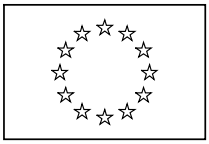

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COMMISSION STAFF WORKING PAPER

15th REPORT OF THE SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES

Brussels, 04-08 November 2002

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1 INTRODUCTION

STECF met at the Conference Centre "Albert Borschette" in Brussels from 4 to 8 November 2002.

The STECF meeting has been preceded by the joint meeting of the subgroups SGRST and SGECA (28-31 October 2002) that has prepared the working documents dealing with the reports on stock status review, the economic implication of ACFM advice as well as a preliminary evaluation of the recovery plan for spiny lobster fishery in Corsica Island (France).

The Chairman of the STECF, Mr Alberto Gonzalez Garces, opened the plenary session at 14.30.

The Secretariat of STECF welcomed the participants wishing them success in their deliberations.

The terms of reference for the meeting were surveyed and briefly discussed to arrange the details of the meeting. The session was managed through alternation of plenary and working groups meetings.

1.1 LIST OF PARTICIPANTS

The complete address of the participants is listed in Annex I.

Members of the STECF:

Ardizzone,G. Domenico

Camiñas, Juan Antonio

Casey, John (Chairman)

Cornus, Hans-Peter

Di Natale, Antonio

Eltink, Guus

Ernst, Peter

Franquesa, Ramon

Gonzalez, Garces Alberto (Chairman)

Gustavsson, Tore

Keatinge Michael

Lokkegaard, Jorgen

Messina, Gaetano

Moguedet, Philippe

Munch-Petersen, Sten

Officer, Rick

Perraudeau, Yves

Pestana, Graça

Polet, Hans

Salminen, Matti

Simmonds, John

Smit, Jos

Virtanen, Jarno

Vanhee, Willy

Invited experts:

Cardinale, Massimiliano

De Cardenas, Enrique

STECF Secretariat:

Biagi, Franco

1.2 TERMS OF REFERENCE

STECF was asked to address the following issues:

1 Institutional aspects and information from the Commission

STECF is invited to comment as appropriate and possibly to schedule its future activity taking into consideration the following points:

1.1. *Ending of the STECF mandate by December 2002. Nomination/renewal of mandate of STECF for the period 2003 and 2004*

1.2. *STECF ad hoc working group reports on recovery plans under Article 16(c) of FIFG Regulation.*

1.3. *Communication on Mediterranean*: STECF is requested to set up a programme of 2 meetings in 2003 to support the work of the Commission. A critic re-evaluation of timing and previous terms of reference envisaged for the SGMED is expected ()

1.4. *Exchange of view on how to improve the scientific advice.*

1.5. *Council Regulation (EC) n°1543/2000 and Commission Regulation (EC) n° 1639/2001*:

a) STECF involvement in the evaluation of the national data collection programmes for 2003 and midterm review of data collection programmes in 2003

b) procedure for the adoption of the forthcoming SGRN report (9-13 December) addressing MS derogations for 2003 programmes

c) STECF analysis of CPUE indices conclusions report (Chapt. III section F.1 of Regulation 1639/2001) and deciding the content of this chapter within the Minimum Programme by 31 March 2003

d) STECF support to the group of Consultants on establishment of a data base for data collection.

1.6. *6th Framework Programme*

2 To review the scientific advice on stocks of Community interest and to elaborate a report on the current state of these stocks.

2.1 This will imply to update the STECF stock status report of April 2001 using the most recent scientific information, including the latest ACFM advice of October 2002. STECF is invited to comment as appropriate taking also into consideration the mixed nature of several fisheries. The basic document for this task will be the report prepared during the SGRST-SGECA joint meeting 28 – 31 October 2002. STECF is requested to review and endorse this document as appropriate.

2.2 after considering the review of the recovery plans made by ICES, identify modifications to the recovery plans that would allow them to meet precautionary criteria and to allow safe and rapid recovery of the stocks of cod and hake.

3 Economic issues

3.1 To review and comments as appropriate the outcomes of the EIAA model based on the latest ACFM advice.

The basic document for this task will be the report prepared during the SGRST-SGECA joint meeting 28 – 31 October 2002. STECF is requested to review and endorse this document as appropriate. STECF is invited to interpret the outcomes of the model taking into consideration the mixed nature of several fisheries.

3.2 Annual Economic Report

4 To review the scientific information of the impact on fish resources of certain derogatory fisheries in the Mediterranean.

Article 3(1) of Regulation 1626/94 prohibits, from 1st January 2003, the use of "gangui".
STECF is requested to evaluate and comment as appropriate the report "Etude de la pratique de la pêche aux ganguis et a la senne de plage en région PACA (France)" May 2002 by Idee – Creocean - Oceanic Development.
In the light both of the above report and of previous STECF opinion (13th STECF report, November 2001, SEC(2002)410), STECF is requested to evaluate and advice on likely consequences in conservation terms of "gangui" fisheries.

5 To evaluate the recovery plan for the Mediterranean spiny lobster in Corse (France).

A proposal of a temporary ban for the Spiny lobster Corsican fishery has been submitted by France under Article 16.1(c) of FIFG Regulation. STECF shall evaluate the genuine need and scientific justification of this plan.
A preliminary analysis of the report, prepared by joint SGRST-SGECA group, is expected on this subject.

6 Incidental catches of cetaceans

STECF is requested to review and endorse as appropriate the SGFEN report on this matter (Brussels, 11-14 June 2002)

7 Mediterranean fisheries

7.1 STECF is requested to review and endorse as appropriate the SGMED report on this matter (Brussels, 04-07 September 2002).

7.2 STECF is also requested to rescheduled the planning of the SGMED meetings to meet its duty (see also point 1.3).

8 Elasmobranchs fisheries

STECF is requested to review and endorse as appropriate the SGRST report on this matter (Brussels, 23-26 September 2002).

9 Mixed fisheries

STECF is requested to review and endorse as appropriate the SGRST report on this matter (Brussels, 22-26 October 2002).

10 Impact of the Northeast North Sea sandeel fishery closure.

STECF is requested to review and endorse as appropriate the report on the impact of the Northeast sandeel fishery closure and status report on the monitoring fishery in 2000 and 2001.

11 Other matters

1.3 INSTITUTIONAL ASPECTS AND INFORMATION FROM THE COMMISSION

1.3.1 STECF nomination

STECF mandate will expire by 7 December next. However, the current STECF will remain in office until the new nomination is not formalised.

The Commission recalled that, in addition to the criteria of high qualification of possible candidates, and taking also into consideration the availability of the current members, the renovation will aim both to a more balance between genders and to bring in new members to avoid a crystallisation of the STECF membership. STECF was informed that Member States, on request of the Commission, have provided a list of experts available to be nominated as STECF member. Notwithstanding, the Commission has no obligations to select possible new STECF members from lists provided by Member States.

Mr Alberto Gonzalez Garces, current chairman of the STECF, informed the Committee that he will not be available for a new mandate as member of STECF because of several and increasing engagements as Director of his Institute. However he said to be available to support the work of STECF as expert to be invited on specific subject.

The Committee expressed its gratitude to Mr Gonzalez Garçes and recognised his competence and expertise to chair the Committee along the past years.

1.3.2 STECF and recovery plans under article 16.1(c) of FIFG Regulation

The Commission recalled the commitments coming from art 16.1 (C) of FIFG Regulation to evaluate the recovery plans. STECF confirmed the arrangements already agreed in a previous STECF meeting. That is, the STECF Bureau together the Commission have the responsibility to choose the scientists as member of the *ad hoc* working groups and, furthermore, it was reiterated that the reports of the WGs will be evaluated and possibly endorsed by the STECF Bureau on behalf of the STECF.

1.3.3 Mediterranean

The Committee welcomed the Commission Communication on Mediterranean and considered it as an important step forward towards a more tailored and stronger enforcement of the CFP in the Mediterranean Basin. However, due to dense agenda and time constraints the STECF decided not to have an in depth discussion on the Communication and kept straight close to the terms of reference (see section 7.2).

1.3.4 Exchange of view on how to improve the scientific advice

The commission provided STECF with a Draft Commission Communication Paper of 24-09-02: “Improving Scientific and Technical Advice for Community Fisheries Management”, Working Programme Number 2002/FISH/534. This paper outlines the Commission’s view of the needs for and shortfalls in scientific advice in fisheries in relation to the proposed new Common Fisheries Policy (CFP).

The following text on background and proposed initiatives is extracted from the paper for summarisation with minor amendments.

1.3.4.1 Summary of Commission Communication

Background

Questions of sustainability and biological risk are now the most important considerations in fisheries management. The challenges in European fisheries management have substantially increased demand for up-to-date scientific assessments and advice. This makes the scientific advice a policy issue. However, recent experience has been that the present advisory systems are not able or have severe difficulties in delivering the advice that is needed by managers, and there is a broad consensus on the need for improvement.

Under the proposed new Framework Regulation governing the operation of the Common Fisheries Policy, the Commission will continue to be responsible for proposals for Community measures for the conservation and management of resources, conditions of access to waters and resources, structural policy and management of the capacity of the fleet, control and enforcement, aquaculture, common organisation of the markets, and international relations. In particular, there is an obligation to put in place a decision-making process based on sound scientific advice and delivering timely results. Because of the Commission's pivotal role in proposing and overseeing the execution of this policy, it is essential that it be supported by the right expertise at the right time.

Reviewing existing procedures for the provision of scientific advice and the current structure of relevant institutions the following principal problems and possible remedial measures have been identified:

- There is a growing need for scientific advice, which is overwhelming the advisory systems - be these ICES, STECF or other organisations - that rely on already overstretched manpower in national fisheries laboratories.
- The priorities of the Community (as users of the advice) and the national fisheries laboratories (where the expertise resides) are not necessarily the same. Indeed, there are only indirect links between the two.
- Scientific expertise is becoming subject to more formal contractual arrangements between the fisheries laboratories and their funding agencies. A place has yet to be found in these arrangements for the provision of advice to the Community.
- Unlike the Member States, the Commission has very little scientific or technical expertise at its direct disposal.
- The challenge of developing integrated and coherent advice that takes account of ecosystem issues and environmental, social and economic aspects will require an increase in resources compared to the traditional fisheries aspects dealt with at present. It is only possible to obtain more and better scientific advice by employing more scientific staff and supporting new science.

Proposed initiatives

The Commission considers that there are two main ways of improving the present situation in the short term.

The first is to **reorganise the provision of advice** in a way that makes it more efficient at delivering what is needed. This will involve improving the links between science and industry (regional advisory committees including representatives of the industry) and better co-ordinating the Community's efforts in fisheries science, in particular by identifying priority tasks and needs and focussing scarce human resources on them. In parallel it will be necessary to use working methods that are more responsive to management needs (quick response to urgent management questions) than the existing procedures. The second is to **devote more resources to obtaining better and more rapid scientific advice**. This will entail collection of more extensive and reliable data and the recruitment of more specialist staff to analyse data and provide advice. While in the short term it may be possible to build on existing institutional structures, in the longer term new structures will have to be developed which provide clear lines of responsibility and ownership for the resources and obligations concerned.

However, the Commission considers the improvements possible in the short term will be not sufficient. More substantial changes are required. A stable institutional structure is needed for the scientific and technical support of the Common Fisheries Policy in the long term. The Commission suggests that **two alternative models** and be discussed at the political level:

The **first** is to reinforce the role of ICES to include the provision of advice of special interest to the Community, including fisheries issues outside its normal geographical scope.

The **second** would be to develop a Community capacity for analysis and advice, a new scientific body whose principal remit would be to provide the science required by the Commission in order to ensure that its proposals and negotiations are soundly based. There are a number of institutional models for such an institution, such as a European Agency, an Office of the Commission or a technical unit within the Joint Research Centre (a Directorate of the Commission services).

Conclusions

- There are too few scientists available to provide the advice needed by fisheries managers in the Community. For the near future, new challenges to deal with ecosystem, social and economic issues in fisheries advice will have to be met.
- Some gains in efficiency can be achieved by better coordinating scientific activities and focussing these more on management needs. These will be pursued by the Commission, notably in better coordinating and planning the Community contribution to fisheries science and advice, but they will not be enough to make good the shortfall.
- As a further step, the Commission will propose to improve support for existing arrangements, and STECF in particular, by seeking to compensate national fisheries institutes financially for the manpower allocated to this Committee. The Commission will also seek to establish a list of experts who can be contracted at short notice to advise on specific issues.
- For the longer term, the Commission wishes to open a debate on the establishment of new institutional arrangements and structures to deliver additional net resources to fisheries science and to improve the provision of advice relevant to the management of the European Common Fisheries Policy.
- The Community's task is to achieve :
    - a firm basis for the new Common Fisheries Policy in science and analysis;

- a strong Community scientific contribution to international fisheries science;
- a strong capability by scientists in the Community to advise managers on fisheries issues as they happen.

1.3.5 STECF Comments and opinion

STECF agrees with the findings of the Commission in relation to the problems and shortfalls of the current advisory procedures and institutional structures. It likes, however, to emphasise that there are even worse problems concerning the advisory system on economics of the fishery sector compared to the system for the fisheries itself. The fishery advisory system has been growing historically and is well established in regional fisheries organisations and in ICES. The only institutional source of economic advice for the Commission is currently STECF supported by Concerted Action activities. Furthermore, on national level there are only few member states which have established institutions for fisheries economics.

These problems have been emphasised in several STECF reports, for example in the 11th report which contains a series of recommendations about economic issues. However, the Draft Commission Communication paper does not reflect any of the recommendations nor does it contain any consideration on the organisation of the economic issues in the advisory system. Therefore, STECF repeats the recommendation about setting up an economic subgroup of STECF with permanent members as a basis for economic advice. The group should deal with all data related issues, the analysis of economic performance, sensitivity analysis of the various fleet segments to exogenous and endogenous shocks, and other relevant analysis. This group should consist of economists of STECF, representatives of the institutions collecting economic data and independent (external) experts.

STECF shares the Commission's opinion of a strong need to improve the current system in the short term by optimising the organisation of the provision of advice. Some issues like the incorporation of representatives of the industry in the advisory process are already on the way namely the North Sea Commission Fisheries Partnership for the North Sea. STECF stresses also that in addition the resource base for advise needs to be improved namely related to modelling, ecosystem issues and in general the science base. For instance, in order to improve the data situation the Council already installed regulation 1543/2000 which fixes the responsibility of member states for sufficient and high quality data sampling.

STECF is in consensus with the Commission that the short term improvements are not sufficient to support the scientifically based fisheries management system under Community responsibility. The Commission proposes two models to improve the advisory system in the long term. STECF discussed the alternatives.

Alternative 1: Enhanced role for ICES

There are more problems than advantages in this alternative. The most important draw-back might be ICES not accepting responsibility outside the ICES area such as the Mediterranean and add structures to provide economic advice as well as the membership of countries not being members of EU . This alternative would require change of the ICES convention involving political and financial consequences and complications. In this case the role and tasks of STECF has to be evaluated also. The role of STECF would in this case be reduced to providing economic advice , advice for the Mediterranean and monitoring or supervising activities of ICES. An integrated biological and economic advice would then be nearly impossible and the difficulties of quick reaction to management needs would remain.

Alternative 2: An additional scientific body on EU-level

Proposed possible forms without any preference are European Agency, Office of the Commission or technical unit within the Joint Research Centre (a Directorate of the Commission services). Principal remit of this new body would be to provide the science required by the Commission in order to ensure that its proposals and negotiations are soundly based. Such an organisation could assure independence of scientific advice, provide the Community with technical advice in support of its policies, using resources from the Community budget and provide additional long-term staffing positions. It could act as a technical and scientific secretariat for STECF. STECF would prefer this alternative as it is considered to have more advantages and better chances of realisation. In addition the role of STECF would be enhanced. The STECF bureau could be a permanent part of this new body located at the Commission. This would increase the effectiveness of the management and administration of STECF. Other members of this new body may be located in small offices at the national labs (paid by the Commission and connected by a network of regional centres) in order to have a link to the basic science. This body would be able to react in short time to urgent management issues.

Finally STECF emphasizes that the future advisory system has to be based on a structure in which the fisheries economics are organised in an efficient way possibly involving all institutions in Europe working in the area of fisheries economics. To this end, STECF wished to recall the Commission to take into consideration its opinion as expressed in previous STECF reports (SEC (2001)1581; SEC (2001)177; STECF report SEC (2003) 288 of April 2002).

1.3.6 Data collection framework

1.3.6.1 Commission briefing

Mr Willem Brugge (DG-Fish, Conservation Policy Directorate - Unit on research investigation) gave a briefing and reminded the forthcoming duties for STECF as foreseen within the data collection framework (Council Regulation 1543/2000).

It was recalled that the STECF subgroup on research needs (SGRN) will meet next 9-13 December for the analysis of National programmes. A thorough and objective examination on possible Member States' derogations is expected.

The Commission, following the request of STECF to be closely associated and to support the work of the private consultants on the establishments of a data base and of a system to query and extract data from national data bases, asked the Committee to provide a final rooster with the names of 5-7 experts that will act, on behalf of the STECF, as a support group for the Community data base consultants.

Member States should provide, by 31.12.2002, conclusions of review of CPUE used during 1995-2000. These conclusions will be submitted to STECF in order to fix the content of Minimum Programme on CPUE as foreseen in Commission Regulation n° 1639/2001 (Chapter III, section F.1). STECF should provide an advice by 31.03.2003 at latest.

An other near future tasks for STECF is to support the Commission in the midterm review of the data collection programmes. Council Regulation 1543/2000 states that: "On the basis of information supplied by MS, and having consulted the STECF, the Commission shall present to the European Parliament and the Council by 31.12.2003, a Report evaluating the measures taken by each MS, the appropriateness of the methods used and the results achieved as regards the data collection. This Report shall also evaluate the utilisation by the

Community of the data collected". Member States should provide, by 31.05.2003, the following information:

- Technical Report of activities, detailing state of completion of the aims set at the time of the drawing of MP and EP.
- Estimates of levels of precision in the event of any sampling

Therefore, STECF is expected to set up a meeting by June-July 2003 to evaluate and comment as appropriate the above information made available by Member States.

1.3.6.2 STECF Comments and opinion

With regard the forthcoming SGRN meeting (9-13 December) to evaluate possible derogations in the national programmes, STECF agreed that the current STECF Bureau will evaluate and possibly endorse the SGRN report on behalf of STECF. This fast track procedure will avoid to await the next STECF plenary of April 2003 for report adoption and it should speed up the negotiation between the Commission and Member States for the 2003 data collection programme.

Regarding the issue of the data base and related querying system, STECF agreed to involve also some experts that had already participated in the work to set up the call for tender for the establishment of the data base. STECF, among possible others, asked the Commission to check the availability of the following experts: John Simmonds, Evelina Sabatella, Henrik Degel, Argyris Kallyaniotys, Valentin Trujillo, Wim Panhorst.

STECF agreed to convene a meeting of SGRN, before the end of March 2003, to cope with commitments as foreseen in Chapter III section F.1 of the Commission Regulation n° 1639/2001. However the final date will be fixed as soon as Member States reports on the use of catch and effort data will be available to the STECF. Furthermore, STECF requested the Commission to provide, as soon as it is available, the scientific report on the evaluation of CPUEs derived from trawl surveys.

With regard the task to support the Commission in its midterm review of data collection framework programme, STECF acknowledged the importance of such a step for possible improvements of the programme including environmental and economic issues. STECF believes that the complexity of the matter needs time for a proper evaluation of the different issues at stake. Considering the already overloaded agenda for 2003, and also in consequence of always possible late delivery of national reports after May 2003, STECF believes that a likely deadline to provide its advice might be the end of September, instead of July as proposed by the Commission.

1.3.7 6 EU Framework Programme. Implications for fisheries and aquaculture research

Mr Jacques Fuchs (DG-Fish, Conservation Policy Directorate - Unit on research investigation) of the Commission, gave a briefing on the Sixth Framework Programme (6 FP) for research and technology development (2002-2006).

The main objectives of the Sixth Framework Programme (6 FP) are:

- strengthen the scientific and technological basis of industry and encourage it to become more competitive;
- to integrate European research;
- to structure and strengthen the European Research Area (ERA).

The activities required to meet these objectives will be carried out:

- in a limited number of thematic areas (7) preferably by means of strongly integrating instruments (networks of excellence and integrated projects);
- in areas covering a wider field of research in the form of certain specific needs of EU policies or new emerging needs;
- in the field of science and technology as a whole in case of complementary research and innovation activities for Small and Medium Enterprises (SMEs).

Research in fisheries and aquaculture could be financed by all of these three activities, in particular under Thematic Priority 5 "Food quality and safety", Priority 6 "Global change and ecosystems", Priority 8, "Scientific support to policy".

1.3.7.1 Priority 5 "Food quality and Safety"

This thematic priority aims at assuring consumer health and well being by providing them with safer, high-quality and health promoting foods, including seafoods, relying on fully controlled and integrated production systems. This end-user driven approach will trigger research on the development of new, safer, fully traceable, tailor-made seafood products and feeds.

1.3.7.2 Priority 6 "Global change and ecosystems"

Among the objectives of this thematic priority is to ensure the preservation of ecosystems as well as their functioning, biodiversity and service to society. Incorporation of ecosystem considerations is crucial to the effective management of exploited marine systems and their resources. To this aim it is important to advance the scientific understanding of the components, structure and properties of ecosystems, the role of habitat quality and diversity as well as key physical, biological and oceanographic parameters affecting ecosystem dynamics and resilience.

1.3.7.3 Priority 8, "Scientific Support to Policy"

The overall objective is to support the formulation and implementation of Community policies, by providing scientific contributions to policies that are targeted precisely on needs ("demand-driven"), coherent across the various Community policy areas, and sensitive to changes in policies as they take place. The draft work programme is reported in the **Annex II.**

Research on Fisheries in support of the CFP should provide the scientific basis to ensure fisheries sustainability and move towards an ecosystem based approach to fisheries management. It should aim at improved scientific advice on medium- and long-term effects of different management tools. Management methods should be explored and evaluated to identify and resolve deficiencies through better understanding of key biological parameters and socio-economic implications. Enhancement of technical measures like introducing more selective fishing, reduction of discards, measures to protect non-target species, and habitats should be aimed at. Better tools for improved monitoring, control and surveillance should be developed.

Research on aquaculture in support of the CFP should provide the scientific basis for sustainable aquaculture production by promoting disease prevention and a sound environment protection. Aquaculture activity and its environmental interactions, as well as

fish and shellfish health aspects, are important policy issues which will be addressed in this section of the 6 FP.

2 REVIEW OF SCIENTIFIC ADVICE ON STOCKS OF COMMUNITY INTEREST

2.1 INTRODUCTION

STECF has reviewed the most recent scientific advice on most of the stocks of Community interest. The report on stocks status is presented in SEC (2003)102.

It is important to note that for the 1st time, the stocks review has been compiled ahead of Commission proposals for management of fisheries in the ICES area. It is hoped that the revised timing of its production, will enhance its utility.

