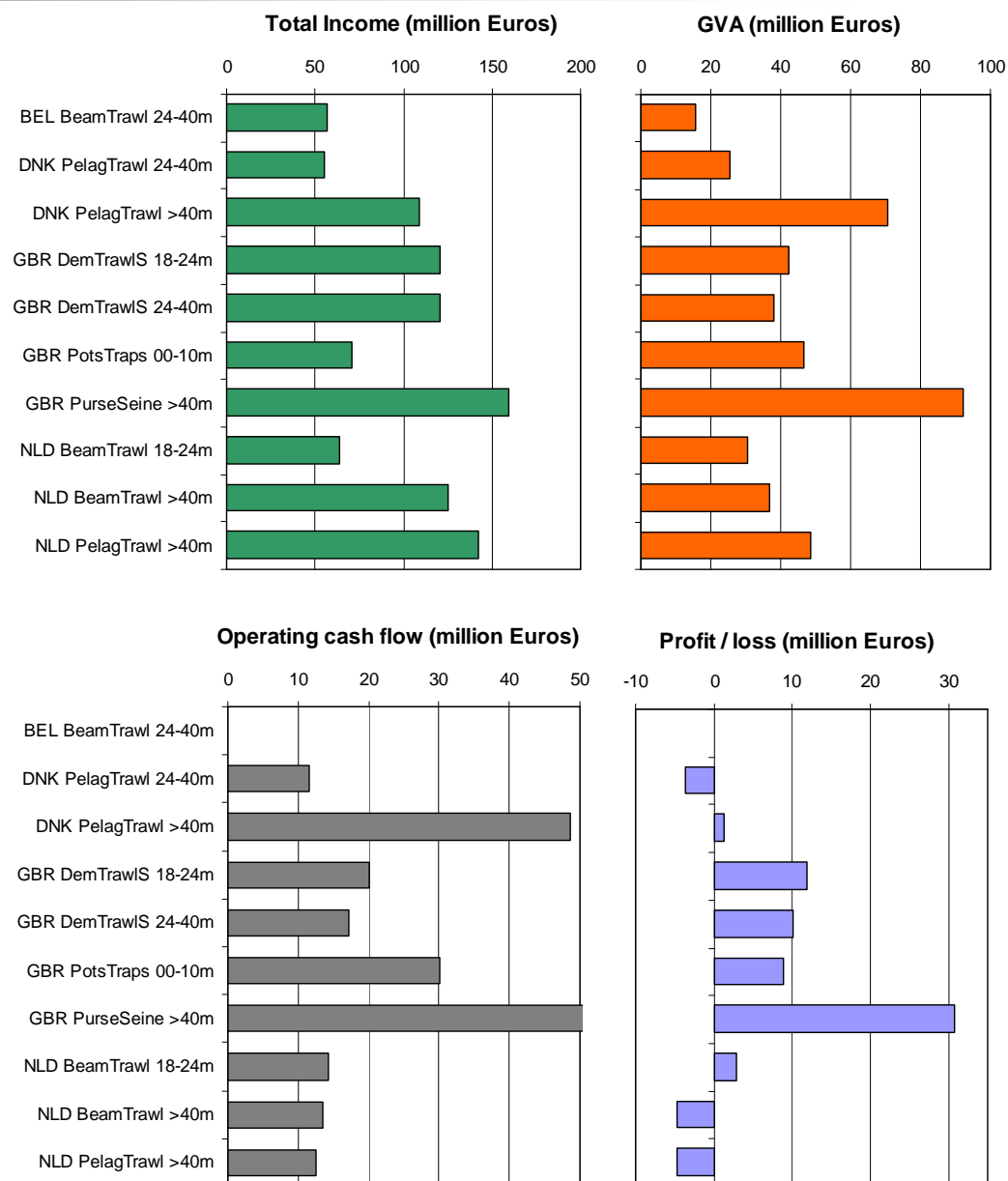
1.2. Fleet-based analysis in the North Sea