This review presents a summary information on the state of stocks and management advice for stocks of community interest throughout the world including those in Third Country and international waters. In undertaking the review, STECF has consulted the most recent reports on stock assessments and advice from appropriate scientific advisory bodies or other readily available literature, and has attempted to summarise it in a common format. The review is partially incomplete, since in some cases, appropriate information was not readily available to the group.

Nevertheless, the report provides summary assessment and management advice on about 300 stocks of interest to the Community. In addition, information on stocks covered from the Mediterranean has been expanded.

STECF notes that the term 'stock' in some cases, may not reflect a likely biological unit, but rather a convenient management unit. In specific cases STECF has drawn attention to this fact. STECF also is of the opinion, that as far as possible management areas should coincide with stock assessment areas.

For each stock, a summary of the following information is provided:

STOCK: [Species name, scientific name], [management area]

FISHERIES: fleets prosecuting the stock, management body in charge, economic importance in relation to other fisheries, historical development of the fishery, potential of the stock in relation to reference points or historical catches, current catch (EU fleets' total), any other pertinent information.

SOURCE OF MANAGEMENT ADVICE: reference to the management advisory body.

MANAGEMENT AGREEMENT: where these exist.

PRECAUTIONARY REFERENCE POINTS: where these have been proposed.

STOCK STATUS: Reference points, current stock status in relation to these. STECF has included precautionary reference point wherever these are available.

RELEVANT MANAGEMENT ADVICE: summary of advice.

STECF COMMENTS: Any comments STECF thinks worthy of mention, including disagreement with assessment or advice where appropriate.

STECF notes that the ICES advice is primarily based on catch options for single species, supplemented with qualitative comments pointing out links with other species taken in mixed fisheries.

Where the ICES single species advice on some stocks does not consider the catch of other species in the fisheries catching the stock under question, STECF considers that, because of the mixed fishery involving such stocks, the management measures for the stock under question should take into account the management measures adopted for other species taken in the mixed fishery, especially species for which stringent management is advised. In view of such links, STECF draws attention to its comments on the report of the SGRST Sub-group meeting's report on mixed fisheries, given in Section 9.

In addition a list of reports and publications consulted is given at the end of the document. STECF recognises that in future the format of the stock review publication may evolve, taking into account comments from users of the publication.

This 1st draft of the STECF review of scientific advice was compiled by the STECF Sub-group on Resource Status (SGRST, Chair, J. Casey) during its joint meeting with the Sub-group on Economic Analyses (SGECA) of 28 – 31 October 2002. STECF acknowledges the painstaking efforts required in compiling the draft stock review and expresses its thanks to all participants for their valuable contributions. In recognition of their contribution the list of participants is given below:

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2.2 STOCKS SUBJECT TO TAC BUT FOR WHICH ADVICE IS NOT AVAILABLE FROM SCIENTIFC BODIES

Traditionally, STECF gives a series of data for recent years on catch and corresponding TACs, based on Commission's statistics. In rare occasions STECF is able to provide with innovative information useful for management, and has generally advised that, if a TAC is to be set, it should be based on recent catches.

Again, STECF was not in a position to improve the advice given in recent years. TAC and catch data (000tons) were updated and this is shown in the following tables. Figures are taken from DG-FISH statistics. STECF notes that in nearly all cases the agreed TACs are not restrictive.

Previous comments made by STECF on these stocks remain valid.

Pollack Vb (EC zone), VI, XII, XIV

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Landings (kt)	0.22	0.34	0.33	0.50	0.40	0.31	0.22	0.31	0.23	0.22	

Pollack VII

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	14.0	14.0	14.0	14.0	14.0	14.0	17.0	17.0	17.0	17.0	17.0
Landings (kt)	5.31	5.32	6.02	5.38	6.08	5.46	5.20	3.81	3.96	5.45	

Pollack VIIIabde

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.1
Landings (kt)	1.64	1.35	1.87	1.60	1.43	1.32	1.00	1.08	1.18	1.30	

Pollack VIIIc

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.64
Landings (kt)	0.06	0.05	0.06	0.05	0.05	0.06	0.09	0.11	0.09	0.12	

Pollack IX, X CECAF 3.4.11

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Landings (kt)	0.07	0.05	0.03	0.06	0.05	0.06	0.05	0.04	0.06	0.12	

Herring VIIef

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Landings (kt)	0.36	0.76	0.45	0.95	1.0	1.04	0.40	0.68	0.71	0.67	

Whiting VIII

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	5.0	5.0	5.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	5.6
Landings (kt)	2.24	3.11	3.43	4.32	2.70	2.69	2.13	3.13	1.56	3.06	

Whiting IX, X CECAF 3.4.11

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	1.7
Landings (kt)	0.21	0.23	0.31	0.17	0.18	0.14	0.11	0.08	0.08	0.04	

Plaice VIII, IX, X CECAF 3.4.11

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.56
Landings (kt)	0.37	0.44	0.44	0.41	0.35	0.32	0.23	0.28	0.45	0.31	

Sole VIIIcde, IX, X CECAF 3.4.11

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Landings (kt)	1.28	1.37	1.20	1.25	0.98	0.96	0.97	0.90	1.02	0.98	

Horse mackerel X, CECAF 34.1.2 (EC Zone - Azores Islands)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	-	-	-	-	5.0	5.0	5.0	5.0	5.0	5.0	4.0
Landings (kt)					1.72	1.92	1.50	0.65	0.65	1.04	

Horse mackerel CECAF 34.1.1 (EC Zone - Madeira Islands)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	-	-	-	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Landings (kt)					0.39	0.76	0.66	0.34	0.56	0.35	

Horse mackerel CECAF 34.1.1 (EC Zone - Canary Islands)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	-	-	-	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Landings (kt)								0.04	-	0.08	

Common prawn, French Guyana (*Penaeus subtilis*). (PEN/FGU.)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agreed TAC	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Landings (kt)	4.0	3.3	4.2	4.0	4.3	4.0	3.8	3.5	2.65	2.65	

2.3 RECOMMENDATIONS REGARDING RECOVERY PLANS

In November 2000, ICES indicated that a number of cod stocks and the stock of northern hake were at serious risk of collapse. Norway and the European Union are co-managers of the stock of cod in the North Sea and an Agreed Record indicating, *inter alia*, the management measures which should immediately be brought in to force was signed by the two Parties on 24 January 2001. Following this a Group of experts met in Brussels from 5 to 9 March, 2001 to further consider the matter. STECF agreed in general with the findings of the Expert Group but had some reservation on the possibility of securing a recovery by technical measures alone[1].

[1] 12th Report of the Scientific, Technical and Economic Committee for Fisheries, Brussels, 02-06 April 2001. SEC(2001)1581

In addition various emergency measures covering these stocks were enacted in 2001 by the EU[2]. These were in addition to measures adopted by the EU to aid recovery of Irish Sea cod[3]. At its meeting in April 2001, STECF considered Commission Regulation (EC) No 259/2001 of 7 February 2001 which established emergency measures for the recovery of the stock of cod in the North Sea and associated conditions for the control of activities of fishing vessels. This Regulation provided for, throughout the period 14 February to 30 April 2001, a prohibition on any fishing activity within specified parts of ICES sub area IV. STECF concluded that the emergency closure alone would not achieve the desired reduction in fishing mortality on cod and pointed to the need to also reduce the numbers of juvenile cod caught, and to afford some protection to spawning adults [SEC(2001)1581, p 65].

STECF comments in relation to the emergency closure to the west of Scotland were essentially the same as those given for the North Sea. In respect of the Irish Sea STECF considered that the implementation of the Irish Sea cod recovery plan was a worthwhile attempt to improve stock status and provide a sustainable fishery. However, whether the measures are sufficient to affect a speedy recovery, the Committee concluded, remained debatable [SEC(2001)1581, p 66].

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[2] Commission Regulation (EC) No 259/2001, of 7 February 2001, establishing measures for the recovery of the stock of cod in the North Sea (ICES sub area IV) and associated conditions for the control of activities of fishing vessels.

Commission Regulation (EC) No 714/2001, of 10 April 2001, amending Regulation (EC) No 259/2001 establishing measures for the recovery of the stock of cod in the North Sea (ICES subarea IV) and associated conditions for the control of activities of fishing vessels.

Commission Regulation (EC) No 456/2001, of 6 March 2001, establishing measures for the recovery of the stock of cod to the west of Scotland (ICES Division VIa) and associated conditions for the control of activities of fishing vessels.

Commission Regulation (EC) No 715/2001, of 10 April 2001, amending Regulation (EC) No 456/2001 establishing measures for the recovery of the stock of cod to the west of Scotland (ICES division VIa) and associated conditions for the control of activities of fishing vessels.

Commission Regulation (EC) No 2056/2001, of 19 October 2001, establishing additional technical measures for the recovery of the stocks of cod in the North Sea and to the west of Scotland.

Commission Regulation (EC) No 1162/2001, of 14 June 2001, establishing measures for the recovery of the stock of hake in ICES sub-areas III, IV, V, VI and VII and ICES divisions VIII a, b, d, e and associated conditions for the control of activities of fishing vessels. C

Commission Regulation (EC) No 2602/2001, of 27 December 2001, establishing additional technical measures for the recovery of the stock of hake in ICES sub areas III, IV, V, VI and VII and ICES Divisions VIIIa,b,d,e.

Commission Regulation (EC) No 494/2002, of 19 March 2002, establishing additional technical measures for the recovery of the stock of hake in ICES sub-areas III, IV, V, VI and VII and ICES divisions VIII a, b, d, e.

[3] Commission Regulation (EC) No 304/2000, of 9 February 2000, establishing measures for the recovery of the stock of cod in the Irish Sea (ICES division VIIa).

Council Regulation (EC) No 2549/2000, of 17 November 2000, establishing additional technical measures for the recovery of the stock of cod in the Irish Sea (ICES Division VIIa).

COUNCIL REGULATION (EC) No 300/2001, of 14 February 2001, establishing measures to be applied in 2001 for the recovery of the stock of cod in the Irish Sea (ICES division VIIa).

Council Regulation (EC) No 1456/2001, of 16 July 2001, amending Regulation (EC) No 2549/2000 establishing additional technical measures for the recovery of the stock of cod in the Irish Sea (ICES Division VIIa).

Council Regulation (EC) No 254/2002, of 12 February 2002, establishing measures to be applicable in 2002 for the recovery of the stock of cod in the Irish Sea (ICES division VIIa).

A further Commission Regulation[2] (No 2056/2001), of 19 October 2001, established additional technical measures for the recovery of stocks of cod in the North Sea and to the west of Scotland. This regulation addressed the immediate requirement to reduce catches of juvenile cod by 1) establishing a general increase in the mesh size of towed nets and static nets used to catch cod and 2) introducing additional conditions to ensure that capture of juvenile cod by towed nets of mesh size less than 120 mm is reduced.

Proposals for longer-term recovery plans for these stocks were also made by the EU[4] in a series of information sheets collectively entitled "Recovery plans for fish stocks threatened with collapse". These included multi-annual recovery plans for northern hake and for cod in the North Sea, to the west of Scotland, in the Kattegat, and in the Irish Sea. In its considered response to these plans STECF[5], at its meeting of November 2001, detailed the requirements the committee considered appropriate for recovering fish stocks [SEC(2001)410, p 46]:

1. A measure of the status of the stock with respect to biological reference points.
2. A target recovery period;
3. A target recovery trajectory for the interim stock status relative to the biological reference points;
4. Transition from a recovery strategy to one that fulfils management objectives.

STECF noted that while these requirements are, to a limited extent, implicit in the Commission's Information Sheet No.1 "Multi-annual process for selection of TACs" they are not clearly stated in each case. STECF further considered that a lack of explicit objectives was a feature of the recovery programmes in place at the time for a number of stocks, most notably cod and hake, and is of the opinion that the approach adopted by the Commission should be amended accordingly. Similarly the absence of an accepted recovery trajectory does not provide for the "mid-course corrections" needed to adjust to differences between projected and realized resource status and in the risk choices of the managers relative to over-runs and under-runs of annual quotas. In addition STECF suggested that when deciding an appropriate recovery period, some multiple of the generation time of the stock concerned should be considered as appropriate: generation time is a biological consideration whereas the multiple used is a management decision.

In respect of information sheet number 2, which deals with effort, STECF considered that when using a formula to partition the required reduction in fishing effort between fleets, it is important that care be taken to ensure that the economic consequences for individual fleets are not disproportionately large for those fleets that take only small fractions of the catch of cod or hake.

In March 2002, the Subgroup on the Review of Stocks[6] (SGRST) reported on an evaluation of recovery plans detailed in a Commission proposal for a regulation that includes harvest control rules for the selection of TACs for a number of fish stocks (including northern hake, cod in the North Sea, to the west of Scotland, in the Kattegat, and in the Irish Sea) [COM(2001) 72]. STECF welcomes both this report and the report of the two-day meeting of

4 Commission document "Recovery plans for fish stocks threatened with collapse". Information sheets 1 – 6.

5 13th Report of the Scientific, Technical and Economic Committee for Fisheries, Brussels, 05-09 Nov 2001. SEC(2001) 410

6 Commission staff working paper. Subgroup on review of stocks (SGRST). Scientific Technical and Economic Committee for Fisheries (STECF), Evaluation of Recovery Plans, Brussels 20-22 March 2002. SEC(2002) 764

scientists from Norway and the Community on the evaluation of harvest control rules for North Sea cod.

In its commentary on the report, STECF[7] noted that options for recovery evaluations were constrained by the limited time available to run simulations: in particular the main component of the report deals with evaluations made using the *CS Model*. This model incorporates uncertainty in a number of population parameters, including the relationship between stock and recruitment and bias in the assessment and considers biomass and F based harvest control strategies. While this partly fulfils the requirements for evaluating specific harvest control strategies, further development of the model to identify optimal HC strategies would enhance its utility.

While STECF considered that the scenarios reported do provide useful evaluations of the presented range of management measures it further suggested that the evaluations presented represent an annual approach rather than a multi-annual approach towards stock recovery. It also reiterated its 2001 comments (outlined above) that there remains a need to specify, in each case, stock-based management objectives rather than species-based ones, with clearly defined recovery periods, and harvesting strategies consistent with the status of the stock, and the fishery with which it is concerned.

With respect to economic considerations STECF noted that the scenarios present information only on single species and single stocks and consequently the Committee could not assess the economic impact of the harvest control strategies presented. STECF also noted that whereas recovery periods are consistent within stocks they are quite extensive. Because of the need to mitigate economic impacts STECF considers that, from an economic perspective, scenarios with major short-term impacts should be avoided unless they have an extremely high probability of success.

In response to a request from the European Commission, ICES evaluated the effectiveness of the management measures described in Commission Communication, COM(2001) 72, and in particular their conformity with ICES usual interpretation of the precautionary approach.

In its reply ICES noted than an evaluation by ACFM of the current status of all stocks for which emergency measures have been applied revealed that none of the stocks currently fulfilled the condition of a spawning stock biomass (SSB) *greater* than Bpa. Further, an examination of recent fishing mortality rates compared to those of recent previous years, did not show any sign of decrease in F-at-age. In addition ICES noted that should any recovery plan be implemented, then the evaluation of stock status with regard to the details of the plan should be undertaken following implementation.

ICES also outlined an evaluation undertaken in June 2002 by the *North Sea and Skagerrak and Kattegat* Working Group. This group analysed 1) the effects of the starting population in the medium-term simulations, 2) the effect of different recruitment models, 3) the effect of bias in the assessment, and 4) software effects. The results of this comparative analysis were summarised by ICES as follows:

1. The medium-term projections were sensitive to the terminal assessment year since the **starting population in 2002** was found to be significantly reduced compared to 2001. The reduction in the starting population of North Sea cod resulted in a reduced probability of recovery from 90% in the baseline scenario to 82%.

[7] 14th Report of the Scientific, Technical and Economic Committee for Fisheries, Brussels, 22-26 Apr 2002.

2. The main factor affecting the estimated recovery time and recovery probability was **assessment bias**. Assuming a consistent 20% stock size overestimation caused a prolongation of the potential recovery time of almost 4 years.
3. Yield, SSB, fishing mortality, and recruitment projections were also found to differ for different simulation methods. **Properties of the various programs** that could be used in the simulations generated dissimilar recruitment variation.
4. As fitted, Shepherd, Beverton & Holt, and Ricker functions were found almost identical over the SSB range up to Bpa. No effect on the medium-term stock parameters could be detected.

ICES further noted that implementation error due to a lack of reliable information on catches (**e.g. discards**) and to systematic overestimation of spawning biomass (**retrospective error**) appeared to be substantial. These sources of uncertainty alone can severely compromise achieving the objectives of recovery plans, including the rapid rebuilding of spawning biomass towards Blim or Bpa.

In conclusion ICES did not accept the likely time frames to recovery indicated from the results of the stochastic simulations undertaken to evaluate harvest strategies, and also expressed doubt over the assumption of 100% implementation efficiency implied by the simulations.

STECF comprehensively reviewed the evaluation undertaken by ICES. When conducting this evaluation STECF also took account of previous work conducted at its 14th meeting of April 2002.

STECF comments in respect of the specific points raised by ICES are as follows:

1 STECF recognises that medium-term projections (of the type provided in the *CS Model*) are sensitive to the choice of **input data**. For this reason, STECF is of the opinion that when elaborating recovery programmes involving medium-term projections the most recent available information in respect of stock status must be used in every case. Specifically, STECF consider that the results provided in the report on the Evaluation of Recovery Plans [SEC(2002) 764] be updated in light of the most recent assessments for the stocks concerned.

2 STECF similarly recognises that medium-term projections (of the type provided in the *CS Model*) are sensitive to **assessment bias** including **retrospective error** that can lead to systematic overestimation of spawning biomass. For this reason, STECF is of the opinion that when elaborating recovery programmes involving medium-term projections the most recent available information in respect of assessment bias, particularly results of retrospective analysis, must be used in every case. Specifically STECF consider that the results provided in the report on the Evaluation of Recovery Plans [SEC(2002) 764] be updated in light of the most recent advice on potential assessments bias for the stocks concerned.

3 STECF agrees with ICES that various outputs can differ for different simulation methods.

4 STECF confirms that the simulations for cod are insensitive to the choice of stock recruitment relationships considered. However this may not be true for other stocks or stock recruitment relationships.

5 STECF further noted that implementation error due to a lack of reliable information on catches and **discards** poses an additional problem that can lead to systematic miscalculation of recovery trajectories. STECF is of the opinion, however, that the appropriate change in risk arising from lack of knowledge both in respect of discarding and mis-reporting is readily incorporated in the CS model projections.

In conclusion STECF consider that in order to plan and evaluate recovery strategies, predictive models that take into account the various features discussed above are a useful tool. Their application throughout a recovery period is necessary to continually monitor and refine the chosen recovery strategy.

Finally STECF echoes comments made by ICES in respect of the potential for success in any recovery scenario. Such success will depend, fundamentally, upon the ability of managers to monitor catches and discards, to adhere to the catch limit and effort reduction schemes, and to achieve reductions in fishing mortality despite assessment uncertainties. Attention has to be paid to all stages of implementation.

2.4 STECF ACTIONS TO EVALUATE LIKELY FUTURE RECOVERY PLANS

STECF, taking into consideration ICES advice on relevant stocks, considers important to organise two meetings to establish the adequate scientific framework for possible recovery plans both for Iberian Norway lobster in Divisions IX and southern hake.

*2.4.1 Norway lobster (*Nephrops norvegicus*) in Division IX.*

STECF suggests that a SGMOS meeting, to evaluate scientific information and to establish a recovery plan for *Nephrops* (Iberian Functional Units: 26-30), to be held in Lisbon (chairman to be determined) during April 2003. The meeting will be hosted by IPIMAR with the following provisional terms of reference**:**

1. Define objectives for the recovery of the Iberian *Nephrops* stocks based on biological reference points and/or other indicators, and the acceptable time-span needed to increase the stocks to levels within safe biological limits.
2. Evaluate under a recovery plan, several different scenarios based on SSB increments, F reduction and TAC constraints, taking into account the time needed to rebuild the stock to the defined safe level.
3. Considering the characteristics of the fishery (multispecies and multifleet), discuss practical management measures to achieve the objectives of the recovery plan.

*2.4.2 Hake (*Merluccius merluccius*) in Divisions VIIIc , IX and X (Southern hake)*

STECF suggests that a SGMOS meeting to evaluate scientific information and to establish a a recovery plan for Southern Hake, to be held in Lisbon (chairman to be determined) in June 2003 with the following provisional terms of reference:

1. Evaluate scenarios under different strategies, based on annual SSB increments, F reduction and TAC constraints and taking into account the time needed for stock recovery,
2. Define criteria to evaluate the performance of the different strategies (time needed for stock recovery and practical implementations) in order to establish a recovery plan for southern hake.
3. Assess the effects of species interactions under the proposed recovery plan for southern hake.

3 ANNUAL ECONOMIC REPORT 2002 AND ECONOMIC INTERPRETATION OF ACFM ADVICE

3.1 SUMMARY OF THE ANNUAL ECONOMIC REPORT

STECF has received the 2002 version of the Annual Economic Report that has been prepared by the Concerted Action 'Economic Assessment of European Fisheries' (Q5CA-2001-01502).

This report contains economic indicators regarding fisheries in twenty countries. It presents information on revenues, costs, profits, employment, value and volume of landings and fleet composition along with analysis of the main developments in 2001. It also offers an outlook on the expected economic results in the year 2002. The report presents economic results for 2001 in 75 fleet segments in the European Union, the candidate member states in the Baltic area, Iceland and Norway. The fleets surveyed represent 50-60% of the total fishery sector of Europe in terms of value and volume of landings and 35-40% of employment. Fishing fleets of the 20 countries discussed in the report employ about 246,000 people on board. The value of total production amounted to EUR 9.8 bln. Average gross value added per fisherman in the surveyed fleets' amounts to about EUR 36,000, of which a major part is disposable income.

In 2001 within the European Union some 216,000 fishermen produced approximately EUR 7.6 bln worth of fish. Average gross value added per fisherman in the surveyed fleets' amounts to about EUR 36,000, of which a major part is disposable income. Some of the segments show average crew share below EUR 10,000 per crewmember. Compared to the year 2000, the value of production has remained approximately constant, but the employment has decreased by about 5%. This implies improving results and higher increasing incomes.

About 57 segments of 70 segments analysed have achieved satisfactory to good economic performance over the period 1999-2001. These segments represent about 44% of the economic value of the surveyed fleets in terms of value of landings and 33% of employment. The results revealed that only 12 segments faced structural losses over that period. In 2001, compared to 1999-2000, 37 segments have further improved their performance, while 26 faced some degree of deterioration.

The data collected in the AER have been used in the EIAA – model calculations referred to below.

The report is available from the research institutes participating in the Concerted Action.

STECF wants to point out that in some Member States information has been produced about the economic performance of their fleets, which was not made available to the STECF. Furthermore, there is no structure for collecting other data than provided by the Concerted Action. Therefore it is impossible to analyse and to evaluate the overall economic situation for EU fishing sectors. Under these conditions STECF stresses that arrangements should be made to guarantee continuation and development of this work in the near future when the Concerted Action will end (see section 1.3.4).

3.2 ECONOMIC INTERPRETATION OF ACFM ADVICE (EIAA MODEL)

A STECF working group (SGECA) met in Brussels 28-31 October 2002 to make economic interpretation of the ICES advice on stock assessment. The work was undertaken together

with the STECF working group on stock assessment SGRST and it was the first time such an intensive joint project was planned. A copy of the report has been included in **Annex III** .

3.2.1 EIAA model calculations

The SGECA report gives an assessment of the expected economic impact of the TACs proposed by the ACFM for 2003. In a special second section it highlights the potential impact of a moratorium on fishing for cod in the North Sea on those fleets whose income is highly dependent on landings of cod. STECF stresses that the model gives a demonstration of how the different factors affecting the economy of the fishery are linked to each other taking into consideration the restrictions and assumptions. The model gives a comparative and static analysis and does not make any predictions of the future financial profitability. It just calculates the consequences of the proposed ICES advice, under the assumptions of the model calculations and with the data available. The future profitability is dependent on a series of factors ranging from cost interactions to price fluctuations, which are outside the present state of this model. Due to the lack of data and the experimental nature of the work it was only possible to run the model for 13 segments in five northern countries. The result for 2003 is summarised below:

Country	**Segment**	**Financial Profitability 1) 2003**	**Impact of 2003 TAC on Financial Profitability compared to 2002**
Denmark	Trawlers ≥ 200 GT	-8.9	Unchanged
	Trawlers < 200 GT	-15.1	Worsened
	Danish Seiners	-26.6	Worsened
	Gill Netters	-46.7	Worsened
Finland	Trawlers < 24 m	-35.2	Worsened
	Trawlers ≥ 24 m	-10.9	Worsened
Netherlands	Eurocutters 191-221kW	8.0	Lower
	Beam Trawlers >811kW	-4.8	Lower
Sweden	Pelagic Trawlers ≥ 24/20 m	4.6	Unchanged
	Cod trawlers ≥ 24/20 m	-0.6	Unchanged
	Cod Trawlers < 24 m	1.8	Unchanged
United Kingdom	Scottish Demersal Trawlers < 24 m	-10.5	Worsened
	Scottish Demersal Trawlers ≥ 24 m	2.6	Lower

Note on definitions:

"Worsened" = Segment was making losses, losses now greater.;

"Improved" = Segment was making losses, losses now smaller;

"Lower" = Segment was making profits, profits now lower;

"Higher" = Segment was making profits, profits now higher.

1) In this table defined as the ratio of net-profit and landings value

The potential impact of a moratorium on fishing for cod in the North Sea in 2003 and other TACs recommended by ACFM is summarised in the text table below. It is necessary to note that the summary only covers the fleet segments which were treated in the EIAA model, however the total coverage is 76% of the total available TAC in 2001.

Table Potential impact of ACFM advice for cod dependent fisheries assuming that TACs can be implemented independently

Country	**Segment**	**Percentage of EU TACs for cod in Baltic Sea and North Sea**	**Percentage of cod in fleet's landings value 2001**	**Percentage Change of income* 2003-average (1999-2001)**	**Percentage Change of income * 2003-2002**
Denmark	Trawlers < 200 GT	15	23	-25	-12
	Danish Seiners	3	34	-58	-2
	Gill Netters	13	57	-56	-25
Netherlands	Eurocutters 191-221kW	1	3	-10	-6
	Beam Trawlers >811kW	1	2	-32	-17
Sweden	Cod trawlers ≥ 24m	4	70	-22	1
	Cod trawlers < 24m	5	77	-23	1
United Kingdom	Scottish trawlers >24m	27	13	-26	-23
	Scottish trawlers <24m	6	9	-28	-21
Total of these fleets		76			
EU TACs (Baltic Sea, North Sea)		100			

* Gross Value Added (see appendix section 2 for definition)

STECF considered that the results in the table may underestimate the economic impact of a cod ban, because the results are based on the full utilisation of TACs, implied by single species advice, and do not take into account the economic impact of additional restrictions in TAC that might result from mixed fisheries implications of the cod ban.

The STECF recognises and greatly appreciates the success now being demonstrated in the practical co-operation between biological and economic expertise. The results have proved fruitful and the STECF intends to stimulate such interdisciplinary work in the future. The model, now being demonstrated is based on output restrictions and can be used for example where there are TAC regulations. STECF stresses:

- The need to develop and use other simulation models based on input restrictions for example in the Mediterranean.
- The coverage must increase, for example, it is also extremely important that some French and Spanish Atlantic fleet segments are included in the calculations.

3.2.2 Data collection

The close link between the data collection regulation and the work with the model was demonstrated during the session with the working group. STECF stresses the need for further considerations of the data regulations in order to harmonise i.e. definitions and to avoid other disparities that might exist in the practical collection of data in the Member States (MSs). Therefore the SGECA should be convened as soon as the Commission consider it feasible in order to assess the data collection programmes of the MSs as well as to propose improvements in the regulations. The progress made in the Concerted Action in defining the economic terms should in this task be taken on board as well as considerations on the future organisation of the economic advice.

3.3 ECONOMIC CONSIDERATIONS OF A MORATORIUM FOR COD AND HAKE

Referring to the consideration about a moratorium for cod and hake fisheries and the above mentioned potential impact on fleet segments depending on cod fisheries in the North Sea, it is important to expand advice on the use of structural instruments in a situation where a great part of the EU fishing sectors faces an economical disaster. A total ban may easily result in wrongly directed economical incentives when not carefully managed and it is expected to be a challenge to enforcement as economic forces for non-compliance will be immense.

For example, the indicative results of the EIAA analysis point out that implementation of a moratorium for cod would result in severe deterioration of economic performance of vessels that have cod in their landings. The fact that a complete ban on fishing target species of a fleet has been recommended reveals that problems with high fishing effort, discarding or enforcement are structural and must have been in existence for many years. Introduction of a total ban would turn the long existing structural problems of over-capacity into an urgent problem.

The moratorium imposed by the critical reduction of stocks will produce important impacts at social, economic and political levels. In this situation it is foreseeable that strong pressure on the politicians and the administration to introduce measures to reduce the negative effects on the sector. In this situation the advice of the STEFC is to attempt to implement these actions not as a result of pressure but as a global plan that takes into account a long-term perspective. In this perspective it is necessary that the social and economic dimension of the management instruments insure:

- On one hand to prevent the complete disappearance of the enterprises concerned, by providing short term financing and adequate support to insure the continuity of the activity after the moratorium.
- On other hand to prevent maintaining the over-capacity that has produced the reduction of the stocks. Only the necessary capacity for a sustainable fishery should remain.

In any case all other measures that alleviate the social impact providing they do not give incentives to maintain the over-capacity of the fleet can be introduced to reduce the impact of the moratorium. For example, the promotion of alternative activities, social security, etc.

STEFC advises that a specific study/workgroup can be established to indicate the adequate dimension and type of the public intervention and a global plan as mentioned above. This analysis need inputs such as:

- Biological and technical data that indicate the necessary capacity for a sustainable fishery under the normal conditions (at the end of the moratorium).
- Economical information on the fleets concerned to evaluate the short term impact on the enterprises

3.4 NECESSITY OF ECONOMIC ADVICE IN STOCK MANAGEMENT

When having a choice between different ways to implement the biological advice to increase the biomass (SSB) it is imperative to include the economic and social aspects. All attempts to find a good level of the SSB in a medium term (for example 5-7 years) will have different consequences on the performance of the fishing firms and the employment of the fishing sector.

The consequences of a big reduction of the TAC during one, two or three years may result in a major reduction of the activity of the vessels which can create a risk of bankruptcy, a lower activity in the fish auctions and in all ancillary activities, and increased unemployment in coastal areas. We should recognise that the firms have to survive in the short term and the assumption of best economic results in the mid-term is generally not sustainable for the firms. This is because the financial constraints imply that there is a large risk of payments ceasing. In this way it will be the end of the fishing firm. That means a definitive situation because it is impossible to create new fishing firms. If we stop a fishing activity it has a structural impact on the market, which was the case of the herring fishing in the North Sea where the market disappeared.

Moreover, in the analysis of the development of the activity of the fishing firms in the mid-term, we use some assumptions about the flexibility of prices, the non-introduction of new imported products etc which introduce a probability of non-realisation of the projected results from the analysis.

Even if stock size and stock safety objectives should prevail in stock management, it is not possible to disconnect recovery plans from the economic and social reality of fishery sectors.

4 DEROGATORY FISHERIES IN THE MEDITERRANEAN: "GANGUI".

STECF was requested to evaluate a report submitted in May 2002 by the CRPMEM of the French Region PACA, dealing with the biological and socio-economic impacts of the *gangui* fisheries undertook by a number of boats in the PACA region. During its 13th Session the STECF reviewed other PACA Region reports on the same subject informing to the Commission on the fisheries and elaborating some recommendations. The new PACA

Report include a scientific evaluation on the environment effects of the aforementioned gear, a regulation proposal and several Annexes, including two studies on the socio-economic and environmental impact of this fishery.

The Regulation 1626/94 of 27 June 1994 foreseen the use of *gangui* till the end of 2002 unless otherwise stated by the Council upon a proposal from the Commission.

4.1 PACA SCIENTIFIC EVALUATION

The scientific evaluation on the environmental effects of the concerned gears presented by the PACA Region reviews and comments previous STECF considerations on Mediterranean EU fisheries affected by the Council Regulation. The PACA report includes general information on the fisheries composition, however STECF doesn't consider this information sufficient (neither tables with basic information nor statistic analysis are included) to deliver a correct advise. Furthermore gangui and beach seine fisheries are presented together and sometime the information is intermingled and not clearly presented.

4.1.1 Gangui fisheries impacts on the marine environment.

The term "*gangui"* relates to several fishing practices depending both on ports and fishing periods. Several type of fisheries named as " gangui "were mentioned in the STECF 13th report (SEC(2002)410) according to the following classification:

- gangui with otterboards, where the mouth of the net, comprising a bag (codend) and two wings, is kept open by otterboards. It varies in shape and size according to the place of deployment:
- gangui with otterboards on hard bottoms are used on *Posidonia* beds situated between 12 and 28m depth;
- gangui with otterboards on soft bottoms are used at depths ranging from between 27 and 50 down to 100m;
- gangui with a net mounted on a rigid steel frame are used on sea bottoms between 15 and 35 m .
- small gangui can be equipped either with a net mounted on a rigid steel frame or with smaller and lighter doors. Such gears are used only on *Posidonia* beds between 12 and 30 m.

The gangui activity at the PACA region by type of gear is as follow:

Type	**Gear name**	**Activity (days/year)**
1	Gangui with otterboard on hard bottoms	120-130
2	Gangui with otterboard on soft bottoms	150
3	Gangui with a net mounted on rigid steel frame	100
4	Small Gangui	50

According to the report, there are 16 boats fishing with gears types 1+2+3 (group 1) in the PACA region and 15 boats corresponding to the 4 gear type (group 2). It is impossible from the report to separate the boats corresponding each type of gangui gear. The effort for the two groups could be approximately evaluated as follow:

Group	**Nº boats/Area**	**Mean fishing days**	**Effort by group (days)**
1	16/Marseille; Toulon	135	2160
2	15/Toulon ; Nice	50	750
Total	31		2.910

Annex 2 of the PACA Report shows an analysis of the effects on the marine environment exerted by *gangui* fisheries in the Toulon area. Although mentioned in the Material and Methods chapter, the document doesn't provide data on the analysed variables or numerical results on the meadows structure and on the fish assemblage. A statistical analysis of the data is also mentioned in the report but not made available to the STECF.

The study states as main results the following:

- The report agrees with the previous STECF advise related with the *gangui* impact on the *Posidonia* meadows. Density, cover area, length of the *Posidonia* leafs and other parameters measured are statistically significant lower in the fished meadow than in the control areas.
- The *gangui* with otterboards on hard bottoms exerts the biggest impacts on the meadow as a consequence of its metallic structure.
- The fishes population on the Posidonia meadow is similar in fished or not fished areas.
- *Labridae* are the dominant species along the year in the Posidonia meadows.
- Some species as *Symphodus cinereus* are more abundant at the fishing meadows but others as *Symphodus rostratus* are more abundant at the reference area.
- Total density, richness and diversity are higher meadow not affected by fisheries.
- The percentage of small and young specimens captured by *gangui* varies from 27 to 41 %.
- The number of *Posidonia* plants that are pull up by the *gangui* during fishing operation is similar to that pulled up by every anchorage operation of sportive vessels.
- Modifications on the Posidonia meadows as a consequence of the fisheries causes some modifications in the permanent meadows fishes populations (Symphodus spp., Chromis chomis, etc.)
- The reduction in the Posidonia meadow plants as a consequence of the fishery has been showed by several authors as a mechanism that increase the diversity of species due to the facility to access to more trophic resources and environments within the meadow.
- The summer increase in the number of juveniles as a consequence of the annual recruitment in many fish species doesn't represent an increase of the gangui captures mainly because during this period much of the small sizes are not captured by the gear.

According to the report the main effects on the environment for the gangui are:

- The gangui gears have an important effect on the Posidonia meadow
- The *gangui* with otterboards on hard bottoms is the most effective in capture by hour, number of captured species, etc.
- The colonisation and degradation of the Posidonia meadows are negatively affected to fisheries. Several authors verify an improvement of the meadow robustness once the fisheries on it are prohibited.
- The percentage of the captured juveniles is related with the velocity and drive of the gear (fishing technique)

4.1.2 Socio-economic impact of the gangui fisheries in the PACA region

Some socio economic information is provided in the Annex 3 of the Report. Nevertheless no data or results from the socio-economic analysis and enquiries are available to the STECF in the PACA report. The main information provide is summarised as follow:

- *Gangui*. The socio-economic analysis over the gangui fishery only concern the Toulon fishing port that concentrate the 80 % of the total PACA fleet. The fishing employment theoretically affected by a definitive closure of the fishery in the Toulon port is estimated in 30 %.
- About 41 fishermen are involved in this fishery

4.1.3 PACA Regulation Proposal

The document on the gangui and beach seine fisheries in the PACA region contains a Regulation Proposal based on:

- The difficulties to have useful data collection on landings, size class distribution, maturity ogive, fishing effort, stock recruitment relationship and other parameters.
- The difficulties to scientifically advice on the fisheries incidence in the marine environment.
- The economic and human resources that are necessary to achieve a real knowledge on the biological and socio-economic effects of this artisanal and marginal fisheries.

The Regional Committee on Fisheries for the PACA Region proposes to create a special and permanent licensing system for the 53 active boats fishing with gangui in 2001.

The licence should be equivalent to the Special Fishing Permit as defined by the Council Regulation1627/94.

The fisherman will collaborate in a specific data collection system to provide to the administration and scientist the information concerning fishing effort and production.

4.2 STECF COMMENTS

STECF notes that the May 2002 document doesn't provide any data on length size distribution of the catches or the specific composition of the yield for the different gangui gears or temporal variation of the species composition in the captures or other biological information. Such a problem was detected also in the previous scientific report.

The socio-economic annex include information on the species composition (fish, crustacean and cephalopods) by commercial categories and commercial species names for the gangui without differentiating among the different "metier". The Annex concerning to the socio-economic analysis of the fisheries provide some data tables on production and employment and some information on the effort. Nevertheless several tables are not very useful for the analysis because reporting different values from what reported in the main document. In some cases, as for the crustacean fishery, the fishing bottoms and depths are not defined. In other cases, as for the commercial category "les blancs", the list of target species include *Mullus* sp., *Sparus aurata*, but no information on sizes composition in the captures is provided in the report.

Most of the above seen problems concerning data are consequence of the lacking of official production data for these fisheries, as also recognised in the PACA report. In fact and unfortunately all the analysed fisheries are included for statistical purpose in the broad category "artisanal metier".

No information on the total capture, economic affairs or employment related with gangui fisheries is provided although some data referred to the results of a socio-economic enquire elaborated for the report are presented. Nevertheless most of the data and information on production, income and employment referred to the port of Toulon (that account for 80 % of the gangui fleet).

The lack of official statistics together the lack of specific fishing licence system do not allow to know the real fleet.

There are different areas within the PACA region where gangui are used. A total of about 31 boats are currently fishing with gangui. According to statements in the report an important reduction of the gangui fleet should have been occurred from 1997 till 2000. The gangui fleet works around 2.910 days/year.

STECF think that the PACA proposal to create a licence for the gangui is a way to maintain at least the *status quo*. However, the STECF also notes that the proposed number of licences, totalling up to 53 boats, is much higher than the fleet of 31 boats recorded in 2000.

STECF thinks that the proposal of keep continuing with this fishery, although within a more regulated framework, does not take into account the real impact of the fishery on *Posidonia oceanica* as well as on other sensitive rocky areas habitats hosting important biocoenosis for the production of littoral marine ecosystems.

STECF considers that another critical problem is the difficulties to control the remaining fleet and to preserve the equitative principle in relation with the vessels that already left the fishery in previous years. Such control difficulties are evident from the report where it is impossible to state the real number of vessels undertaking these fisheries.

In conclusion :

- STECF considers that the prohibition to trawl fisheries for operating in littoral areas should be more widely implemented and strongly enforced because of the very small mesh size trawl fishery in the Mediterranean.
- the gangui fishery is clearly a mixed unselective trawl fishery currently operating in shallow waters and very often on sensitive and protected habitats. STECF believes that other and more selective fishing gear can be used to target the same pool of species
- STECF reaffirms its comments (see the 13th STECF Report) related to the Posidonia meadows, the bio-ecological interest of the Mediterranean phanerogams and the protection of *Posidonia oceanica* (French law on the Protection of the Nature 1976; CEE

Habitats Directive 92/43 that includes the prairies of *Posidonia* within the habitats that need strong protection).

- STECF reiterates its comments on the reduction of the Posidonia density as a consequence of the gangui fisheries and the negative effects on the Posidonia reiterated once more, also by the new PACA document

4.3 STECF RECOMMENDATIONS

- STECF recommends that the Regulation 1626/94 prohibiting the use of "gangui" fisheries from 31 December 2002 be properly enforced and proposes that the prohibition of equivalent fishing practice be applied to all Mediterranean waters,
- STECF recommends the implementation of this Regulation by the French PACA Regional authorities to better protect the Posidonia meadows and the rocky littoral areas.

5 SPINY LOBSTER RECOVERY PLAN – CORSICA ISLAND (FRANCE)

STECF has reviewed the document submitted by French Administration (Comité Regional des Peches Maritimes et des Elevages Marins de Corse) for recovery plan of spiny lobster fishery in Corsican Island. A preliminary evaluation of this documents has been prepared by the SGRST-SGECA joint subgroup that meet from 28 to 31 October last. STECF endorses the conclusion of the SGRST-SGECA report (**Annex IV**).

In particular STECF wishes to point out that recovery plans should be based on reliable data analysis, including evolution of fleets, CPUE and catch data, as well as on biological data on the target species. It is also advisable that the legal framework to eventually enforce the recovery plan be provided.

Even though the provided information is very limited, the STECF recognises that the spiny lobster stock in Corsica, as well as in other Mediterranean areas, appears possibly overexploited and in some areas also heavily overexploited.

STECF notes that the structure and internal monitoring of the plan seem quite weak.

STECF believes that the proposed measures are going to produce poor or any beneficial conservation improvement either in the fishery or in the population in the absence of a more adequate limitation of fishing effort during the authorised fishing season. In addition, an improvement of the current exploitation pattern, perhaps by implementing a different and more selective fishing practice, is desirable.

The short duration of the recovery plan is certainly not adequate to achieve the expected results.

Because this is a shared stock, STECF believes that a specific assessment should be carried out by GFCM-SAC at the first opportunity. STECF recommends that data and scientific analysis for such assessment be provided to SAC.

Furthermore, since the Corsican spiny lobster is a shared stock with Sardinia (Italy), STECF believes that a possible recovery plan, to be effective, should involve both Countries concerned.

6 INCIDENTAL CATCHES OF CETACEANS

6.1 STECF COMMENTS

STECF welcomes the report of the SGFEN meeting on Incidental Catches of Small Cetaceans (SEC(2002)1134; chair Simon Northridge). This represents a considerable amount of work achieved by the participants in a short period of time. STECF considers that the report provides a very useful step forward in the provision of appropriate management advice.

The subgroup was tasked to update information on cetacean bycatch in European fisheries, and to provide advice on how best to address such bycatch at a European level.

A table of fisheries known or suspected to take cetaceans was prepared, though it was noted that the categorisation of such fisheries was to some extent arbitrary. Some cetacean bycatch has been reported in most of the major fishing gears used in Europe, though gill nets and pelagic trawls appear to contribute most records. EU fleets operating outside EU waters also catch cetaceans but were not considered in any detail.

The subgroup considered several candidate measures for minimising cetacean bycatch. Effort reduction would reduce bycatch linearly with the degree of effort reduction unless such reduction can be targeted at sectors with the highest cetacean bycatch rates. Fishery closures, spatial or temporal, would only work if areas or times of particularly high bycatch rate could be established. The subgroup was not aware of any suitable candidate areas or times. Likewise, protected areas were held to be ineffective on their own in achieving bycatch reduction targets. Exclusion devices and acoustic deterrent devices are currently being trialed in pelagic trawl fisheries, but such approaches will require further development work if they are to be effective. Acoustic deterrent devices have been widely tested and implemented in several gillnet fisheries around the world where they have been successful in reducing bycatches of harbour porpoises, common dolphins and striped dolphins. Alternative netting materials for gillnets were also discussed.

The subgroup reviewed currently available acoustic deterrent devices and some proposals were put forward for appropriate technical specifications for such devices. Concerns were also raised that in some cases, there has been insufficient research into measuring any possible negative impact such devices might have at a population level on the animals that they are designed to deter.

The subgroup updated the information given in its previous report (SEC(2002)376) on population assessment, bycatch monitoring and bycatch mitigation, including management measures currently in place. This included a discussion of the ASCOBANS Baltic Porpoise Recovery Plan, and some limited new information on fishing effort in several areas including the Channel and Biscay, on bycatch monitoring, and some revised estimates of bycatch for the North Sea and Kattegat. Some recently published accounts of bycatch mitigation trials in the Mediterranean were also included.

The subgroup considered how best to implement a bycatch monitoring scheme, and indicated that scientific observations of fishing activities were essential to provide adequate bycatch estimates. The practical difficulties of implementing such schemes were discussed. The appropriate level of observer coverage will depend on the desired level of precision in the estimate of bycatch, and upon the statistical properties of bycatch events within a particular fishery. Some preliminary information is therefore required before monitoring levels can be specified. The subgroup was able to identify several fisheries where priority should be given to the establishment of monitoring schemes (Tables 7 & 8 in

SEC(2002)1134). STECF noted that observer schemes are already in place in some of these fisheries, in particular a number of pelagic fisheries.