- Indicators of the ecological direct impact of the main fleet segments operating in the ecosystem
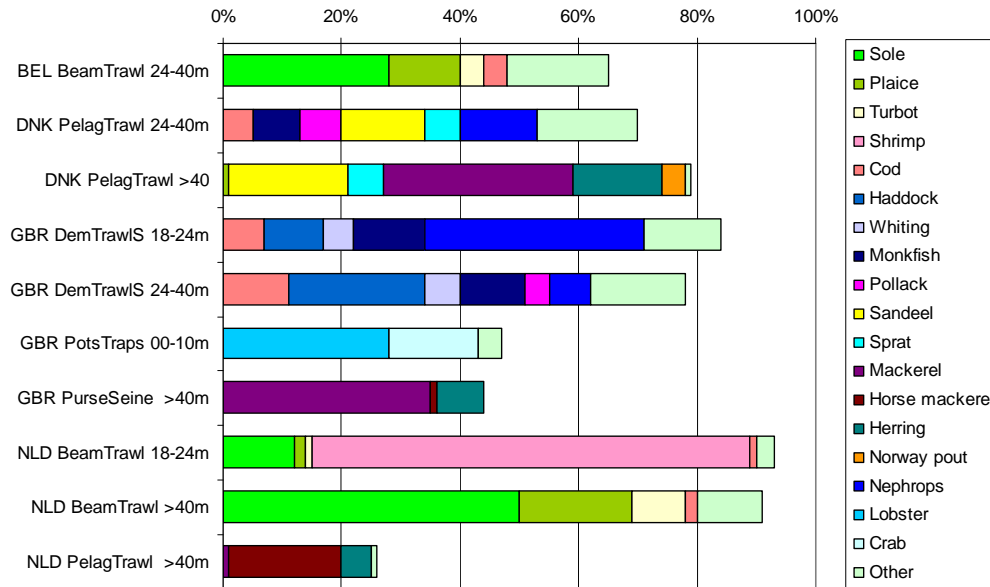
Dependency of the selected fleet segments on the North Sea (% of landed value)
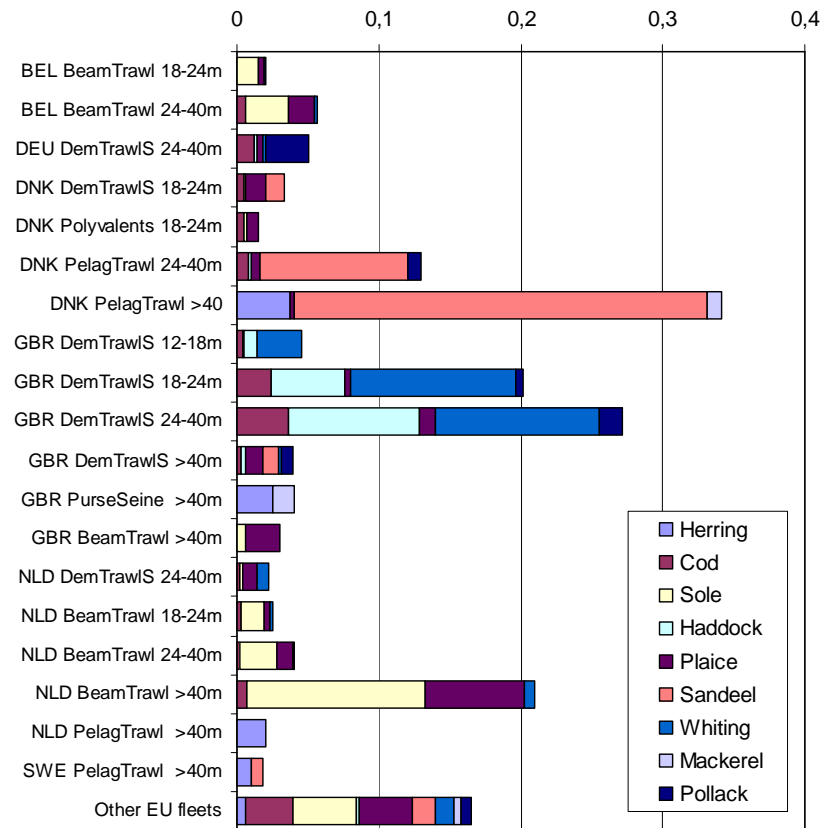
Index of impact on the exploited fraction of the ecosystem (partial Fs)

1.2. Fleet-based analysis in the North Sea

- **Sustainability index of the selected fleets**

  (mean standardized F and SSB of stocks exploited by each fleet segment, compared to precautionary and MSY targets)