STECF considers that for those fleets where observer schemes are already in place these should continue in order to provide the required level of precision indicated in the tables. For those fisheries not currently covered by observers, pilot schemes should be introduced to ascertain the level of coverage required.

STECF considers that an appropriate management scheme to minimise cetacean by-catch should be established in the EU. Such a scheme should be preceded by the adoption of overall management goals. While the sub group suggested that such goals are driven by societal values rather than scientific ones, STECF is firmly of the opinion that specific management goals must be defined within a scientific framework. STECF considers that an appropriate objective for by-catch limitation would be that by-catch should have an acceptably low impact on cetacean populations.

The subgroup suggested an overall goal of restoring or maintaining cetacean populations at or above 80% of their notional environmental carrying capacity, in the long term, would be an appropriate such goal in a European context. STECF considers that to achieve this goal while laudable, is unlikely to be achieved through by-catch limitation alone.

The subgroup considered that within an overall management framework there must be a monitoring and surveillance programme to identify fishery métiers, or times and areas, where cetacean bycatch is a problem, and to provide quantitative estimates of the levels of bycatch for each species/'stock'. Timely population assessments are also required within this framework. There must be a recognised means of determining unacceptable bycatch levels, and an institutional framework for devising bycatch reduction plans where these are necessary. Beyond this, there needs to be a means of implementing any bycatch reduction plan, including methods of enforcement, and of continued monitoring and feedback to ensure the overall objectives are met.

The subgroup concluded with a series of recommendations. STECF draws the following general recommendations from the report of the sub-group:

a) A management framework, such as that described in Section 6 of the report, needs to be implemented at an EU and other appropriate management levels if cetacean bycatch is to be addressed adequately.

b) While a reduction in overall fishing effort is likely to reduce bycatch and therefore be an effective mitigation measure, limitation on the use of fishing gear, whether total or partial, could result in redistribution of fishing effort, either into other metiers, or into adjacent areas.

c) Bycatch 'hotspots' are few and might not be persistent over time. We do not recommend spatial closure on a small scale, without accompanying overall effort reduction, as an effective mitigation strategy.

d) STECF is of the opinion that acoustic pingers would appear to provide a simple, practical and relatively inexpensive way of reducing cetacean by-catches in many fixed net and drift net fisheries. Because the effectiveness of these devices and their effects on distribution are still uncertain, pinger application must be monitored and evaluated.

e) Research that characterises and quantifies noise in the aquatic environment and that assesses the effects of acoustic deterrents on the general behaviour and ecology of cetaceans should be encouraged.

f) Further research into mitigation methods including the use of rigid grids in pelagic fisheries and alternative gears should be encouraged.

The sub-group report also makes specific recommendations for certain sea areas. STECF notes that the consequences of implementing these recommendations would be severe for some fisheries.

While recognising the need to minimise the incidental by-catch of cetaceans in these areas, and with this as the sole biological objective, STECF supports the proposals.

However, STECF feels that an evaluation of the economic consequences of the proposed measures, or any alternatives that achieve the same biological objectives, should be undertaken, before endorsing the area–specific recommendations of the Sub-group.

7 MEDITERRANEAN FISHERIES

7.1 SGMED REPORT : SUBGROUP ON THE MEDITERRANEAN SHARED STOCKS

STECF was asked by the Commission to organize, in 2002, a series of meetings dedicated to Mediterranean stocks and fisheries (SEC2002 (410)). STECF was given a provisional open list of possible items that needed to be dealt with. The main aim of these meetings was to update and comment scientific technical and commercial information available on fisheries, stocks and status of marine resources. This work, together with other source of information already available to the Commission, should thoroughly inform Commission's future management proposals for the Community Mediterranean fisheries.

A sub-group on Mediterranean fisheries (SGMED) has been established with the aim to compile the available information and to comment the status of fisheries resource.

The first of these meetings was held in Brussels (4-7 September 2002; chair Mr Giandomenico Ardizzone) and was focused on "Shared Stocks in Mediterranean Fisheries" (SEC (2002)1374)

In its terms of reference, supplied by the Commission, the SGMED was asked to:

(1) - Provide a comprehensive and updated overview of shared stocks, both among EC Members and with Third Countries, by GFCM geographic areas. A scientific evaluation and critical review of the background information is expected;

(2) - Provide a comprehensive and updated overview of Mediterranean fisheries that catch shared stocks, either as target or by catch species; all technological interactions should be highlighted. These fisheries should be briefly described in terms of target species or group of species, fishing gear (average length, mesh size, hanging ratio etc.), fishing regime, catch composition, catch rates, average size of catches, size distribution of main target species, discards rate and its size composition, number of fishing vessels, economic performance, fleet dynamics and characteristics. Fishing grounds of the main target species or group of species should be mapped;

(3) - Provide a comprehensive and updated overview of maturity ogives, by length and age, for the species identified as shared stocks;

(4) - Provide a comprehensive overview, for the species identified as shared stocks, of spawning seasons (overall period and peak of spawning) and to map areas of major concentrations of juveniles (distinguishing between young of the year and other juveniles) and spawners

(5) - Provide a comprehensive and updated overview, for the species identified as shared stocks, of lengths at first capture and selectivity parameters by mesh size, hook size, mesh shape, and taking into consideration material, hanging ratio and twine thickness;

(6) - Provide an explicit ranking, by GFCM geographic area, of stocks which are at different levels of risk according to the most updated evaluation.

(7) - Determine suitable limit and target precautionary reference points (biomass, fishing mortality rate, size-limits etc..) as well as harvesting strategies for sustainable fisheries of shared stocks

(8) - Identify, to describe and possibly map essential fish habitats and benthic communities either of shallow waters or of deep sea bottoms(*e.g.* Phanerogames beds, rocky areas, ham mussel beds, white corals etc..), which are considered important for the production of marine natural systems.

(9) - Identification of gaps in the current knowledge of fishery systems and possibly future research needs.

(10) The SGMED adopted the following definition of shared stock:

(11) "Stock fished in a common area (GFCM geographic sub-areas, groups of sub-areas or the entire Mediterranean Basin) by different countries or stocks widely distributed and exploited by different Countries in different areas".

The subgroup has identified the following first list of shared stocks, taking into consideration deliberations of Regional Fisheries Organizations[8], of FAO sub-regional programs[9] as well as other available information. However, considerations on geographic contiguity, on species distribution as well as on fleet movements, could extend the list quite easily (*e.g.* small pelagic species in the Aegean Sea, small pelagic in the Ligurian Sea, blackspotted seabream in the Ionian and Tyrrhenian Seas, and others).
A second list of known potential shared stocks is provided in the report without giving details because the information is not sufficient.

[8] GFCM, ICCAT

[9] ADRIAMED, COPEMED

SHARED STOCK	ADRIATIC SEA (Albania, Croatia, Rep.of Yugoslavia, Italy, Slovenia)	GULF OF LIONS (Spain, France)	STRAIT OF SICILY (Italy, Libya, Malta, Tunisia)	TYRRHENIAN SEA – CORSICA (France, Italy)	ALBORAN SEA AND GIBRALTAR STRAIT (Spain, Morocco)	GREEK SEA (Greece, Italy, Turkey)	CENTRAL WESTERN MEDITERRANEAN (Spain,Italy,Malta,Tunisia)	ALL MEDITERRANEAN
HAKE	●	●	●	●				
RED MULLET	●		●	●				
DEEP-WATER PINK SHRIMP	●		●	●				
NORWAY LOBSTER	●		●	●				
RED SHRIMPS			●	●				
BLACKSPOT SEABREAM					●			
EEL								●
ANCHOVY	●	●				●		
SARDINE	●	●				●		
ALBACORE								●
BLUEFIN TUNA								●
SWORDFISH								●
DOLPHIN FISH							●	

7.1.1 SUMMARY COMMENTS OF SGMED

- The SGMED noted the large amount of biological and assessment data available for Mediterranean fisheries. Most of these data have been collected in the last twenty years through national and EC funded research programmes and more recently also through assistance of FAO Sub-regional projects.
- The Sub-Group noted that a stock status evaluation on a local or regional level (including one or more GFCM geographical sub-areas) is still lacking for most of the species. Only large pelagic species are regularly assessed by ICCAT also for the Mediterranean.
- The SGMED noted the lacking of appropriate studies and international agreements for the definition of Reference Points for the assessment of Mediterranean stocks. The existing historical data from trawl surveys or from other sources of information are therefore under-utilized or sometime not finalized to assessment.
- The Sub-Group emphasized the convergence of independent experts' opinion in the evaluation of the critical status of the important shared stocks in the different areas. This gives a picture of a potential risk in the Mediterranean sea: a wrong exploitation cannot be considered a national problem because of the nearness of countries and their contiguous sea space.
- The knowledge of genetic characteristics of groups of individuals of the same species in different areas of the Mediterranean sea is often lacking. Therefore assessment of shared stocks could be sometime ineffective.

As far as the status of the examined shared stocks is concerned the SGMED made the following comments:

- Hake (Adriatic sea) : growth overfishing from trawl catches can be easily detected in the last fifty years. Landings do not show a clear trend in a long-time series, but since 1993-1994 up to now a marked decrease can be observed. Also experimental data of CPUE show a sharp decline. The stock may be unable to sustain the current level of exploitation.
- Hake (Gulf of Lions) : Hake is in growth overexploitation. The biomass value shows a decreasing trend from 1988-91 to 1998-01 and is stable in the last years. Also the spawning stock seems to be decreasing.
- Hake (Straits of Sicily) : Hake is in a state of overexploitation both in the Italian and Tunisian coasts and in the international waters. The Sicilian trawler mesh-size is still 28 mm and should be increased to 40mm (UE minimum size since 2000).
- Hake (Tyrrhenian sea) : Hake is considered to be fully or overexploited all over the Italian coasts. The current level of SSB seems too low to guarantee the stock self-renewal.
- Red mullet (Adriatic sea): Most of the catch of this stock is taken in late summer or autumn and is based on the newly recruited juveniles. Therefore the fishery is prone to fluctuations in recruitment. Assessment based on trawl surveys data pointed out that total mortality is very high. In southern Adriatic a Y/R model has been applied to trawl surveys data giving a situation ranging from fully exploited to slightly overexploited.

- Red mullet (Tyrrhenian sea) : The stock is considered to be fully or overexploited all over the area. However, non negative trends in abundance derived from both fishery dependent sources and trawl surveys have been observed. The current level of SSB is too low to guarantee the stock self-renewal, especially in a case of unfavourable environmental change.
- Red mullet (Strait of Sicily) : Stock assessment of Red mullet inhabiting Tunisian waters showed an overexploitation. The MSY was overcome during the early eighties. Also for the Sicilian coasts the exploitation status of the stock exceeds the equilibrium values. The time series of biomass indices derived from trawl surveys however does not show decreasing trends in the last fifteen years.
- Deep-water pink shrimp (Adriatic sea) : The stock is distributed mostly on slope bottoms in the eastern part of the Central and Southern Adriatic sea. The stock abundance seems quite variable from year to year.
- Deep-water pink shrimp(Strait of Sicily): Since the eighties deep-water pink shrimp is showing an exploitation rate that is higher than the optimal. A late nineties evaluation confirmed overfishing and assessed an increase of 4-6% in yield per recruit and of 25-30 % of income per recruit if the 40 mm mesh-size was adopted. These results are not clearly linked to the increase in biomass indices from trawl surveys.
- Deep-water pink shrimp (Tyrrhenian sea) : The results of the trawl surveys and commercial fishing gave a very similar picture, pointing out a noticeable inter-annual fluctuation of *P. longirostris* abundance. Apart from environmental conditions that may markedly affect the stock, this variability should be related to the peculiarities of the species - characterised by a short-life span and fast-growth rates and to different exploitation rates over the years. Results of analytical models of evaluation in this area showed a generalised slight overexploitation status of this resource.
- Norway lobster (Adriatic sea) : Stock assessment has been conducted only on portions of the stock and should be considered with caution. The condition observed was always of full exploitation or overexploitation. Assessments carried out until now cannot quantify the amount of effort reduction needed.
- Norway lobster (Strait of Sicily) : Assessments carried out in the late nineties suggested an overfishing status. However the indices of biomass from trawl surveys are quite stable in the last years. The prolonged maturity and spawning period reduce the effectiveness of management tools such as the seasonal fishing ban.
- Norway lobster (Tyrrhenian sea): The stock is considered to be not homogeneously exploited. No negative trends in abundance derived from fishery dependent sources or from trawl-surveys have been observed. The current level of the SSB is acceptable in some areas while it is too low in other areas. This fact may not guaranty the species self-renewal everywhere, especially in the case that unfavourable environmental changes may occur. The size at first capture seems in general adequate while fishing pressure seems to be moderate or in some grounds excessive.
- Red shrimps (Strait of Sicily) : A decrease of catch rate in the main red shrimp fishing grounds occurred from the sixties onwards . Predictive models show an increase of 8-10% in yield and 11-17% of income per recruit if the 40 mm mesh-size were to be adopted. No evident nurseries were identified for red shrimps.
- Red shrimps (Tyrrhenian sea) : Stock assessment seems to indicate a condition near to the equilibrium or only a slight overexploitation. However in some cases a tendency towards growth over-fishing was detected. For example in the northern

Tyrrhenian Sea a substantially lower size at first capture than the size of maximum reproductive potential is reported .

- Blackspot seabream (Alboran sea and Gibraltar Strait) : There are clear indications that the stock is under high risk of collapse and the stock can no longer sustain profitable fishery. The Andalucia region presented a recovery plan. An *ad hoc* STECF WG examined the plan and suggested the approval if enforced under a series of condition.
- Eel (Mediterranean sea) : A wide decline all over Europe(including the Mediterranean) in recruitment and in total catch is confirmed. There are strong evidences of a process of contraction of the stock, emerging from both official landing statistics and from long-term observations in selected systems**.** Silver eel fishing at fish barriers, typical of the Italian tradition and spread also in other Mediterranean countries, can be considered to take up to 100 % of the spawner escapement. An important increase of the aquaculture production with wild juveniles is reported.
- Small pelagics (Adriatic sea) : Anchovy (SCSA 2002) :the estimated stock biomass of Adriatic anchovy by VPA showed a strong fluctuation during the observed period (1975-2001). Collapse occurred in 1987 and the recovery of the stock biomass shows a positive trend. Nevertheless, the biomass level has not reached the previous higher values. Sardine (SCSA 2002): the estimated stock biomass of sardine by VPA showed a peak between 1983 and 1985, then a gradual decrease appeared and the stock reached its lowest value in 1999. In 2000, and in a stronger way in 2001, the sardine estimated biomass increased.
- Small pelagics (Greek seas): There have been suggestions that the anchovy stocks in the Greek seas are facing an overfishing problem that is a warning for a potential depletion. The information about anchovy stocks in the central Greek seas is very limited. There is evidence that in the Greek and neighbouring Seas there exist several different stocks of anchovy due to barriers in gene flow. The knowledge of the sardine stocks inhabiting the central Greek Seas is very limited.
- Small pelagics (Gulf of Lions) : Anchovy: SCSA and SAC recommended not to catch individuals smaller than the length at first maturity to avoid the risk of recruitment overfishing.
- Albacore (Mediterranean sea): Albacore is one of the most relevant species among the Mediterranean large pelagic ones. No stock assessment is available for the Mediterranean. National authorities often underestimate the albacore fishery and this fact creates serious problems for the data collection.
- Dolphin fish (Mediterranean sea): No stock assessment information is available for the Mediterranean. The movements of dolphin fish in the Mediterranean are not well known. The situation created by the strong development of the dolphin fish fishery in the central Mediterranean sea is inducing several problems: modification of the sea floor (stones used for FADs), interference between fishing systems and a strong increase of the fishing effort.
- Bluefin tuna (Mediterranean sea): The results of the last assessment meeting for bluefin tuna belonging to the Eastern and Mediterranean Stock (Madrid, 22-30 July. 2001) were more optimistic than previous assessments. The decline of the spawning stock biomass was lower and the recruitment seemed to be higher. Nevertheless, the fishing mortality is 2.5 times greater than the F_{max}. The analysis showed that fishing mortality has considerably augmented for fish belonging to the 8+ age-class since

1993. On the other hand, long term projections have shown that, following current fishing patterns, the long term yield is going to be about 25 000 MT.

- Swordfish (Mediterranean sea) : The present condition of the Mediterranean swordfish stock is not known. ICCAT performed a preliminary assessment in 1995 that revealed that the stock might be close to over-exploitation. However, the assessment was not considered sufficiently reliable for an in-depth evaluation of the state of the stock as the available time series of data was rather limited. A more recent assessment based on Greek and Italian data, which was performed within the frame of the EC project 98/034, suggested the presence of a rather stable situation in terms of mortality and recruitment, but small fishes represents a large part of the catches.

7.1.2 STECF RECOMMENDATIONS

The STECF has thoroughly discussed the results of the sub-group and draws the following general recommendations from the report of the sub-group SGMED:

- The full exploitation or overexploitation status for most of the important Mediterranean shared stocks call for a regular monitoring of these resources and related fisheries as a top priority in the following years. The STECF considers important a periodic stock assessment at a basin level for the most important Mediterranean shared stocks.
- The lacking of agreed Precautionary Reference Points for the evaluation of the Mediterranean fishery resources status reduces the potential use of the large amount of existing data. The STECF recommends a specific work of experts finalized to the selection of RPs to be adopted at basin level.
- Because of the general need to reduce overexploitation as well to improve the exploitation pattern of many demersal stocks, STECF stresses the importance of adopting technical measures such as periods of fishing bans, protection of nursery areas and improvement in selectivity of the fishing gear .
- Considering the management of shared stocks divided by geographical sub-areas, the STECF suggests the promotion of studies to improve knowledge upon spatial distribution, movements and genetics of the main fishery resources to strengthen the scientific basis upon which base management actions.
- The STECF recommends the improvement of catch data monitoring at Mediterranean basin level.

Regarding the status of the shared stocks examined STECF considers important to point out the following recommendations:

- Hake (Adriatic sea): Avoid trawl fishery on nursery grounds (the nursery areas are well known and mapped). Control the fishing effort (also through temporary and spatial bans) both for trawlers and fixed gear.
- Hake (Gulf of Lions): Reduce the effort of longlines and gillnets in order to increase the SSB. A reduction by 20% of the fishing effort has been recommended by GFCM. Ensure proper enforcement of the current minimum landing size of 20 cm
- Hake (Straits of Sicily): Avoid any increase in number of trawlers. Adopt the 40mm minimum mesh size . Reduce the trawling time to decrease the fishing effort. Close the main nurseries areas.
- Hake (Tyrrhenian sea) : Protect nursery areas with temporal or stable closures. A moderate reduction of the effort is recommended in order to drive the SSB to a safer

level. The size of first capture should be increased because the mesh size currently in use captures 8-9 cm TL individuals.

- Red mullet (Adriatic sea) : The current trawl fishing ban within the three miles strip from the coast or at depth less than 50 m should be properly enforced. The trawl fishing ban during part of late summer-autumn, as implemented in Italian waters, should be considered in the whole Adriatic.
- Red mullet (Tyrrhenian sea) : A seasonal closure during the period of post-recruitment could be theoretically efficient in order to delay the catch of newly settled individuals. A reduction of effort should be encouraged, at least in some areas. Mesh size currently in use determines a length of first capture smaller than the legal size. The enforcement of spatial and temporal closures can determine an increase in the above mentioned size. Improvement in trawl selectivity is needed.
- Red mullet (Strait of Sicily): Avoid any increase in number of trawlers. Adopt the 40mm minimum mesh size . Eliminate the trawling on recruits inhabiting the coastal water strictly enforcing the existing normative. Prohibit trawling during the night to contrast illegal fishery. Adopt a trawling ban to protect the recruits movement towards deeper waters.
- Deep-water pink shrimp(Strait of Sicily): Avoid any increase in number of trawlers. Adopt the 40mm minimum mesh size. Reduce the trawling time on the main nursery grounds. Decrease the fishing effort.
- Deep-water pink shrimp (Tyrrhenian sea) : Nursery areas of relatively high importance were already identified and mapped. An area closure should be useful in order to protect these vulnerable individuals. The mesh size currently in use defines too small a size of first capture for *P. longirostris*. The best way in order to increase the size of first capture can be to avoid fishing grounds where small specimens are concentrated or by enforcement of temporal or total closures of defined areas.
- Norway lobster (Adriatic sea) : Fishing regulations based on mesh size should take into account that all Norway lobsters are retained by the current 40mm mesh size. Assessment carried out until now cannot quantify the amount of effort reduction needed. Effort regulation appears to be a rather more realistic option .
- Norway lobster (Strait of Sicily): Avoid any increase in number of trawlers. Adopt the 40mm minimum mesh size . Reduce the trawling time to decrease the fishing effort. Improve the technological features of the gear in order to modify the selectivity and to protect the bottom .
- Norway lobster (Tyrrhenian sea): Considering that the *Nephrops* grounds in the area are not exploited everywhere with homogeneous rates, no management recommendations that could apply to the whole area can be made for this species. However a fishing effort reduction is advisable especially in the southern portion of the area where the species suffers a higher fishing pressure.
- Red shrimps (Strait of Sicily): Avoid any increase in the number of trawlers. Adopt a minimum mesh size larger than 40mm (48-56 mm) for trawlers targeting shrimps. Post-pone recruitment to gear through an *ad hoc* fishing ban during spring
- Red shrimps (Tyrrhenian sea): Despite the fact that these resources are subject to a high fishing pressure, it is currently thought that they can sustain the actual levels of exploitation. Assessment of the stocks evidenced the importance of the reduction of the fishing effort during the recruitment period and also focused on the importance of a slight increase of the size at first capture.