- Some fleet segments exploit stocks in an unsustainable way

- The approach is more powerful when the fraction of assessed stocks is high

- More integrated approaches should be developed in the future (LCA,…)
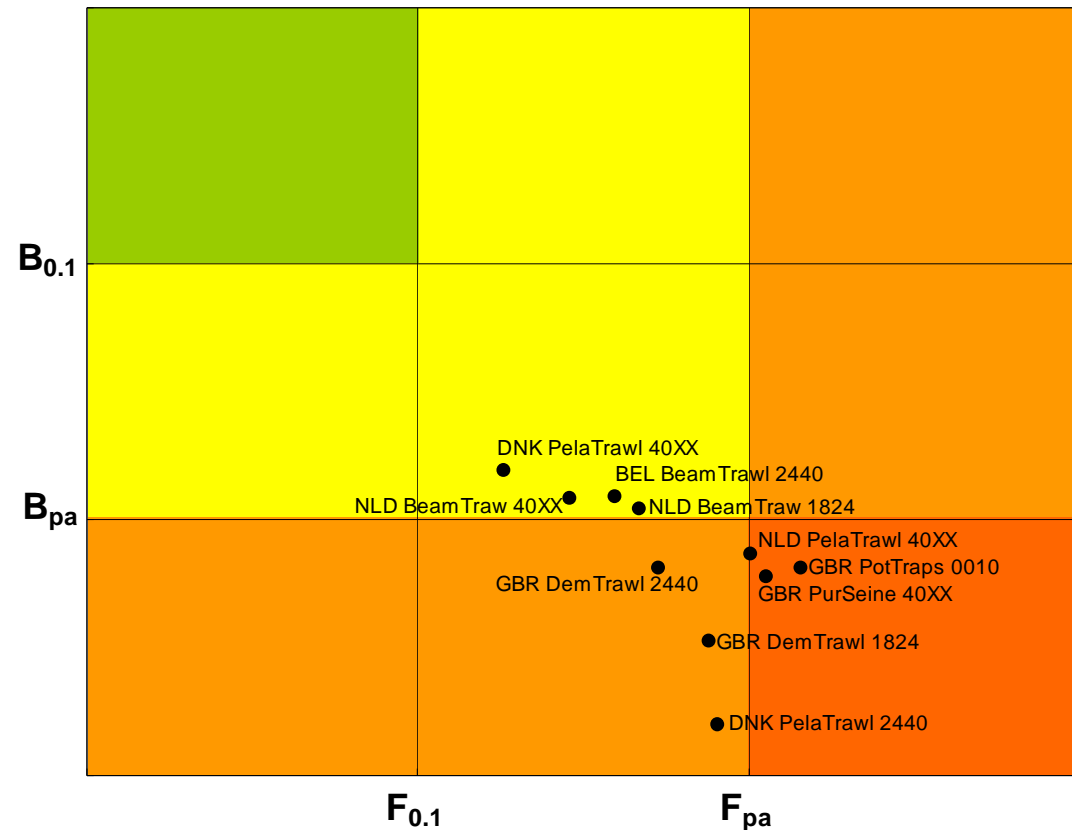
1.2. Fleet-based analysis - **Conclusion**

- Results are very preliminary (due to the lack of data), but from a methodological point of view the test was successful

- Significant contrasts exist between fleet segments, in term of:
  - their direct impact on the fishable fraction the ecosystem
  - their economic performances

- More work is required regarding methods
  - Impact on the food web and on habitat
  - Tradeoffs between ecology and economy

- This kind of analysis is a step towards a fleet-based management:
  - Fleets: witch fleet segments would have to be reduced or developed.
  - Fishing effort: determining management plans for fishing effort, according to ecological and economical performances of fleets
  - Fishing practise: introducing positive or negative economic incentives in order to encourage fleets to improve their fishing practices.

1. **CONCLUSION** from the feasibility analysis

- The SGMOS working group concludes that the feasibility analysis conducted using the North Sea and the Celtic Sea as case studies confirms that such ecosystems represent the appropriate level:

  - to draw syntheses on stock status and analyze trends in ecosystem indicators,

  - to study ecological impacts and economic performances of fleet segments,

  - to analyze tradeoffs between economy and ecology in order to develop a fleet-based management of fisheries,

  - to develop models devoted to scientific advice in both ecological and economical frames (see below).

- The ecosystem also appears to be the right entity to improve the dialogue and involve stakeholders (with regards to RACs) and to build integrated management plans.

- Suggestions regarding methods: see report

2. Recommendations for the development of EAFM

- **R1. Defining a reference list of <u>European marine ecosystems</u> is the top priority** for implementing EAFM.