- Blackspot seabream (Alboran sea and Gibraltar Strairs): The stock shows clear signs of heavy overexploitation. STECF suggests that a recovery plan may be needed under condition explained in the STECF ad hoc working group . SEC (2002)888.
- Eel (Mediterranean sea) : It has been recommended that an international commission for the European eel management be formed, to coordinate monitoring and research, and that a recovery plan for the eel stock be prepared as a matter of the utmost urgency (ICES, 2001, 2002). ICES/EIFAC WG on Eel also recommends that the monitoring of recruitment, stocks and fisheries be sustained, and that ICES countries report annually on trends on their local populations and fisheries (ICES, 2002). It is advisable that such initiatives be brought into action, and that the Mediterranean situation be represented and considered with the utmost attention. Therefore, on the short term it would be advisable that the European eel be inserted in the species list within the GFCM, because this could allow to extend and update the information on this species in the Mediterranean area. Likewise, it would be advisable that European eel be included in the Reference species list, for ICES areas and for the Mediterranean, of Council Regulation (EC) No 1543/2000, establishing the Community framework for the collection and management of the data needed to bring forth the scientific evaluations needed for the Common Fisheries Policy.
- Small pelagics (Adriatic sea):
  - *Anchovy* Considering that the present amount of catches (20,542 tons, average catch on the 1999-2001 period) is about 17% of the estimated biomass, the current level of fishing effort should be maintained or slightly increased.
  - *Sardine*. As the present level of catches (18,800 tons, average catch on the 1999-2001 period) is about 18% of the estimated biomass, the current level of fishing effort could be moderately increased. Monitoring of sardine discards at sea is recommended. It is also recommended to improve the collaboration between Adriatic countries, so as to study and to exploit jointly anchovy and sardine, the most important shared stocks of the Adriatic sea.
- Small pelagics (Greek seas) :
  - *Anchovy* (Central Aegean and Ionian Sea). A shift of the ban period for purse-seines from December-March to September-October (during the recruitment period) will reduce the fishing effort on the small individuals (EU 97/048,). Due to high inter-annual variability of the biomass of small pelagic stocks, it isn't possible to give management suggestions without more recent data.
- Small pelagics (Gulf of Lions):
  - *Anchovy*. STECF agrees with SCSA and SAC recommendation not to catch individuals smaller than the length at first maturity to avoid the risk of recruitment overfishing.
- Albacore (Mediterranean sea): STECF agrees with the ICCAT-SCRS recommendations, that reliable data on catch, effort, and size should be provided as a first priority for the stock. Efforts to have more detailed and constant information on the larval and juvenile distribution should be supported.
- Dolphin fish (Mediterranean sea): STECF agrees with the ICCAT-SCRS recommendations, that reliable data on catch, effort, and size should be provided as a first priority for the stock Studies to collect information useful to assess the environmental impact of this activity should be supported.

- Bluefin tuna (Mediterranean sea) : STECF recommends a strict enforcement of the new measures to protect juveniles and to regulate the fishing effort to support the adopted TAC. Tuna farming is also to be strictly monitored.
- Swordfish (Mediterranean sea): STECF agrees with the ICCAT-SCRS recommendation about the necessity to have a comprehensive stock assessment for Mediterranean swordfish to better evaluate management measures. Protection of juveniles is a priority and a closing season for at least two months between September and February would reduce their catch and reduce overall fishing effort. A minimum size should be at least 110 cm LJFL, but better biological data should be necessary

7.2 PLANNING OF SGMED MEETING IN 2003

7.2.1 Fleets, Technical Measures and Alternative Management Options in Mediterranean Fisheries

The STECF was asked by the Commission to give an overall knowledge of the fishing activity of the E.U. Mediterranean Countries. Three SGMED meetings were proposed (14th STECF Rapport) to complete a first overview over the Mediterranean Fisheries. A first subgroup on shared stocks was celebrated in September 2002 and the results reported on the document presented in this STECF plenary meeting. The second subgroup should have define the Mediterranean EU fleets, the applied and potential technical regulations and pros & cons of different alternative management options. After the publication of the Commission Communication on a Mediterranean Plan of Action [COM(2002) 535 final], it has been considered more useful to modify the terms of reference as follows:

1. Classify the Mediterranean fleets in E.U. Countries;
2. Describe the fishery features [i.e. fleet, gear characteristics (mesh size, hanging ratio for active and passive gears, hook sizes etc.), fishing seasons and areas, main target species, catch composition and discards] etc.;
3. Specify where the fleet is located and how operates over the time;
4. Summarise the needs of fishing effort reduction for different stocks in different GFCM geographical sub-areas;
5. Evaluate the relationships between fishing effort, fishing mortality, catch rates and fleet capacity for the most important fisheries;
6. Indicate alternative options of fishing effort reduction to achieve equivalent reduction of fishing mortality to keep the stocks status within precautionary safe biological limits;
7. Evaluate and comment, as appropriate, inconsistencies of current mesh sizes and minimum landing sizes;
8. Identify the desirable length of first capture for major stocks.
9. Predict short and long-term results in catches, biomass and economic consequences under the assumption of increase selectivity in appropriate Mediterranean fisheries catching shared stocks, to respect the current minimum landing size and to set the length at first capture to the length at first maturity.

A meeting (chair Mr Gaetano Messina) will be held in Brussels before the next STECF meeting of April 2003.

7.2.2 Social and Economic aspects of the Mediterranean Fisheries

After the elaboration of the SGMED reports on shared stocks and fleets and technical measures respectively, the last meeting will address the social and economic aspects of the Mediterranean Fisheries. STECF believes that this meeting has to consider also the Commission Communication on a Mediterranean Plan of Action [COM(2002) 535 final], in particular, as to the need to present some basic harmonised information to evaluate the social impact of the plan, to the financial needs, to the effects on the consumers, to the management cost and to the possibilities of developing an effective control to assure the real application of the proposed management actions.

The terms of reference of such WG shall be the following:

1. Employment by fleets and areas: basic figures and characteristics.
2. Investments by fleets in EU area (and candidates?)
3. Value of landings (distribution and time evolution) by fleets
4. Basic accounts of the fleets: wages, costs
5. Relative overcapacity: possible methodologies and description of basic trends.
6. Market characteristics: channels, control, prices.
7. Basic national control systems: institutions, legislation, resources and running cost

A meeting (chair Mr Ramon Franquesa), is proposed to be held at May 2003 in Barcelona.

8 ELASMOBRANCH FISHERIES

STECF reviewed the report (SEC(2002)1160) of the subgroup on Resource Status (SGRST) Elasmobranchs Fisheries (chair Mr Henk Heessen).

STECF welcomes the report of the SGRST meeting on Elasmobranchs Fisheries. This represents a considerable amount of work achieved by the participants in a very short period of time. STECF considers that the report provides a very useful first step forward in the provision of management advice in Elasmobranchs Fisheries. STECF has highlighted the overall conclusions for future development of advice in Elasmobranchs Fisheries.

So, STECF endorses the following main conclusions of the report:

- New meeting of the Sub-Group, in 2003, to update the information presented in the report;
- Give high priority in market sampling and observer programmes to provide information on species compositions of catches and landings under the National Programmes on data collection;
- Collect the detailed species-specific data on length, weight, sex, age, maturity, etc. The selection of species could be based on member states' share of landings;
- Improvement on the knowledge of the species biology (age-specific data on natural mortality, reproduction, spawning areas, etc);
- Improvement on data quality for pelagic and deepwater sharks caught in international waters;
- Correction of taxonomic errors included in guidelines for the Data Sampling Programme. Urgent need for a user-friendly fishermen's identification guide for elasmobranchs in European waters, including the Mediterranean;
- Exploration of the archive of survey data for construct abundance time series;

- Exploration of the catch and effort data from the commercial transactions in order to obtain more information;
- Analyse the surveys and observer programmes data to provide information on vulnerability and stock status of less common elasmobranch species.
- The Biodiversity conservation and the threatened status of rare species is required to allow an evaluation of the ecosystem effects of fishing on these vulnerable species.
- DELASS project has considerably improved elasmobranch assessment methodologies in NE Atlantic stocks. The poor available data was the main impediment to further progress so, a follow-up project, focusing on collection of the strictly-specified data, should be urgently considered.

STECF considers that the advice on elasmobranchs fisheries depends greatly on elasmobranch catch statistics either as target or by-catch species and therefore that a requirement within the data regulation (1639/2001) to record catch statistics by species would greatly improve the quality of elasmobranch assessments and the resulting advice.

STECF suggests that attention must be paid to elasmobranchs in the Mediterranean Sea, with a view to collecting data and information for consideration at a future meeting and/or by a specific project.

9 MIXED FISHERIES

STECF reviewed the report of the subgroup on Resource Status (SGRST) dealing with mixed fisheries SEC(2002) 1373 (chair Mr Stuart Reeves).

STECF welcomes the report of the SGRST meeting on Mixed Fisheries. This represents a considerable amount of work achieved by the participants in a very short period of time. STECF notes that the constraints in time and the data available appear to have constrained the approach taken. STECF considers that the report provides a very useful first step forward in the provision of management advice in mixed fisheries. STECF has highlighted below the main issues for future development of advice in multispecies fisheries.

9.1 SPECIES CONSIDERED.

The species considered by the study group are generally thought to be the most important species for consideration, however, STECF would like to endorse the view of the study group that there is an urgent need to include catches of fleets which target *Nephrops* in the analysis.

9.2 USE OF LANDINGS DATA

Most of the analysis has been carried out using the official landings data by fleet and by country. This was the only data available. Data on discards have only been included for haddock and whiting, where they are explicitly included in the assessments. The report notes that for these species up to 70% of catches by weight could not be allocated to fleet mainly due to discarding. For cod and saithe the unallocated component, ignoring discards, was 30% and for Sole and Plaice it was 10%. STECF is concerned that evaluation of mixed fisheries advice through landings may seriously distort the impact of some fisheries. To obtain realistic predictions of catch in a multispecies fishery constrained by TAC it is important to consider total catch (both landings and discards), otherwise the results may reflect only the TAC already in place. The unallocated proportions for cod saithe, plaice and

sole may be greater if discards are included in the analysis. While STECF considers that the analysis provided gives a reasonable basis for exploration of the issues and methods required to provide multispecies advice, the failure to include discards (or bycatch) in the analysis will bias the results if discarding of other species is at high levels.

9.3 FLEETS

The fleet segmentation used in this analysis is chosen to reflect the functional units in the fisheries (métiers) and not those that conform to the MAGP segments and the data regulation (1639/2001). The analysis presented was carried out both by fleet using landed tonnages assuming a single selection pattern, and by country using catch at age. While the reported results are similar for fleet based and country based analyses though as the report indicates the fleet based approach allows greater flexibility of response to management constraint and provides slightly better catch options ie. Options which conform more closely to the desired Fs. As the report indicates it is very important that fleet segmentation must match the fleet management capabilities. Segmentation should be properly chosen taking into the ability for moving catch between fleets. Well specified fleets that reflect groups of vessels have a defined catch selection pattern will allow for the most flexible and therefore optimal solution to mixed fishery allocation. Combining fleets with diverse catch characteristics will reduce flexibility. If necessary fleets can be specified by area or by season reflecting the possibility of seasonal and spatial restriction. It is therefore important for the future developments that fleet segmentation be defined at the appropriate level such that the métier has:

A homogeneous group of vessels with similar gears and fishing patterns,

Sufficient data to describe catch of the métier,

A distinct group of vessels that can be allocated a quota.

9.4 METHODOLOGY.

Generally the methodology is appropriate to provide mixed fishery advice. However, the multispecies modelling method chosen assumes that the species composition by fleet is maintained when switching catch between fleets. While this may be acceptable for small adjustments to fisheries, this may be a demanding assumption for the level of change in fishing pattern that has been examined for the mixed fisheries that catch cod in North Sea. STECF considers that a selection patterns and species composition will need to be re-evaluated once mixed fisheries management is implemented.

9.5 CHOICE OF SCENARIOS

The report provides 3 management methods for apportioning catch between fleets, and a number of management objectives for restraint of catches of cod and other species. The report explicitly indicates that the different management objectives are provided as examples and their choice lies with managers, however, the 3 management methods chosen to apportion catch are also management choices. The three presented do not cover all the options, rather they show the extremes of choices available. These or some other options that lie between them may need to be made available as management choices. As indicated in the text it may be useful to constrain the choices to those that conform to the agreed total national share of TAC.

It would be useful to include the implications of economic issues within the management options. Including economic parameters will change the results of different scenarios. Rather than using catch in weight by species to apportion catch options, it is more appropriate to use value of the catch. Data on prices by species and by fleet is available. Including income or value added would be preferable from economical point of view but requires cost and earnings data that are not yet available for all fleets.

9.6 AREA SPECIFIC RESULTS

North Sea

STECF draws the following main conclusions from the North Sea analyses:

- According to the data available to the Group, there are no demersal fisheries in the North Sea which do not catch some cod.
- Managing all other demersal species according to the single species advice will not achieve a substantial reduction in F for cod.
- An effective reduction on fishing mortality on cod will also require a substantial cut in F of the other demersal species in the North Sea, and for many species a reduced TAC.

At the Commission's request a specific selected example of model input and output has been included in the report as **Annex 5.** Other possible options can be found in the report of the subgroup. STECF endorses the general methodology behind the model but have not validated the numerical calculations and the results cannot be guaranteed as correct. The data used to provide input to the model should be viewed with caution. The limitations are:

catch is taken as landings only, excluding discards,

A common age structure is applied to all fleets

Nephrops catches are excluded

high proportions of catches (up to 70% for haddock and whiting) are not allocated to fleets

The input options for the model run, which are given in the appendix were specified by the Commission. The results are sensitive to the choice of weighting factor and the method chosen for apportioning reduction between fleets (see choice of scenarios above), these management choices have been taken by the Commission. **STECF notes that these are not the only possible management objectives and other choices based either on biological or economic criteria could also be evaluated .** The model assumes stability of species linkages; this stability cannot be expected, given the associated changes in fishing opportunity implied by the resulting changes in TAC and any technical measures that are to being implemented in 2001 and 2002. STECF is not able to validate the suitability of the input data, the numerical veracity of the output or endorse the choice of this run as an appropriate management option.

West of Scotland

STECF notes that no analysis was conducted for this area. STECF considers that an appropriate analysis should be conducted before the results of a mixed fisheries management model are applied to this area.

Irish Sea

STECF notes that no analysis was conducted for this area. STECF considers that an appropriate analysis should be conducted before the results of a mixed fisheries management model are applied to this area.

Southern Shelf

The report contains a good qualitative description of the fisheries in this area

STECF endorses the view that the analyses presented for the southern shelf are not definitive. The two datasets presented on stocks of the Southern Shelf must be taken with caution and can only be used for exploratory analyses. Both data sets contain many assumptions and the validity of which has not been checked. These datasets provide only a rough approximation to the true catches by fishery unit.

The present allocation by gear/FU does not take in account the constrictions for each country caused by the present TACs and Quotas system. Data on the total catch (discards and landings) need to be assembled before realistic evaluations of these cod and hake fisheries can be carried out. In consideration of these points STECF agrees that the results runs presented in the report should not be used for management purposes.

STECF considers that an appropriate analysis should be conducted before the results of a mixed fisheries management model are applied to this area.

9.7 OVERALL CONCLUSIONS

STECF draws the following main conclusions of the report

- Management on a single-species basis is unlikely to be effective in any of the areas considered because virtually all demersal fisheries catch a mix of different species.
- Managing demersal species according to the single species advice ignoring multispecies considerations will not achieve appropriate F for all species
- Despite the current limitations of the input data (incomplete catch data and sub-optimal fleet segmentation) the report provides a useful first step in providing mixed fisheries options for management and a basis for moving forward with the provision of mixed fishery options and advice for the future.
- The method requires further dissemination to fully evaluate its utility and to allow other management options to be explored.

9.8 FUTURE WORK

STECF considers that the provision of mixed fisheries advice can be improved in the future by addressing the following issues:

1. Agreement on a set of fleet métiers that conform to manageable units and for which total catch data can be assembled.
2. Ensure that a high proportion of total catch of the species of interest (90% of total catch) is covered by these fleets.
3. Quantify catch (both landings and discards) for these fleet métiers.
4. Obtain and incorporate economic data for fleet métiers

5. Define with managers the range of methods to be accepted for apportioning of catch among fleets.
6. Define the scope of overall objectives (biological, economic and social) that managers require to be considered for each mixed fishery.

In choosing the appropriate métiers STECF suggests that:

- There must be sufficient data to describe the catch of each métiers,
- Metiers must be administratively identifiable
- The total catch of all métiers must represent at least 90% of the total catch of the mixed fishery.
- A larger number of métiers provides greater flexibility in managing mixed fisheries.

STECF considers that although the current provisions for discard data collection in regulation 1639/2001 will improve the situation from 2001 onwards it may not ensure that sufficient sampling of the discarded component of the catch is achieved in all cases.

10 SANDEEL FISHERY

10.1 BACKGROUND.

In 1999 the U.K called for a moratorium on sandeel fishing adjacent to seabird colonies along the U.K. coast and in response the EU requested advice from ICES. An ICES Study Group, was convened in 1999 in response to this request with two terms of reference (ICES 1999):

a) assess whether removal of sandeel by fisheries has a measurable effect on sandeel predators such as seabirds, marine mammals, and other fish species.

b) assess whether establishment of closed areas and seasons for sandeel fisheries could ameliorate any effects. Identify possible seasons/areas as specifically as possible.

This study group noted that there was suggestion of a negative effect of the Firth of Forth fishery on the sandeel stock in 1993 which coincided with a particularly low breeding success of seabirds, especially kittiwakes.The study group concluded that there were two reasons for continued concern about this area:

1. sandeels supported a number of potentially sensitive seabird colonies
2. work on stock structure indicated that sandeels in this area are reproductively isolated from the main fished aggregations in the North Sea.

The ICES study group noted that, as sandeel assessments are only conducted for the North Sea there was no reliable information on the state of the sandeel aggregation near the Firth of Forth. Given available information the study group proposed that kittiwake breeding success was the best practical indicator of sandeel availability at least to seabirds. This proposal was based on simulations indicating that kittiwake populations will decline with a breeding success of 0.5 fledged chicks per well-built nest, and increase with breeding success greater than 0.7 fledged chicks per well-built nest. The Study Group therefore recommended using these values as thresholds to close and re-open, respectively, the sandeel fishery near the Firth of Forth. As breeding success of kittiwakes had declined to less than 0.5 fledged chicks per well-built nest the study group recommended that the sandeel fishery west of 1^{o} W near the Firth of Forth be closed. It was further recommended

that during the period of closure a very limited commercial monitoring fishery should be conducted in order to maintain a time series of commercial CPUE and biological sampling data on sandeels in this area.

The ICES Advisory committees (ACFM and ACE) accepted the advice from the study group. STECF (1999) agreed with this ICES advice and the EU advised to close the fishery whilst maintaining a commercial monitoring. A 3-year closure, from 2000 to 2002, was decided and the Commission was requested to produce annual reports to the Council on the effects of the restrictions in the sandeel fishery in the Firth of Forth area.

10.2 TWO REPORTS WERE PRESENTED TO STECF IN NOV. 2002:

1. European Commission's annual report on the impact of the Northeast sandeel fishery closure and status report on the monitoring fishery in 2000 and 2001 [10]

2. Report on the commercial monitoring fishery directed towards sandeel around Wee Bankie in 2001 (Jorgen Dalskov & Palle Brogaard).

This report contains the fishery data analysed in the annual report.

The annual report presents:

- Information on fluctuations in abundance of sandeel in the Firth of Forth area (referred to as 'Area 3'), both the area closed to fishery (except the 'monitory fishery') since 2000 and the remaining area with open access.
- Information on fluctuations in breeding success of the 3 sea bird species: Kittiwake (*Rissa tridactyla*), shag (*Phalacrocorax aristotelis*) and Guillemot (*Uria aalge*), all of which feeds on sandeel.

The first 2 sections of the report gives overviews of the sandeel aggregations and the fishery in the Firth of Forth area.

When comparing with the rest of the North Sea, several different factors indicate that the sandeel in the Firth of Forth area is reproductively isolated from the populations in the rest of the North Sea. As for the aggregations, the high-density patches of sandeels at Firth of Forth banks are far less extensive than those from around Dogger Bank and Fisher banks.

The fishery for sandeel in the Firth of Forth area is conducted by Danish vessels and begun in 1985. Information on the distribution of the fishery by ICES rectangle is available from logbook records. Furthermore, mapping of the sandeel fishing grounds is an ongoing project at the Danish Inst. for Fishery Research. However not all grounds have been mapped yet.

The report shows the catches by ICES rectangle in 'Area 3'. It also gives the catches by vessel size category.

Section 3 presents estimates of the fluctuations in sandeel abundance in the Firth of Forth area. 3 different measures are presented:

A. Analyses of commercial CPUE data

B. Dredge survey data

C. Acoustic data.

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[10] P.J.Wright, H.Jensen, H.Mosegaard, J.Dalskov, S. Wanless – 30 September 2002: European Commission's annual report on the impact of the Northeast sandeel fishery closure and status report on the monitoring fishery in 2000 and 2001

10.2.1 Analyses of commercial CPUE data.

These are based on CPUE from Danish logbook information for the period 1982 – 2001. The method of analysis is ANCOVA (analysis of co-variance) using the GLM procedures available in SAS™ software. 5 models were used. Altogether the following factors influencing abundance fluctuations were considered:

Vessel size, year, month, week, rectangle, sub-area (closed/open).

A detailed description of the various models are given in the report together with the results. Of particular relevance are analyses of the performance of the 3 vessels conducting the monitoring fishery in the closed area. Due to difference in CPUE between these 3 vessels the fluctuation in CPUE was analysed separately for each vessel. It is noted that, although the estimated mean CPUE is higher in 2000 and 2001 (closed) than in the period 1993-99, it was not significant different. Considering the year*rectangle effect the analyses suggest a significant increase in 2001 CPUE in the rectangle where the major catches are taken (Wee Bankie).

The main conclusion of these analyses of the CPUE are:

- that there were significant differences in sandeel abundance between years and months.
- A decrease in abundance in the Firth of Forth area has been indicated from 1995 to 1999, followed by an increase from 1999 to 2000 and 2001.
- The increase in stock abundance in 2000 and 2001 was mainly due to an increase in stock abundance at Wee Bankie, i.e. rectangle 41E8.

10.2.2 Dredge survey data

There is not a particular good agreement between the estimated trends in densities from these surveys and those based on the commercial CPUE data. However, both data sets indicate low densities in 1999

10.2.3 Acoustic surveys.

Echointegration surveys of the Firth of Forth area have been conducted annually in June or July by FRS Marine Laboratory. Although there are only 5 years of data there does appear to be a similar trend between log. transformed acoustic survey estimates of biomass and commercial CPUE.

10.2.4 Conclusions on fluctuations in abundance of sandeel.

Based on information from all 3 survey methods it can be inferred, that sandeel abundance in the Firth of Forth region declined in 1999 and then increased by 2001.

10.2.5 The relationship between seabird breeding success and sandeel availability.

Several species of seabirds rely, especially in their breeding period, on the availability of sandeels. Three species are considered be sensitive to the availability of sandeels : Kittiwake, Guillemot and Shag.

The results presented in this report are based on long term studies of seabird diet and breeding success carried out on the Isle of May by the Centre of Ecology and Hydrology, Banchory, UK. They are part of work carried out under contract to the Joint Nature

Conservation Committee and an EU project on Interactions between the marine environment, predators and prey: implications for sustainable sandeel fisheries.

Results of the study suggest that although breeding success was higher than the years in which the fishery was operating, productivity was markedly lower than in 2000. This is consistent with the hypothesis that breeding success is affected by the timing of appearance and growth of 0 group sandeels. The breeding performance of both kittiwakes and shags both improved in the two years of the fishery closure. Shags are very dependent on 1+group of sandeels, the foraging distribution of Shags is, however, entirely inshore and they are therefore unlikely to compete directly with the fishery for the same sandeels in the same place.