Note: MSFD has defined ecosystems according to EEZ.
This cannot be used directly for EAFM (and PCP)
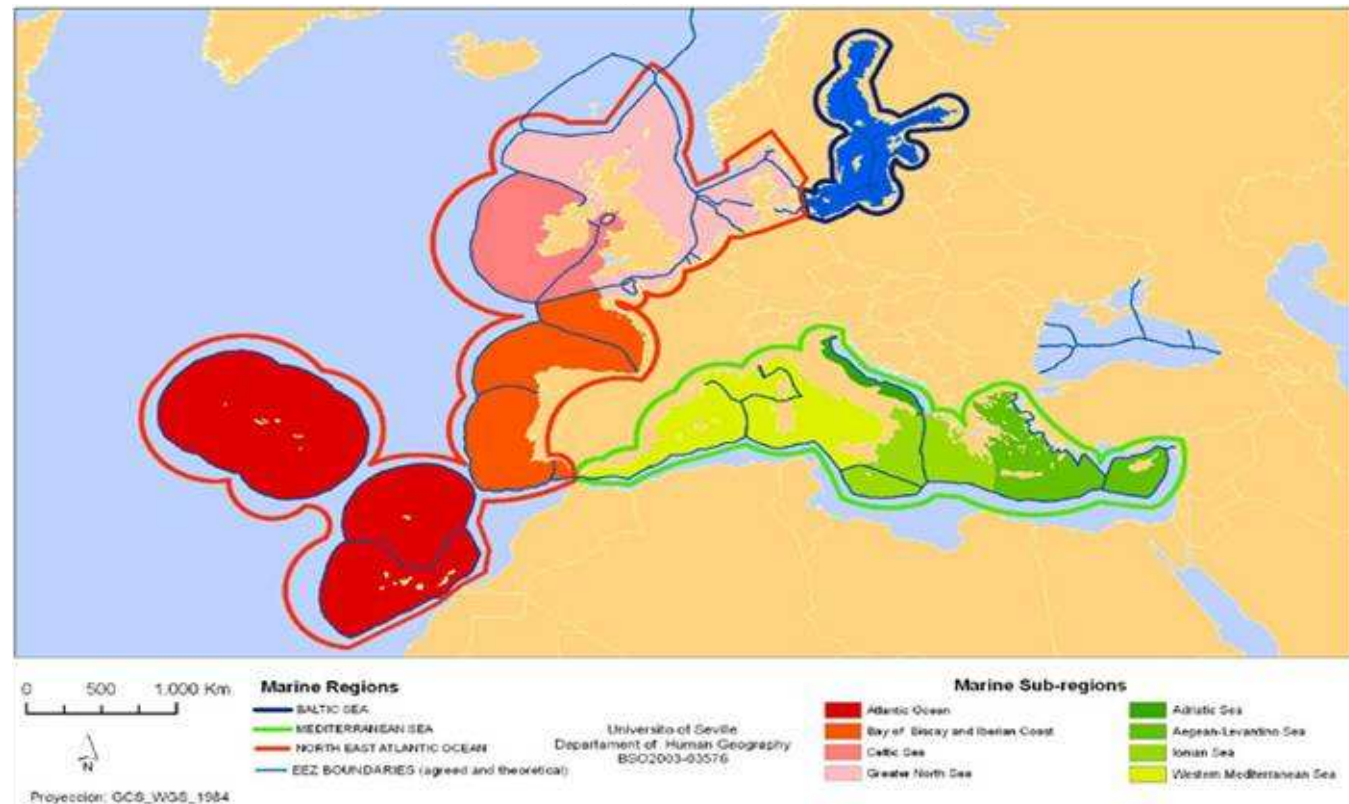
2. Recommendations for the development of EAFM

- Reference list of ecosystems suggested by the working group

	Ecosystem	FAO subdivisions	Depending on the RAC:	MSFD Marine region close
1	Baltic sea	ICES IIIb, 22-32	Baltic sea	Baltic sea
2	North sea	ICES IVa-c, IIIa, VIId	North sea (except VIId)	North sea
3	West Scotland/Ireland	ICES VIa-b, VIIb-c	North western waters	North sea / Celtic sea
4	Irish sea	ICES VIIa	North western waters	Celtic sea
5	Celtic sea	ICES VIIe-k	North western waters	Celtic sea
6	Bay of Biscay	ICES VIIIabd	South western waters	Bay of Biscay & Iberian coast
7	Iberian coast	ICES VIIIc, IX	South western waters	Bay of Biscay & Iberian coast
8	Acores	ICES X	South western waters	Atlantic ocean
9	Canarias, Madeira	CECAF 1.2	South western waters	Atlantic ocean
10	Western Mediterr. Sea	GFCM 1.1, 1.2 & 1.3	Mediterranean Sea	Western Mediterranean Sea
11	Adriatic Sea	GFCM 2.1	Mediterranean Sea	Adriatic Sea
12	Central Mediter. Sea	GFCM 2.2	Mediterranean Sea	Ionian sea
13	Eastern Mediterr. Sea	GFCM 3.1, 3.2 & 4.1	Mediterranean Sea	Aegean-Levantin sea
14	Black sea	GFCM 4.2	- none -	

2. Recommendations for the development of EAFM

- Reference list of ecosystems suggested by the working group
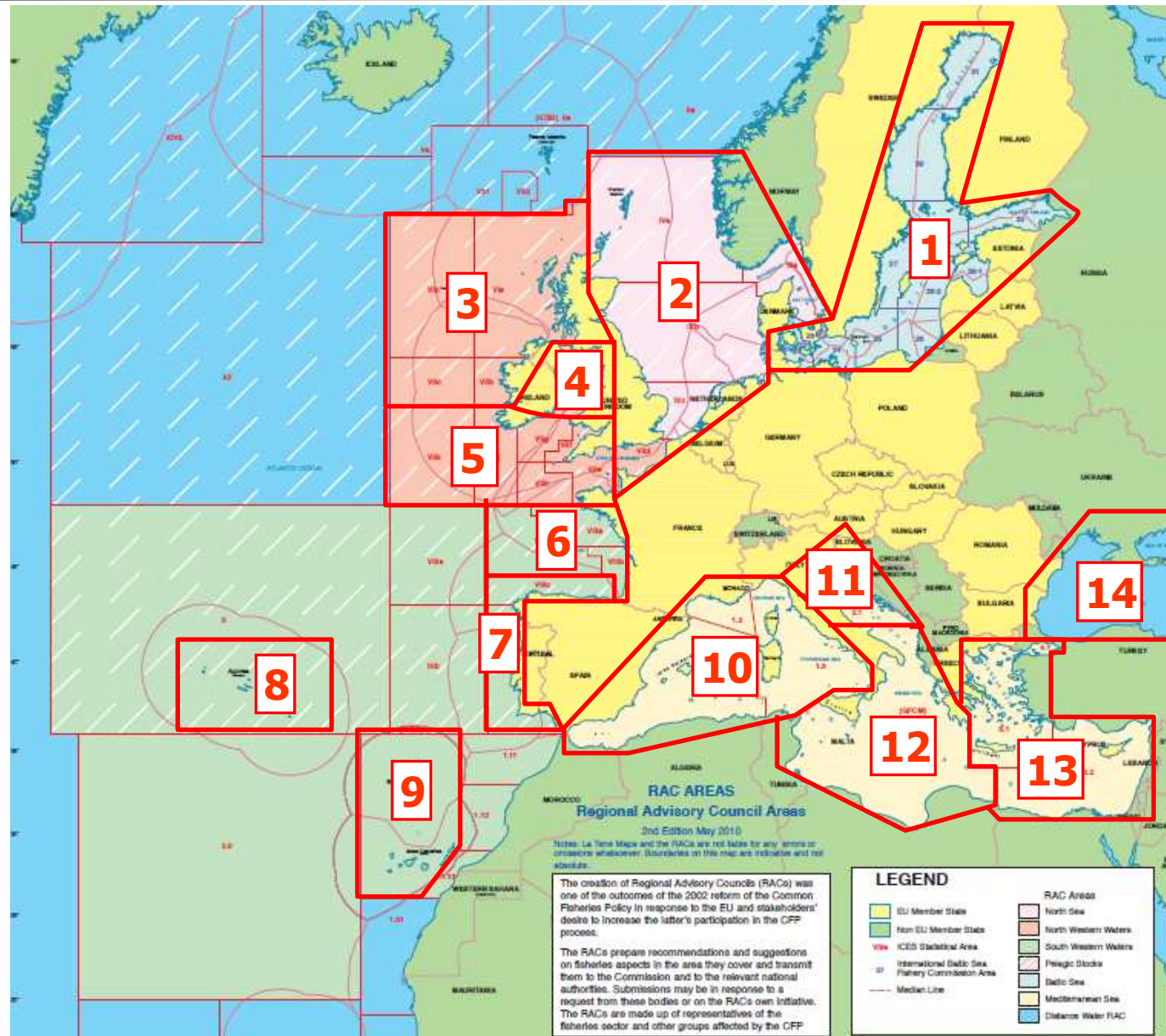
2. Recommendations for the development of EAFM

- The list has to be officially agreed by stakeholders and political bodies. The SGMOS study group suggests it could be submitted to the advice of STECF and possibly to an experts' consultation, before consultation with RACs and formal adoption by the Commission.