Studies have indicated that kittiwakes in the North Sea take mainly 0-group sandeels, during the breeding season. However, as kittiwake breeding success has also been shown to correlate with the availability/abundance, of 1+ group sandeels in the North Sea, there may also be a link between kittiwake reproductive output and the abundance of older age classes of sandeels i.e. high abundance of 1-group in one year reflects high abundance of 0-group in the preceding year. Since the fishery catch composition is mostly composed of 1-group sandeels, such a relationship was tested by the correlation between. mean CPUE for ICES rectangle 41E8 (Wee Bankie) as a proxy for local 1-group abundance (and thus an index of 0-group abundance in the preceding year) with the breeding success of kittiwake. While the correlation between breeding success and mean CPUE in the same year was poor, there was god correlation between mean CPUE and breeding success in the previous year.

The breeding performance of both kittiwakes and shags improved in the two years of the fishery closure. Kittiwakes in nearby colonies fledged > 0.7 chicks per well-built nest in 2000 and 2001 with the highest breeding success being seen in 2000. For kittiwake this improvement may be explained by the closure of the fishery, since this species prey on the same aggregations of sandeel as exploited by the fishery. Since shags prey on inshore sandeel, a more speculative explanation based on the interrelationship between the offshore and inshore aggregations of sandeel is given.

The declining trend in guillemot breeding performance, initiated when the sandeel fishery was active, has continued through the two years that the fishery has been closed. The reasons for this are not clear, since potential sandeel prey appear to be more abundant and a significant positive relationship was found between mean CPUE and guillemot breeding success for all years except 2001, when breeding success was very poor. However, environmental factors also have a role to play in determining prey availability to foraging predators and it is possible that, during the two years that the fishery has been closed, environmental conditions have been adverse as far as guillemots are concerned.

10.3 GENERAL CONCLUSIONS

Considering the interrelation between the breeding success of Kittiwake, Shag and Guillemot and abundance/availability of sandeel in The Firth of Forth, STECF notes that the closure of the area to fishery does not seem to have had any impact on the Guillemot populations as they mainly feed on inshore aggregations of sandeel. However, the data available so far indicate that the closure of the fishery may have resulted in increased the breeding success of Kittiwake as well as on Shags. However, further studies are probably necessary to quantify this effect.

STECF agrees with the content of the report.

11 OTHER MATTERS

11.1 PARTICIPATION OF THE STECF'S MEMBERS AT THE MEETING OF THE ACFA

Every year the ACFA organises 12 meetings, respectively by 4 fields : fisheries resources, aquaculture, markets, general questions. Since 2001 STECF members (biologist and/or economist) have participated at these meetings. For 2002, the STECF's members have participated regularly at 9 meetings, during these they have contributed to answer or to shed a good light on the discussions of the members of the ACFA.

Even though the minutes of the ACFA meetings are regularly distributed to STECF members, however their content should be considered **confidential** and not circulated outside STECF circuit.

11.2 STECF ACTIVITIES AND PLANNING OF MEETINGS FOR 2003

STECF wishes to recall that the agendas of its meeting have been becoming more and more overloaded with several items quite often added on a very short notice. STECF asks the Commission to re-evaluate such strategy and suggest to have less points in the terms of reference. However, STECF is also aware that the number of inter-session subgroup and *ad hoc* meetings has passed from 1-2 to more than 10-12 per year. This fact inevitably raises the number of subgroups reports that need to be evaluated and possibly endorsed by the STECF.

STECF recognises that most of the preparatory work before plenary sessions cannot be duly undertaken by STECF members due to their routinely and institutional engagements within their Institute. STECF underlines that more formal solutions, including economic rewarding of both research Institutes and experts, as envisaged in the draft communication on scientific advice, could help in finding a more adequate structure to cope with the increasing workload. Perhaps, also a higher number of STECF plenary sessions (more than 2 per year) might be considered.

STECF notes that the participation of its members to subgroup meetings is sometimes quite limited with a predominance of invited experts. STECF invites its members to attend more regularly subgroups meetings, such a strategy should also speed up the work during the plenary sessions.

The Commission informed STECF that Andalucian Administration is going to submit for the second time a proposal of a recovery plan, under article 16.1(c), for blackspot seabream. STECF agreed to include a specific point in the agenda of the forthcoming SGRN meeting (9-13 December). Adoption of the opinion will be done by correspondence.

STECF notes that the number of STECF reports has rapidly increased in the recent years and more and more people and stakeholders ask a copy of its reports. On request of the STECF, the Commission informed that the STECF reports will be soon made available on the following web site of the Commission: *http://europa.eu.int/comm/fisheries/doc_et_publ/factsheets/legal_texts/rapp_en.htm*

In closure of the meeting it was recalled that the next plenary session will take place in Brussels from 31 March to 4 April 2003.

The following table shows both the activities carried out after the plenary of April 2002 and provisional activities of STECF and its sub-groups scheduled in 2003. The Commission informed that the provisional planning for 2003 could be changed depending on the

outcomes of the December Council and the adoption of the CFP reform. Besides, STECF budget constraints might determine rearrangement of the provisional planning.

MEETING	ITEM	DATE
April –December 2002		
ad hoc working group	Evaluation of Sicilian and Andalucian recovery plans *Chairman*: Henri Farrugio	23-24 May
- Fisheries and Environment (FEN) – **Coordinator** Sten Munch_Petersen	- Incidental catches of cetaceans *Chairman*: Simon Northridge	11-14 June
STECF bureau	Coordination	23 July
ad hoc working group	Evaluation of Galician recovery plans for southern hake stock and sardine stock *Chairman*: Mike Pawson	22-24 July
- Mediterranean (MED) **Coordinator** Ramon Franquesa	- Shared stocks in Mediterranean fisheries *Chairman*: Giandomenico Ardizzone	4-7 September
- Review of scientific advice on STocks of relevance to the CFP (RST) **Coordinator** John Casey	- Elasmobranchs fisheries *Chairman*: Henk Heessen	23-26 September
- Review of scientific advice on STocks of relevance to the CFP (RST) . **Coordinator** John Casey	- Mixed fisheries *Chairman*: Stuart Reeves	22-26 October
SGRST – SGECA joint group **Co-ordinators** John Casey and Jos Smit	- Stock status review - EIAA model *Chairman*: John Casey	28-31 October
- Research Needs and Data Collection (RNDC)- **Co-ordinator** Philippe Moguedet	- Evaluation of derogations in national programmes - Evaluation of 2° submission of recovery plan for blackspot seabream in Andalusia *Chairman*: Philippe Moguedet	9-13 December

2003		
- bureau	Coordination	TBD
- Research Needs and Data Collection (RNDC):	Task force to support external consultants on setting up data base Chairman: Win Panhorst	5 meetings of one day .Various dates.
- Research Needs and Data Collection (RNDC):	Analysis of CPUE used for tuning and implication for minimum programme Chairman: Philippe Moguedet	24-28 March 2003
- Mediterranean (MED) –	fisheries identification, technical measures and management options simulations *Chairman* : Gaetano Messina	24 - 28 March 2003
Scientific, technical and economic committee for fisheries (STECF)	Plenary session	31 March – 4 April
- Management Objectives and Strategies (MOS):	Recovery plan Iberian Nephrops norvegicus (IX)	29 April- 3 May to be confirmed
- Management Objectives and Strategies (MOS):	Recover plan for southern hake	June 2003
- Research Needs and Data Collection (RNDC)-	mid-term review of data collection national programme *Chairman*: TBD	July 2003
- Review scientific advice on Stocks of relevance to the CFP (RST) -	WG on elasmobranch fisheries *Chairman*: Henk Heessen	2 half of July
- Review scientific advice on Stocks of relevance to the CFP (RST)	Mixed fisheries *Chairman*: TBD	2 – 3 quarter
- Review scientific advice on Stocks of relevance to the CFP (RST) – Economic Assessments (ECA) Joint meeting	Further improvement of EIAA model *Chairman*: John Casey	2 – 3 quarter
- Mediterranean (MED) –	economic performance of Mediterranean fisheries *Chairman*: Ramon Franquesa	2 or 3 quarter 2003
SGRST – SGECA joint group	- Stock status review - Fleet status report - EIAA model *Chairman*: John Casey	Last week of October
Scientific, technical and economic committee for fisheries (STECF)	Plenary session	3 - 7 November

- Fisheries and Environment (FEN) –	-Sensitive fish habitats and habitats of paramount importance for biodiversity conservation. - Environment integration indicators *Chairman:TBD*	4 quarter TBD
- Economic Assessments (ECA) –	Economic consequences of mitigation measures of cetacean incidental catches *Chairman*:	4 quarter TBD
- Research Needs and Data Collection (RNDC)-	evaluation of derogations in national programmes *Chairman*: TBD	December 2003

12 ANNEX I LIST OF PARTICIPANTS

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13 ANNEX II DRAFT WORKPROGRAMME OF POLICY-ORIENTATED RESEARCH (SO CALL PRIORITY 8) IN 6 FP

Draft Workprogramme

B.1.3 - Modernisation and sustainability of fisheries, including aquaculture-based production systems

Scientific basis of fisheries management

Some exploited stocks in European waters are at historically low levels. To recover the stocks and promote sustainable fisheries it is necessary to obtain improved scientific advice on medium- and long-term effects of different management tools. Management methods should be explored and evaluated to identify and resolve deficiencies through better understanding of key biological parameters, exploitation patterns and socio-economic implications.

Enhancement of technical measures like introducing more selective fishing, reduction of discards at sea, measures to protect non-target species, and habitats will rely on new scientific discoveries and developments.

First call tasks

- **(Task 1) Operational evaluation tools for fisheries management options:** to develop operational evaluation tools to appraise the biological and social and economic effects of management measures in the EU, and apply these tools to important groundfish, deep-sea and pelagic fisheries. The tools must take account for uncertainties and should include risk assessments.

- **(Task 2) Operational fishery-independent assessment tools:** to develop operational assessment models not dependent on fishery data and related survey tools and methodologies, and test these for important management procedures for groundfish and pelagic stocks. The models must take account for uncertainties and should include risk assessments.

- **(Task 3) Operational multi-annual management methodologies:** to provide operational scientific and methodological support for multi-annual management strategies and evaluation of harvest rules, including from a socio-economic perspective.

- **(Task 4) The relationships between fleet capacity, fishing effort and fishing mortality:** to quantify the relationships between fleet capacity, fishing effort and fishing mortality in order to ensure coherence between effort restrictions, fleet policy and stock management measures.

- **(Task 5) Species-selective fishing:** to develop low-impact, species-selective fishing gears and to formulate alternative fishing tactics in order to reduce

undesired impacts on non-target species. To estimate the socio-economic effects of application of the measures suggested.

Scientific basis of fisheries monitoring, control and surveillance

Monitoring, control and surveillance constitute a main part of the day-to-day execution of the CFP. The implementation of the Vessel Monitoring System (VMS) has provided the ground for more cost efficient methodologies to be developed. Relevant research should aim at improving the accuracy and consistency of fisheries catch data, especially in the context of growing doubts about the performance of catch reporting systems and of traditional assessment and management systems.

First call tasks

– **(Task 6) Operational, cost-effective and secure electronic logbook transfer system:** to develop an operational, cost-effective and secure electronic transfer system that will convey logbook information to and between authority agencies in order to facilitate improved monitoring and control.

Indicative tasks for further calls

– **Catch estimation models:** to develop an operational catch estimation model to forecast catches from VMS (Vessel Monitoring System) data, observer reports and present and historical fishery information, in order to make prognoses on the degree of TAC fulfilment and potential discarding.

Sustainable aquaculture production

Research on aquaculture in support of the CFP should provide the scientific basis for sustainable aquaculture production by promoting disease prevention and a sound environment protection.

Aquaculture activity and its environmental interactions, as well as fish and shellfish health aspects, are important policy issues, which will need to be addressed. Increasing scientific knowledge on the effect of aquaculture on the structure and functioning of marine ecosystems (including non-commercial species) as well as the effects of environmental hazards on these activities has to be based on innovative research in this field.

First call tasks

– **(Task 7) Assessment and mitigation of the influence of husbandry and environmental conditions on health of farmed species:** To improve the health, welfare through reduced stress and improve immune competence of major important commercial species (salmon/rainbow trout and seabass/seabream).

Indicative tasks for further calls

– **Development of functional genomics to identify suitable source strains for disease and stress resistance:** To provide the physiological and genetic basis for direct or marker assisted selection breeding for oysters, seabass and seabream (Salmon may be addressed taking into account the latest developments for this species).

– **Potential exchange of pathogens between wild and farmed species:** To establish a co-ordination action that will integrate current knowledge on the potential exchange of pathogens between wild and farmed species, and that will promote collaboration among on-going projects and identify future research needs.

– **Genetic impact on native populations:** To establish a co-ordination action that will integrate current knowledge of genetic impact of escapees (accidental or restocking), quantitative and qualitative genetic modifications, introduction of non-native species and recombinant DNA vaccines on native populations. Will promote collaboration among on-going projects and identify future research needs.

Integration of environmental requirements into the CFP

The requirement to integrate environmental issues into Community policies as stipulated under Article 6 of the Treaty is reflected in the CFP reform[11], where the Commission is promoting the progressive adoption of an ecosystem-based approach to fisheries management.

Two aspects are of special relevance for research: the better understanding of structure and dynamics of marine ecosystems, including their response to the impact of human activities, and the development of operational protocols and procedures in order to improve scientific advice to fisheries management.

From this perspective, three main topics will be addressed: the problem associated to critical biological interactions between and within target species and by-catch species, the development of methods to assess the impact of fishing and aquaculture on the marine ecosystems, and the use of area-based fishery management tools.

In all cases, indicators of the environmental performance of the CFP will be identified and developed and their utility investigated in order to monitor progress towards a more complete implementation of the ecosystem approach.

First call tasks

– **(Task 8) First steps towards developing an ecosystem-based approach to fishery management:** to identify and characterize critical biological interactions between and within target species and by-catch species (both commercial and non-commercial) and their dependence on the environment.

– **(Task 9) Developing indicators of environmental performance of the CFP:** to identify quantitative indicators for the impact of fishing on the ecosystem state, functioning and dynamics, to assess the applicability of such indicators and to develop operational models with a view to establishing the relationship between environmental conditions and fishing activities.

– **(Task 10) Potential of marine protected areas for marine environmental protection:** to investigate the potential of different regimes of protected areas as measures to protect sensitive species, habitats and ecosystems from the effects of fishing.

[11] COM(2002)186 final – setting out an Action Plan to integrate environmental protection requirements into the Common Fishery Policy; COM(2001)143.

Indicative tasks for further calls

– **Developing an ecosystem-based approach to aquaculture:** to develop operational tools with a view to a progressive implementation of an ecosystem-based approach into the management of the aquaculture sector. This will include the identification of quantitative indicators relative to the effects of aquaculture on the environment and vice versa.

Call information

Date of publication:

17 December 2002

Closing date:

17 March 2003

Indicative budget 2003:

19 M€

Types of instruments available:

The only instruments available are specific targeted research projects (STREP), co-ordination actions (CA) and specific support actions (SSA).

Tasks of the work programme opened in 2003:

Tasks 1 to 8, 10 - STREP

Task 9 - Co-ordination action (CA)

14 ANNEX III MODEL ON ECONOMIC IMPLICATIONS OF ACFM ADVICE

Working document

SCEGA Report

(Brussels 28-31 October 2002)

The Potential Economic Impact
on Selected Fishing Fleet Segments
of TACs Proposed by ACFM for 2003
(EIAA-model calculations)

October 2002

Members of the SCEGA Working Group:

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Acknowledgement: the model used in this Report was developed from that set out for the Economic Interpretation of ACFM Advice originated under FAIR CT97-3541. Most of the data presented was collected under the current EU funded project 'Economic Assessment of European Fisheries' (Q5CA-2001-01502) under the 5'th Framework Programme 'Quality of Life and Management of Living Resources', and provided by economist at a working group meeting in Salerno (I) 14-18. October 2002.

THE POTENTIAL ECONOMIC IMPACT ON SELECTED FISHING FLEET SEGMENTS OF TACS PROPOSED BY ACFM FOR 2003: (EIAA-MODEL CALCULATIONS)

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Introduction to the EIAA Report for 2003

This report gives an assessment of the expected economic impact of the TACs proposed by the ACFM for 2003. In a special second section it highlights the potential impact of a moratorium on fishing for cod in the North Sea on those fleets highly dependent for their income on landings of cod.

The EIAA Model used for the calculations is described in an Appendix which is intended to throw light on some bio-economic features of the model that will help non-economists and that dovetail with the conventional bio-economic advice.

To carry out an assessment of the financial impact of ACFM advice, the fleet segments examined need to be subject to quotas, and knowledge of the catch composition for the national fleet and each fleet segment is also required. The costs and earnings information is from the Annual Economic Report (AER).

Section 1 includes the segments for which necessary information is available. The economic information is generally reliable. In this report it has been possible to include segments from each EU member state as follows:

Denmark	4 segments
Finland	2 segments
Netherlands	2 segments
Sweden	3 segments
United Kingdom	2 segments

The assumptions for the calculations for these 5 countries are:

- Future prices are base period prices adjusted with a flexibility rate of 0.2 based on the whole TAC for the EU for the relevant species.
- The stock-catch flexibility rate is 0.6 for demersal species, reflecting their relatively low spatial density, and 0.1 for pelagic species owing to their shoaling behaviour. Hence, an increase in stock abundance lowers the amount of effort.
- The change in effort is proportional to the change in the quotas for the relevant segment.
- Costs are calculated at fixed prices (base period) but adjusted proportionally with the change in effort for future years.
- For the United Kingdom fleet segments, landings have been valued at the national average price reigning in each year.

The format of the analysis presented includes text and diagrammatic information. A glossary and explanation of the indicators used are set out in Sections 2 and 3 of the Appendix.

The calculation about the long term economic consequences use information about spawning stock biomasses and long term yield. The members of the SGRST-working group provided that information during the meeting, which is greatly appreciated.

The EIAA-model is constructed to work with a list of TACs for the management areas as complete as possible. For the member states and the included fleet segments this list should be as complete as possible as well implying that if the landing value is composed of a large share of non-quota species or no information is available about the quota species for the pertinent fleet segment, the model will produce too optimistic economic results from drastic quota changes. In particular, this is the case for the included UK segments.

Section 1

THE POTENTIAL ECONOMIC IMPACT ON SELECTED FISHING FLEET SEGMENTS OF TACS PROPOSED BY ACFM FOR 2003: (EIAA-MODEL CALCULATIONS)

SUMMARY

Country	**Segment**	**Percentage Level of Financial Profitability 2003**	**Impact of 2003 TAC on Financial Profitability compared to 2002**
Denmark	Trawlers ≥ 200 GT	-8.9	Unchanged
	Trawlers < 200 GT	-15.1	Worsened
	Danish Seiners	-26.6	Worsened
	Gill Netters	-46.7	Worsened
Finland	Trawlers < 24 m	-35.2	Worsened
	Trawlers ≥ 24 m	-10.9	Worsened
Netherlands	Eurocutters 261-300 HP	8.0	Lower
	Beam Trawlers >811kw	-4.8	Lower
Sweden	Pelagic Trawlers ≥ 24/20 m	4.6	Unchanged
	Cod trawlers ≥ 24/20 m	-0.6	Unchanged
	Cod Trawlers < 24 m	1.8	Unchanged
United Kingdom	Scottish Demersal Trawlers < 24 m	-10.5	Worsened
	Scottish Demersal Trawlers ≥ 24 m	2.6	Lower

Note on definitions:

"Worsened" = Segment was making losses, losses now greater.

"Improved" = Segment was making losses, losses now smaller.

"Lower" = Segment was making profits, profits now lower.

"Higher" = Segment was making profits, profits now higher.

1.1 DENMARK

1.1.1 Trawlers over 200 GT

Segment

The number of vessels has stayed almost constant at 125 (2001) over the last years. The average size of the vessel is around 350 GT and nearly 800 kW in engine power. The total employment of the segment is around 800 persons, which is a decrease of around 10% over the last five years.

The segment targets industrial species, mainly sand eel that constitutes around 60% of the total value in 2001. The second most important species are herring and mackerel in that order.

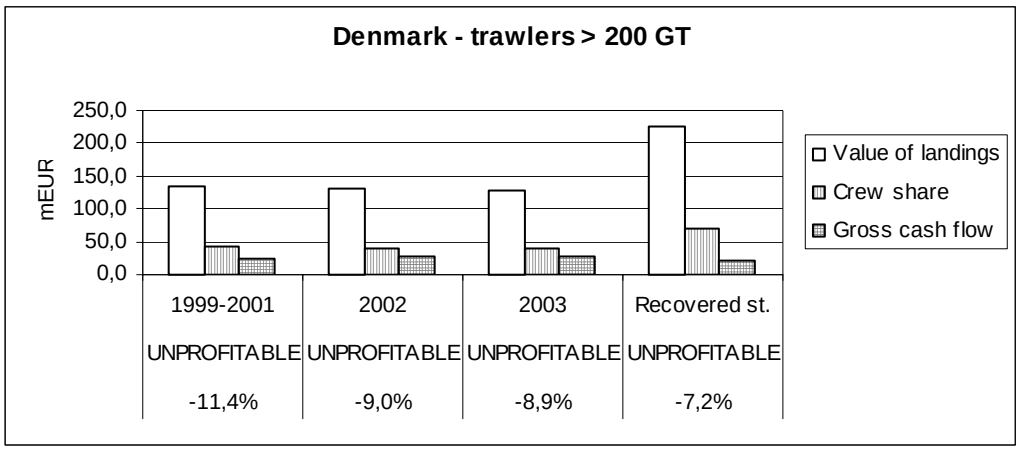
The economic performance of the fleet has become worse over the last years mainly caused by a decrease in prices on industrial fish. The segment as such has been unprofitable which is caused by high fixed costs (depreciation and interest payments).

ACFM advice for 2003

The species that affects the segment are herring, mackerel and sand eel, but no major change is foreseen here. The situation for 2003 is expected to look very much the same as for 2002, which was worse than 1999-2001.

Recovered stocks

The herring stocks, targeted by the fleet segment, are assumed to be able to recover to even higher levels than the current ones. With all stocks of interest to this segment recovered, the increase in the value of landings is more than 70% and the gross value added increases with more than 30%. However, the profitability of the segment remains poor, and the profitability is much dependant on the ability to increase catch rates per vessel which assumably is more difficult in pelagic fisheries than in demersal fisheries.



1.1.2 Trawlers under 200 GT

Segment

The segment is constituted by 517 vessels (2001) which is a reduction at around 10 % over the last five years. The average size of a vessel in the segment is around 50 GT with an engine power at 250 kW. The segment employs around 1600 fishermen and only a small reduction in employment has taken place over the last five years.

The most important species for the segment is Norway lobster (2001) with 25 % of the total landings value. Cod is nearly as important followed by a range of flatfish.

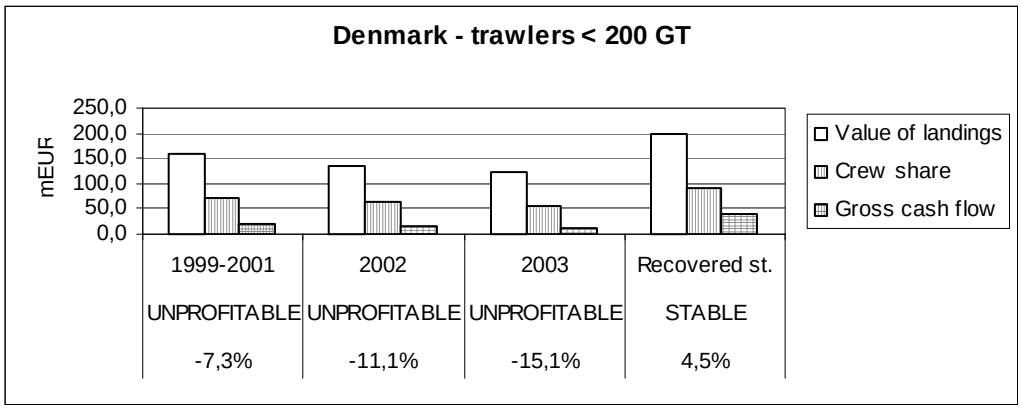
The economic performance of the segment has become worse over the last years mainly due to the reductions in the cod quotas.

ACFM advice for 2003

The segment is strongly affected by the decrease in the cod quotas, and the net profit has become increasingly negative. The cash flow is positive, however, implying that fishing still contributes to cover the fixed costs, although not all the costs.

Recovered stocks

The improved situation in the long run is cause by an improvement in the cod stock yield and the cod stock abundance. The higher stock abundance is expected to increase the catch per fishing day, and hereby lower costs relative to the landings value. No spawning stock information is available for Norway lobster, and status quo is assumed for that species in the calculation. Flatfish stocks are also expected to be able to increase in the long run which benefits the economic performance as well.



1.1.3 Danish seiners

Segment

The fleet segment consists of 97 vessels (2001) with an average vessel size at 35 GT and around 170 kW in engine power. The small engine power relative to the size of the vessel is a result of the semi-stationary fishing technique. Employment is around 300 fishermen which has been decreasing at around 10% over the last five years.

The segment targets plaice that constitutes almost 50 % of the landings value, while cod constitutes around one third of the landings value (2001). Therefore, the segment is very dependant on few species.

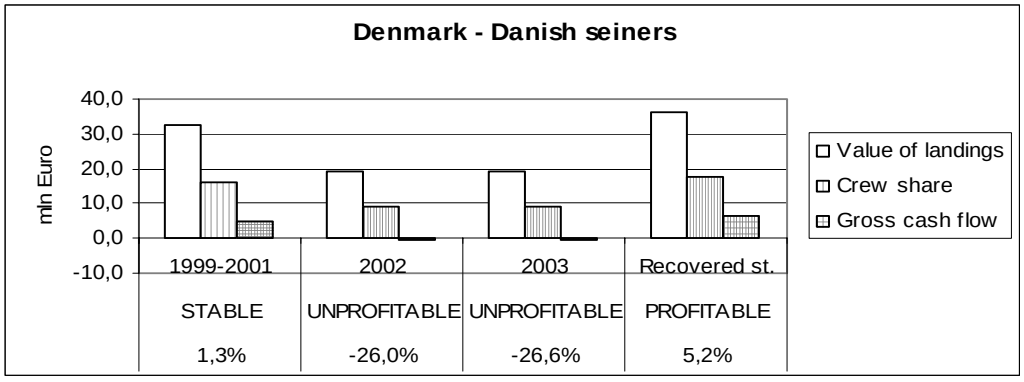
While the segment could show positive net profit in the period 1999-2001 the situation became worse in 2002 with an expected reduction in landings value at around 40% relative to the previous period. The net profit is expected to be negative in 2002.

ACFM advice for 2003

The reduction in the cod quota affects the segment. However, relative to the expected poor year 2002 the situation the situation will not become much worse, as is the case relative to 1999-2001. This is partly because in the calculation it is assumed that the seiners are not locked to the current fishing area the North Sea and the Kattegat but be able to exploit the Baltic quota. It is not possible to judge the realism in that assumption but some restructuring is expected to take place. It should be noted that the segment is not expected to cover even the variable costs in 2002 and 2003 which implies that the fleet should not be fishing at all.

Recovered stocks

The expected recovery of the cod stock together with the improved situation for the plaice stock in the long run has strong effect on the Danish seine segment. With recovered stocks the segment is expected to be able to conduct a profitable fishery.



1.1.4 Gill net

Segment

The gill netters are on average small vessels with a size at 15 GT and an engine power at around 110 kW. These figures reflect the stationary type of fishing technology. The total number of vessel is around 500 with a decrease above 10% over the last five years. The total number of fishermen in the segment is around 1100 (2001), with a tendency to decrease.

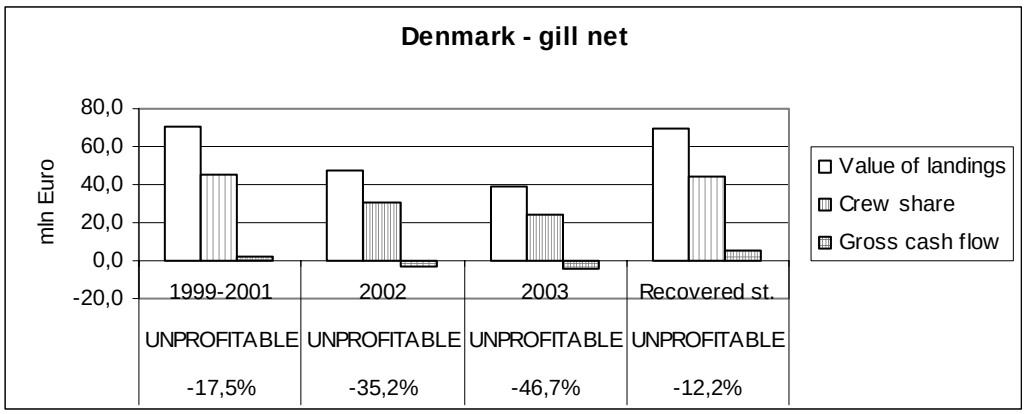
Cod is by far the most important species for the segment. Cod constitutes in the neighbourhood of 60% of the total landings value of the segment. Plaice and sole together constitute 25-30%.

ACFM advice for 2003

The ACFM advice is expected to induce a further 20% reduction in landings value relative to the expected 2002 landings value, and 45% relative to the period 1999-2001. The economic consequences are strong because the average vessel is not able to cover variable costs on an annual basis. That implies a direct loss every time the vessel goes fishing. The vessel may switch to other species, but that would only constitute a loss to society because the other quotas could be exhausted by the already existing capacity.

Recovered stocks

Stock recovery would affect the segment positively. The effect does not seem strong relative to 1999-2001. However, the situations are different. While the stock situation in 1999-2001 was not able to sustain the fishing pressure, this would be the case with recovered stocks if the fishing capacity is not increased.



1.2 FINLAND

1.2.1 Trawlers under 24 meters

Segment

There were 78 vessels in this segment in 2001. The number is down from 101 in 1999. The average vessel was 16.4 m of length and capacity of 43 GT and 260 kW. These vessels employ some 150 fishermen including the skipper-owners.

The segment targets Baltic herring and sprat. It accounts for half of the total volume of the landings and some 25% of the total value of the landings.

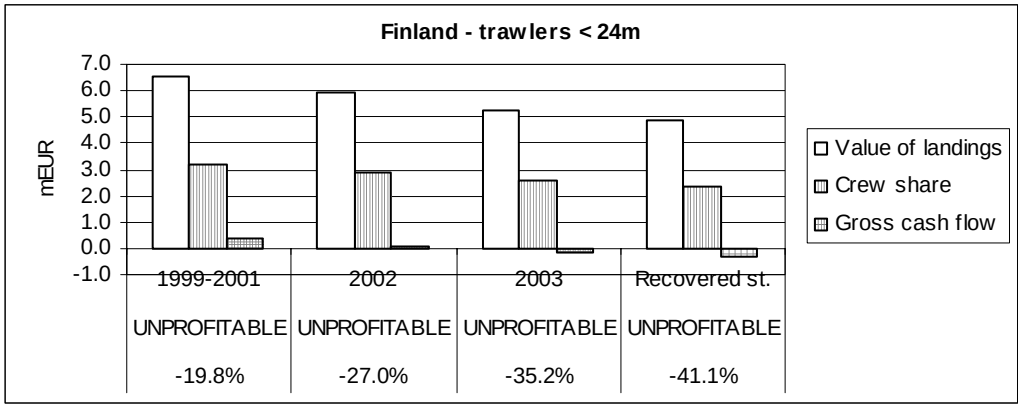
The economic performance of the fleet segment has improved during the past couple of years while the number of vessels has decreased. In 2001 gross cash flow was reasonable, but not enough to cover imputed depreciation and interest.

ACFM advice for 2003

In ACFM advice there were further cuts for Baltic herring and sprat quotas. This will lead to a further fall in expected value of landings by 20% to EUR 5.9 mln. This will also deteriorate the profitability severely yielding even negative gross cash flow in 2003.

Recovered stocks

While inn the long run the precautionary approach TACs for sprat will increase the Baltic herring TAC will be lower than they have been in previous years. The total value of landings will decrease further in the long run scenario and so will the economic performance. The gross value added will deteriorate by 40% and the segment would make even higher losses in the recovered stocks scenario.



1.2.2 Trawlers over 24 meters

Segment

There were just 17 vessels in this segment, but they account for 40% of the total volume of the landings and some 30% of the total value. The average length of a vessel is 29 meters and capacity of 200 GT and 680 kW. The segment provides job for some 50 fishermen.

The segment targets mainly Baltic herring and sprat, but there are also a couple of demersal trawlers in this segment too, catching also for cod.

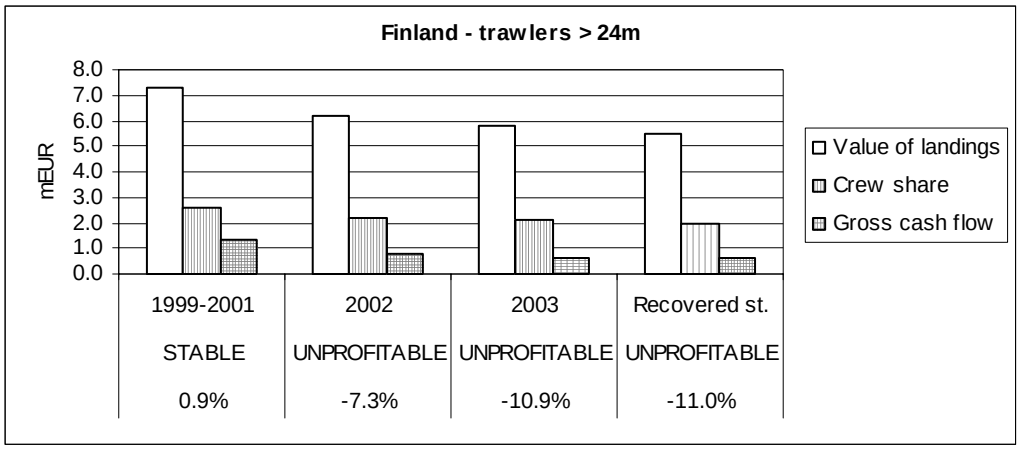
In 2001 the revenue of the segment exceeded EUR 8 mln – yielding some EUR 480,000 on average per vessel, which was enough to yield a positive net result for the segment.

ACFM advice for 2003

The cuts in TACs for 2002 and those proposed for 2003 in ACFM advice for target species – Baltic herring, sprat and cod – will result significant deterioration in the economic performance of the segment and turn the net result unprofitable.

Recovered stocks

In the long run precautionary approach TACs for Baltic herring are lower than they have been in previous years. So the landing value will be lower in the long run scenario and the economic performance will further deteriorate. According to biological information that there is not foreseen any gains in the future and the segment has overcapacity in short and long run.



1.3 NETHERLANDS

1.3.1 Eurocutters 261-300 HP

Segment

In 2000 there were 163 vessels in this segment. They comprised 39% of the national fleet by numbers but 7% by GT and 9% by kilowatts power. The number of vessels is up from 143 in 1999. The fleet employs 519 fishermen which is 22% of the jobs in fishing.

The main target species are shrimp and sole. Shrimp provided 51% of segment earnings in 2001, sole 26% and cod 3%.

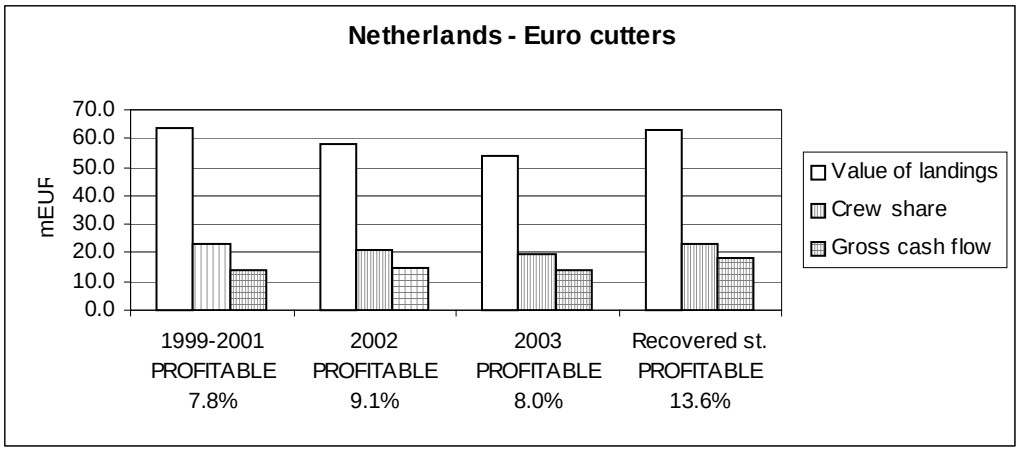
The Eurocutters were profitable over the 1999-2001 period and economic performance improved further in 2001**.**

ACFM advice for 2003

Lower TACs advised for sole would affect the result of Eurocutters. Some vessels in this fleet would be hit by a cod moratorium. But on average the fleet is expected to remain profitable under the 2003 TACs. Earnings are forecast to decline by 10% in 2002 and by 15% in 2003 compared to 2001. Crew share is forecast to fall by 15% and gross cash flow by 5 % in 2003 compared to 2001.

Recovered stocks

In the recovered stocks scenario the estimated value of landings reaches EUR 63mln, which is at the level of 1999-2001. This indicates that also the crew share would remain on the level of the base period. However, it is expected that these earnings could be achieved with less effort. Consequently, gross cash flow would be up and the profitability of the fleet would further increase.



1.3.2 Beam Trawlers > 811 kw

Segment

There were 153 vessels in the beam trawlers > 811 kilowatts segment in 2001. They comprised 37% of the fleet by numbers but 38% by GT and 62% by power. 47 of these vessels have been built since 1990. The fleet provides 45% of employment at sea in the Dutch fishing industry.

In 2001 these large beamers contributed 49% of the landings value of the Dutch national fleet. Their main target species are flatfish, especially sole and plaice. Sole landings amounted to 52% of their earnings and plaice 26%. Cod were 2% and other species 20%.

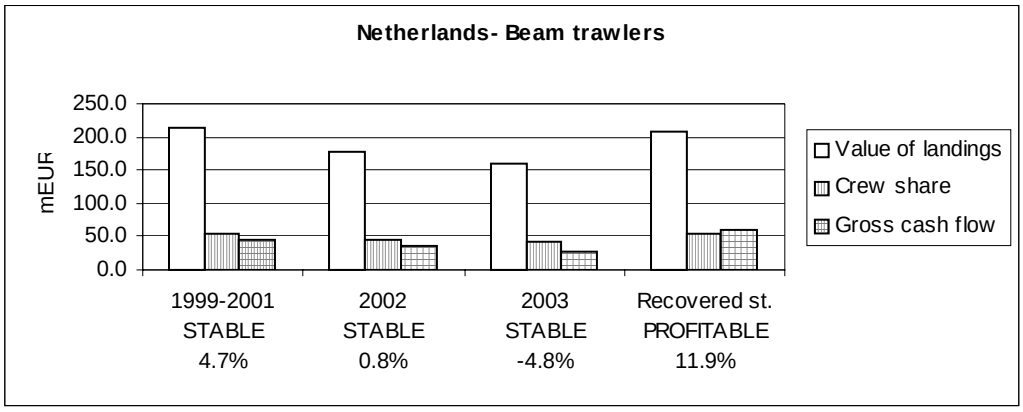
The beam trawl fleet was profitable over the period 1999-2001. The economic performance declined since 1999.

ACFM advice for 2003

Lower TACs advised for sole and plaice would affect the result of beam trawlers. Some vessels in this fleet could be hit severely by a cod moratorium. The positive results are expected to turn into losses under the 2003 TACs. Earnings are forecast to decline by 16% in 2002 and by 25% in 2003 compared to 2001. Crew share is forecast to fall by 25% and gross cash flow by 37 % in 2003 compared to 2001.

Recovered stocks

In the recovered stocks scenario, the estimated value of landings reaches EUR 208 mln which is at the level of 1999-2001. This indicates that also the crew share would remain on the level of the base period. However, it is expected that these earnings could be achieved with less effort. Consequently, gross cash flow would be up and the fleet would be more profitable than in the base period.



1.4 SWEDEN

1.4.1 Pelagic trawlers over 24 meters

Segment

In 2001 there were 62 pelagic trawlers in this segment. Though they comprised only 3% of the Swedish fleet by numbers, they provided 50% of the Gross Tonnage of the fleet and 30% of its power. These vessels provide job for 372 men at sea. This is some 14% of the employment at sea in the Swedish fishing industry.

The segment contributed almost 90% of total volume of landings and half of the value in 2001. The main target species of the fleet are herring, sprat and mackerel.

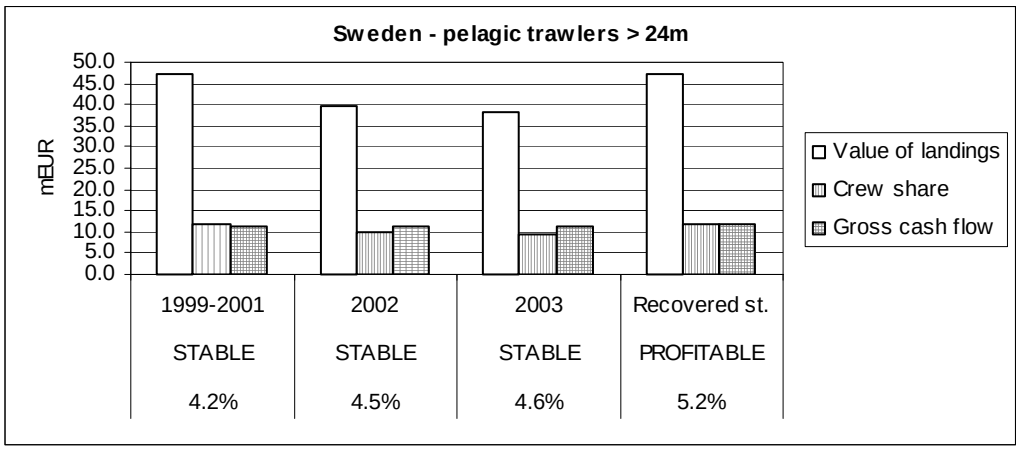
In 2001 the total value of landings reached EUR 61 mln. The gross value added was reasonably high, 60%, and gross value added was EUR 20 mln. This was enough to cover imputed financial costs.

ACFM advice for 2003

Due to cuts in TACs expected revenues for 2003 are expected to fall by 20%. The gross value added will deteriorate slightly. This is mostly due to a fall in the crew share, while the gross cash flow will remain constant. The net result will even increase.

Recovered stocks

In a long run scenario revenues will be the same as in previous years. There will be a slight increase in crew share and gross cash flow and the fleet segment continue to be profitable.



1.4.2 Cod trawlers over 24 meters

Segment

There were 21 vessels in this segment in 2001. The total capacity of these vessels was 4.6 thousand GT and 13 thousand kW. These vessels provide jobs for 105 fishermen.

These vessels target mainly on cod, which constitutes some 70% of the total of the landings in terms of volume and value in 2001. They catch also a small amount of nephrops and various other species.

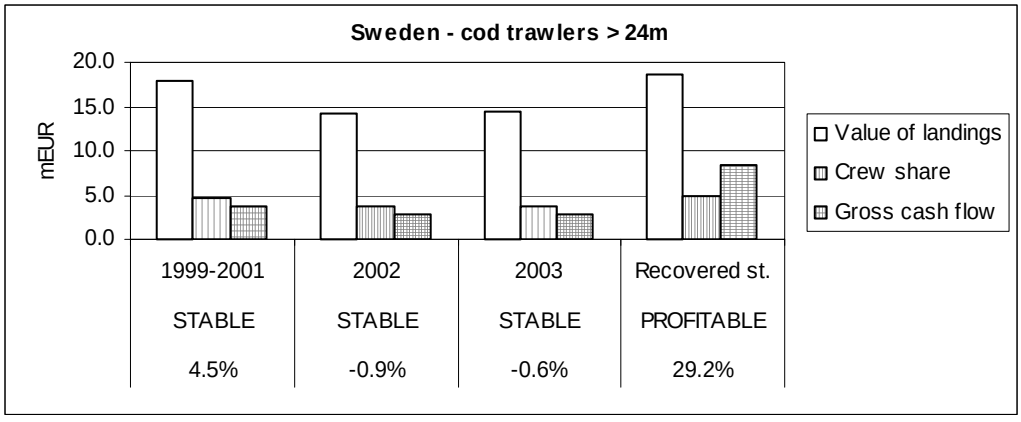
In 2001 the revenue of the segment exceeded EUR 12 mln. Gross value added was EUR 3.8 mln, which was enough to yield a positive net result for the segment.

ACFM advice for 2003

The proposed moratorium cod fishing in the North Sea does not affect significantly to economic performance of this fleet for 2003, since it fish cod mostly on Baltic sea. Due to higher prices resulted from moratorium the landing value likewise profitability of the segment is not expected to change from 2002. Compared to 1999-2001 average there is clear deterioration in the results.

Recovered stocks

There will be a slight increase in value of landings in a recovered stocks situation. This will raise the profitability significantly as at same time the variable costs will cut down. The gross cash flow will more than double and the net profit will manifold compared to 1999-2001 average.