  (In the same way as stocks identities were defined and agreed by the scientific community and the political bodies after World War II).

- Reference ecosystems should be considered as the functional units used:
    - in all data collection programs related to fisheries, resources, habitats, etc. It clearly applies to **the DCF that should be revised (R2)**.

    - in many working groups from ICES and STECF. This could imply changes in the organisation or in the terms of reference of several working groups (see below).

    - in many research programs.

- The use of a single geographical level in various groups, projects, programs or committees would allow an incremental process, with a more efficient aggregation and synthesis of results, experiences and knowledge.

2. Recommendations for the development of EAFM

- **R3. <u>Operational models</u> should be urgently implemented** in order to provide scientific advice that can be effectively used in the frame of EAFM.

  (Like single species models are used (more or less homogeneously) in ICES assessment working groups).

- Step one:

  - A set of a limited number of reference models should be developed or adapted for each one of the 14 European marine ecosystems.

  - The SGMOS working group suggests this could be done trough a specific call for projects managed and sponsored by DG MARE.

  - A scientific committee could be set up (or identified ?) to validate models as reference to be used within the scientific advice framework.

  - Models agreed as reference will have to improve according to progress occurring in modelling approaches and in the quantity or quality of the available data

2. Recommendations for the development of EAFM

- Step two: a specific working group should be set up to run the reference models on a regular basis, in order to;

  - update the diagnosis on ecosystem health,

  - simulate various options for fisheries management,

  - investigate compromises between simultaneous and often incompatible biological objectives (such as the objective to reach the FMSY simultaneously for every stocks)

  - investigate compromises between ecological, economical and social objectives.

- In practice, SGMOS suggests that:

  - such a group should be set up rapidly, starting with a very limited number of ecosystems (possibly 1).

  - On the medium term, as far as models may be developed, more ecosystems will have to be considered and several groups will become necessary, for instance according to RACs.

2. Recommendations for the development of EAFM

- **R4.** Setting up **a new organisation of working groups devoted to the scientific advice**, in the field of fisheries ecology and economy, on an ecosystem basis.

- SGMOS suggests starting discussions with the other STECF groups and with ICES (and potentially with GFCM) in order to promote an advice-oriented ecosystem approach.

- As a first step of proposals, SGMOS especially suggests to:
  - Draw the long-term picture of trends in catch and fishing effort in all European reference ecosystems. This is likely to require a specific project developed in close relation with the ICES-SGHIST;

  - Routinely estimate values of ecosystem indicators (and work on methods) would be the task of a specific and permanent working group, possibly the ICES WGECO (at least for Atlantic and Baltic waters);

2. Recommendations for the development of EAFM

- **Assessing stocks** is part of the EAFM and should be extended to as many as possible exploited resources.

  - SGMOS suggests STECF should recommend that an increasing proportion of the stocks targeted by European fisheries should be assessed (by ICES or national bodies).

  - An analysis is required in each ecosystem to determine which part of the exploited stocks is currently assessed and how this could be improved (especially defining strategies for non-targeted species);

- Performing fleet-based analysis, including environmental and economical assessments, should be the task of a specific group (possibly under the auspice of SGECA);

- A first SGMOS working group could be in charge of updating and running each year the reference ecosystem and bio-economic models (it should also take into account results from other groups: WGMIXFISH, etc);

- A second SGMOS annual meeting could be in charge of building synthesis and formalize scientific advice under the authority of STECF.

  - The **Annual EAFM report** would be the product of this group, based on an integrative approach of results obtained by several bodies

2. Recommendations for the development of EAFM

- Summary:

    - Define the reference list of European marine ecosystems.

    - Built reference models,

    - Revise data collection programs (including DCF)

    - Change organization and/or terms of reference of several STECF and ICES working groups.

    - Consider ecosystems in most research programs.

    - … Start (or improve) an incremental process of knowledge on ecosystems and fisheries.

- Input of both ecologists and economists is required. Thus STECF has a particular responsibility in EAFM improvement.

Thanks to all the participants of the SGMOS 10-03 WG

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