1.4.´3 Cod trawlers under 24 meters

Segment

In the smaller cod trawler segment there were total of 70 vessels in 2001. The capacity totalled 4.5 thousand GT and 13 thousand kW and they employed some 210 fishermen.

Likewise the larger trawlers this segment target mainly on cod. Cod accounted for about 75% of the value of the landings.

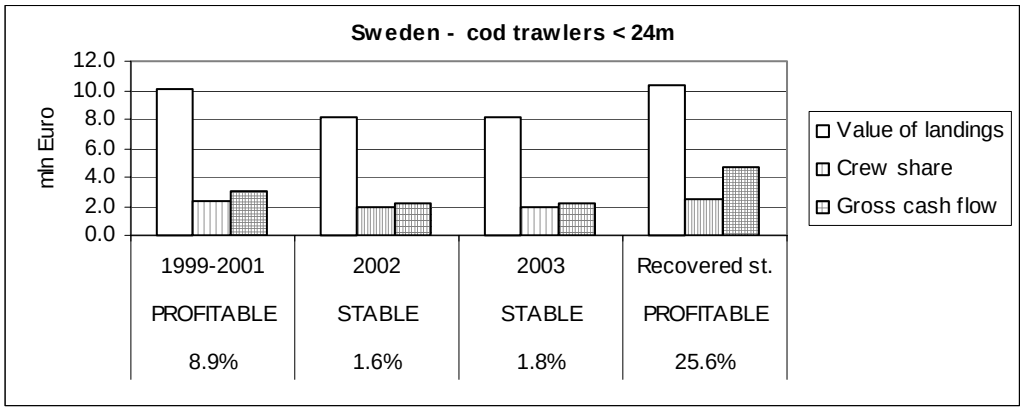
Total value of landings in 2001 reached EUR 12.8 mln. Gross value added was high, more than half of the revenue, and the net result of the segment were well positive.

ACFM advice for 2003

The proposed moratorium cod fishing in the North Sea does not affect significantly to economic performance of this fleet for 2003, since landings of cod are mostly from the Baltic Sea. Due to higher prices caused by moratorium the landing value and profitability of the segment is not expected to change from 2002. Compared to 1999-2001 average there is clear deterioration in the results.

Recovered stocks

In a recovered stocks situation the value of landings will raise to the level that it has been in previous years. The segment will gain marked increase in profitability due to decreased costs. The gross cash flow will increase by 30% and the net profit will double compared to 1999-2001 average.



1.5 UNITED KINGDOM

1.5.1 Scottish Demersal Trawlers under 24m registered length

Segment

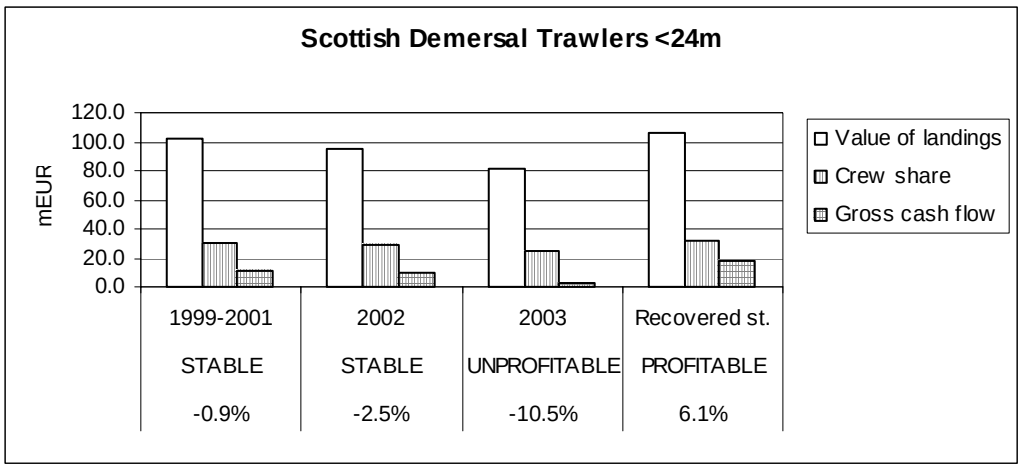
There were 214 vessels in this sector in 2001, approximately the average of the last five year. The mean Gross Tonnage of vessels was 23.7 rising significantly over the last five years. Mean kilowatts power in the segment has also risen steadily. Crew employed in 2001 fell to 914 from 1075 in 2000. The segment targets *Nephrops* and demersal whitefish. *Nephrops* comprised 30% of the sales revenue of the fleet in 2001. The fleet provided 9.4% of the national landings by value. The economic performance of the fleet is estimated to have remained steady, but loss-making in 2002. Gross Cash Flow fell by 47% compared to 1999.

ACFM Advice for 2003

Constraints on quota and a legacy of over-capacity have meant that this segment has not been profitable for some years. The ACFM proposals for 2003 closing the North Sea and West Coast fisheries for cod, but allowing the fisheries for haddock and whiting to remain open, would cause the segment to fall into significant unprofitability of 10.5% in a situation where the segment has few reserves from any previous profits. [This result from the model is almost certainly optimistic since no data for the segment's catches of whiting and saithe were available to the SCEGA Working Group. In this situation the model assumes effectively that the TAC for those species is unchanged. Likewise should a haddock and whiting closure follow a cods closure the financial performance of the fleet would be significantly worsened.]

Recovered Stocks

In a situation of recovered stocks there is a slight improvement in the value of fleet landings and Crew Share at about 12% each. This is reflected by a significantly improved Gross Cash Flow with the segment returning to a reasonable level of profitability.



1.5.2 Scottish Demersal Trawlers of 24 metres registered length and over

Segment

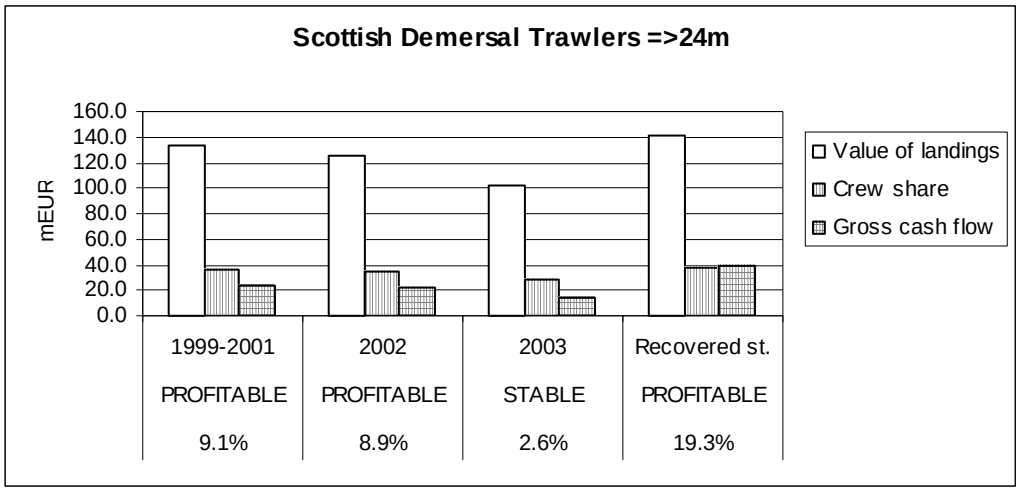
There were 125 vessels in this segment in 2001, showing little change. Mean Gross Tonnage and mean kilowatts power of vessels has been rising slowly, to 34.4 GT and 83.8 kW in 2001. Crew employed remained virtually unchanged at 750. The segment targets demersal whitefish, with cod, haddock and monkfish providing 47% of sales revenue. The fleet contributes 13.4% to the value of UK landings. In the last three years the fleet's economic performance has declined into unprofitability, and Gross Cash Flow has fallen by 37%.

ACFM Advice

The ACFM advice for 2003 closing the North Sea and West Coast fisheries for cod but allowing the fisheries for haddock and whiting to remain open, would mean that this segment would make only limited profits and with Crew Share, Gross Cash Flow and the value of landings all falling. [This result from the model is also optimistic owing to the absence of data for the segment's catches of whiting and saithe. In this situation the model assumes effectively that the TAC for those species is unchanged.]

Recovered Stocks

The situation of recovered stocks would ostensibly offer a 11% improvement in the value of landings and Crew Share compared to 2002. It would also ostensibly provide a return to excellent profitability at nearly 20% of sales revenue. However, such an event will not materialise except perhaps in the short-run. The incentive of such profitability would either create overcapacity or cause a significant increase in the cost of quota entitlements where they are traded. In the former case the profits will ultimately be dissipated. In the latter, the segment will return to levels of profitability comparable with other industries, but the cost of quota could become prohibitive.



Section 2

THE IMPACT OF A MORATORIUM ON FISHING FOR COD ON COD-DEPENDENT FLEETS

Impact of ACFM on cod dependent fisheries

This section summarizes the impact that implementation of 2003 ACFM advice may have on cod dependent fisheries.

The 9 fleets in the table landed some 75% of the cod available for EU member states in 2001. The table indicates that dependency of cod differs widely by fleet segment. Scottish trawlers take over 25% of EU TACs for cod but cod contributes only 13% of the landings value of this fleet. Danish gill netters have 13% of EU TAC but their landings value depends for 57% on cod.

The impact of a moratorium for cod and 2003 TACs recommended for other species are expected to result in losses of income for cod dependent fisheries in the range between 25 and 60% when compared to the base period 1999-2001. The difference with respect to income expected in 2002 is generally much lower.

Summary table. Potential impact of ACFM advice for cod dependent fisheries

Country	Segment	Percentage of EU TACs for cod in Baltic Sea and North Sea	Percentage of cod in fleet's landings value 2001	Percentage Change of income* 2003-average (1999-2001)	Percentage Change of income * 2003-2002
Denmark	Trawlers < 200 GT	15	23	-25	-12
	Danish Seiners	3	34	-58	-2
	Gill Netters	13	57	-56	-25
Netherlands	Eurocutters 261-300 HP	1	3	-10	-6
	Beam Trawlers >811kw	1	2	-32	-17
Sweden	Cod trawlers ≥ 24m	4	70	-22	1
	Cod trawlers < 20m	5	77	-23	1
United Kingdom	Scottish trawlers >24m	27	13	-26	-23
	Scottish trawlers <24m	6	9	-28	-21
Total of these fleets		76			
EU TACs (Baltic Sea, North Sea)		100			

* Gross Value Added (see appendix section 2 for definition)

Appendix

The EIAA Model

Methodology, Definitions and Features

An extract from "The Potential Economic Impact on Selected Fishing Fleet Segments of TACs Proposed by ACFM for 2002 (EIAA-model calculations), EAFE-AC Report, FØI, Copenhagen, May 2002".

1. Methodology

Background
The background to this report is the need for economic assessment to supplement the ACFM advice demanded by STECF and other interested agents.

Objective
To produce short-term economic forecasts that take into consideration the quota advice given by ACFM for the fleet segments specified in the economic report.

Data requirements
- Technical details of fleet segments
- Landings by species
- Prices by species
- Cost information for fleet segments
- ACFM advice for landings by management stocks

Costs and earnings data should be drawn from the Annual Economic Report on Economic Performance of Selected European Fleets, while ACFM advisory data should be extracted from pertinent ACFM reports.

Scenario calculations
The EIAA report presents scenarios. They are intended as information to aid in making political choices. Therefore the scenarios should not be interpreted individually but rather in comparison with one another for each country. Such comparison indicates what change can be expected if one or another choice is made.

On many major species the ACFM provides options according to the level of fishing mortality. Different options for various stocks can be combined in the catch composition of the fleet segments leading to a potentially very large number of scenarios, many of them not leading to converging results.

It cannot be foreseen which TAC will be decided upon by the Council of Ministers and to which extent quotas will be swapped between Member States. For some stocks ACFM does not provide any advice. In other cases the advice is not identical to the TAC management areas.

Only for a relatively few stocks are precautionary Spawning Stock Biomasses and TACs estimated.

Data problems

When combining biological assessment and advice with economic assessment and advice, a number of data problems arise. Based on the problems detected in the work with the economic assessment the problems could be divided into 6 areas:

1. Where quota species are constituting a large part of the landings composition of the fleet segments but the final data are not available

2. Where item one applies, but where data exists and where the management decisions have been made already

3. Where the quota species constitute only a small share of the total landings of the fleet segment

4. Where no biological assessment is made but where precautionary quotas are fixed

5. Where the biological stock assessment areas are inconsistent with the quota management areas

6. Where no assessment and no quota management is in function

The model can be applied with necessary adjustments to all areas.

Assumptions

In many cases assumptions have had to be made regarding information lacking which is essential for use in the model, e.g. the composition of costs and catches of specific fleet segments, price flexibility rates of certain species, etc.

Constant fishing patterns

The calculations require an assumption regarding the relative shares of the various national fleet segments in the national landings of a specific species.

It is assumed that this fishing pattern will not change from the reference year to the year for which the evaluation is made. In other words there is no substitution effect between the inputs to fishing.

The time that becomes available due to reduced effort on one stock remains unused. It is not utilised in another fishery or another species. For short term forecasting, when the quota changes remain within reasonable limits, this assumption can be justified. However, over a longer time period and with more substantial changes in the overall composition of fishing opportunities (quota and non-quota species) the fleets may adjust their fishing pattern to the new conditions.

Effort and catch of non-target species

When a TAC is changed the effort on the specific species will have to be adjusted accordingly. At the same time catches of other species may be affected because of the change in effort and their catch per unit effort (CPUE). These adjustments have been introduced as follows:

- Effort: The fishing effort exerted on a particular species in the reference year is assumed to be proportionate to the share of that species in the total value of the landings of the fleet segment. Consequently, when F<1 is selected in a scenario, the total fishing effort of that fleet segment will be reduced by weighing the new Fs of all species with the respective shares in value of landings (see the example on page 27). Consequently, the composition of effort of one fleet segment by target species shifts away from the species which is to be protected. At the same time the role of all fleet segments fishing this species remains proportionately the same.

- Non-target species: Landings of non-target species are not affected by the reduction of effort on the target species. The implicit assumption may be that either the CPUE increases or that the vessels search for other fishing grounds with different proportions of various species in their total catch.

The effort influences the variable costs in the short and the long run while fixed costs are unchanged. Variable costs are assumed to be non-linear with effort because it is assumed that the stock abundance influences the CPUE in a non-linear way. This implies that i.e. a smaller quota requires less fishing effort to be caught and therefore lower variable costs.

At the same time a lower stock abundance leads to a lower CPUE, which offsets some of the lower effort needed to catch the lower quota. To include this assumption the model operates with a catch-stock abundance flexibility rate. The procedure is summarised in the following items:

- Fishing mortality is changed only for a few species (quota species)

- Initial effort is normalised relative to the catch composition for the relevant fleet segment

- Species effort is changed according to change in recommended landings (TACs and F values)

- Landings per unit effort are dependent on stock abundance

- Landing flexibility rate is assumed 0.1 for pelagic species and 0.6 for demersal species; if no stock information is available the flexibility rate is 0

- Total effort is changed as a weighted average of the landing composition

- Effort is assumed to change as a weighted average of the stock abundances.

Live weight equivalents

As the ACFM advice is provided in live weight, all catches and landings are assumed to be live weight equivalents. In practice some fish is landed headed or gutted so that also the respective price information regards dead weight price per kg. At this stage the prices are unadjusted. This leads to overestimation of forecasted values. It is considered to correct for that in future model versions.

Quota uptake

Nominal quota, as set at the beginning of the year, is considered. However, in practice quotas are swapped between countries, some quota remain unutilised and/or some are exceeded. The total effect of these changes is summarised in an uptake correction factor. This factor allows the projected landings of the coming year to be different from the proposed quota.

Prices

Price level is adjusted to changes in the volume of landings. Future price is calculated based on a price flexibility rate at -0.2. Consequently, value of lower quota is somewhat (20%) offset by higher prices. General price trends could not yet be included and neither could the total European or global catches be taken into account. A greater refinement of price elasticity by species will be pursued in a later stage.

In the model price changes are calculated for each species (e.g. one herring and cod species etc.). Landings from third countries are not included.

2. Definitions

Gross Earnings of the vessel and catches (Value of landings)

Gross earnings of a vessel are evidently determined by annual volume of catches per species and the prices, which those species fetch. The time, which can be spent at sea, and the productivity achieved per unit of time (catch per unit of effort) determine the annual volume.

Variable costs

Variable costs vary directly with effort i.e. fuel, provisions, repairs. When effort, exerted on a certain stock, is reduced due to lower F (or TAC), the total variable costs of that fleet segment are reduced relative to weight of the reduced species in the fleet segment's composition of landings (cf. above concerning effort).

Fixed costs

Fixed costs (including interest payments and depreciation) are kept constant and are assumed not to vary with effort. This is justified because in the short-run no changes in the invested capital can be expected.

Gross value added

Gross value added = depreciation costs + interest + crew share + net profit, or,

Gross value added = Gross revenues - all expenses (excl. labour remuneration, instalments and interest payments on loans).

Crew share

Crew share is a percentage of the difference between gross revenue and variable costs.

Gross cash flow

Gross cash flow = gross value added – crew share *(= income to the vessel)*

Net result

Net result = gross revenues – variable costs – fixed costs – crew share

3. Presentation and interpretation of results

EIAA contains a short, a medium and a long-term assessment of expected changes in economic performance. Four main indicators are used for this purpose:

- *Gross revenue:* Is total landing value and is easy to relate to because it compares to total landing volume and are often used as an indicator of gross income.

- *Crew remuneration:* Earnings of the crew members, including a skipper-owner. An important indicator for the economic attractiveness of the profession. If the figure is divided by an opportunity salary, employment measured in full-time fishermen is easily calculated.

- *Gross cash flow:* Can be considered the main indicator for the feasibility of the survival of fishing companies in the short run (2-3 years). Negative cash flow cannot be born for long, as the cash expenses exceed cash income. Low cash flow will lead to problems of repayment of loans. The policy of the banks becomes of crucial importance in such situation.

- *Net profit (result):* Represents the "above normal" economic remuneration of invested capital. As this is the 'bottom line' of the calculations, it is very sensitive to changes in earnings or costs. It must be stressed that the net result calculated in EIAA is an economic and not a fiscal indicator. This means that it shows the long-term feasibility of survival of the sector. A low economic net result may be still quite satisfactory in fiscal terms in the medium term (4-5 years). Net result is presented in the diagrams relative to the gross revenue, and in this way the result represents a substitute for net profit relative to investments.

This information is presented in diagrams, with the scenarios placed along the horizontal axis. The value of landings, crew share and gross cash flow are shown as histograms. Below each scenario there is a verbal indication of the economic performance of the fleet segment and the precise value of the ratio of net profit to gross value of landings. The classification is derived from this ratio as follows:

- *Profitable:* Net profit/gross value of landings > 5%.

- *Stable:* -5% < net profit/gross value of landings < 5%

- *Unprofitable:* Net profit/gross value of landings < -5%. In this situation fishing cannot continue in the long run.

4. Specification of the biological data required for the EIAA model

All data specified below must be defined with precise correspondence to the definition of TACs in terms of species and areas for all North East Atlantic stocks, i.e. including Norway, Iceland, Russia, Faeroe Islands, etc.

The following data is required:

- Estimation of long term TAC under precautionary conditions (yield per recruit at Fpa * number of recruits).

- Time series of SSB, annually up-dated to reflect latest VPA or another indicator reflecting fish density SSB under long term sustainable conditions.

- Sets of proposed Fs, incl. Fpa, with the corresponding TACs, e.g.:

    - TACs at Fpa,

    - TACs at 0.8 F, and

    - TACs at 1.2 F.

- Indication of the multi-species effect, e.g. probability distribution that all stocks will recover at the same time, if management is properly implemented.

If information about fishing mortalities and SSB does not exist, which is the case for a number of management areas, only the TAC fixed for the management area is used in the calculation.

5. Selected model features

The use of price and stock abundance flexibility rates

The forecast prices *P* for species *i* and fleet segment *j* are calculated by use of the subsequent formula, where α is the price flexibility rate and Q is the landing volume.

$$Pfcast_{i,j} = \frac{Pbase_{i,j}}{Qbase_i^{\alpha}} \cdot Qfcast_i^{\alpha} . \qquad \text{It is assumed that } \alpha \leq 0 \qquad (1)$$

The variable costs *VC* of fleet segment *j* is adjusted by the change in effort caused by the change the total allowable catches *TAC* of each species *i* and the change in the stock abundance (density) calculated by the spawning stock biomass SSB in the base year and the forecast year. The flexibility rate β indicates the impact on *VC*, through the effort change, by the change in stock abundance. For pelagic species it is assumed that the flexibility rate (density impact) is small while it is large on demersal species.

The forecast effort for each member state and member state fleet segment (member state subscript omitted) is calculated in the following way. Forecast landings value of each species *i* subject to a TAC (LVTAC) is put relative to the sum of landing values of TAC species in the base case for the fleet segment. This produces coefficients displaying the shares of the species in the landing value composition of the TAC-species.

These coefficients are adjusted (multiplied) with the relationship between the spawning stock biomasses (SSB) lifted to an exponent (the flexibility rate). This relationship expresses the change in stock density. Finally, the coefficients calculated for each species are added into one figure for the fleet segment showing the effort required to catch the fleet segment's share of the new TAC

$$Efcast_j = \sum_i \left(\frac{LVTACfcast_{i,j}}{\sum_i LVTACbase_{i,j}} \cdot \left(\frac{SSBfcast_i}{SSBbase_i} \right)^{(-\beta)} \right); \quad \text{It is assumed that } 0 \leq \beta \leq 1 \qquad (2)$$

The change in effort affects the variable fishing cost in a linear way. The element *Ebase* is included in the equation to secure that effort in the forecast situation is normalised relative to base case situation. Effort in the base case is not always fixed at 1 because there are minor differences between the observed landing values derived from the Annual Economic Report (AER) of quota species and the landing values that are calculated in the EIAA-model taking the empirically estimated fleet segment landings multiplied with recorded prices. The landing values (*LVTAC*) in the base case are the ones from the AER-report.

$$VCfcast_j = VCbase_j \cdot \frac{Efcast_j}{Ebase_j} \qquad (3)$$

In the new version of the model the above formula (2) has been changed to allow for a non-linear increase in future effort, and hence variable fishing costs, as a function of future changes in landings volume.

$$E_{fcast\ j} = \sum_i \left(\frac{LVTAC_{\ fcast\ i,j}}{\sum_i LVTAC_{\ base\ i,j}} \cdot \left(\frac{LTAC_{\ fcast\ i,j}}{LTAC_{\ base\ i,j}} \right)^{(\chi)} \cdot \left(\frac{SSB_{fcast\ i}}{SSB_{base\ i}} \right)^{(-\beta)} \right) \quad (4)$$

Where it is assumed that χ is very close to 0 until otherwise is documented.

LVTAC is landings in value and future quotas in value, LTAC is landings volume and future quota, SSB is spawning stock biomass.

The flexibility rate:

Assuming a price-quantity function as below, the flexibility rate is equal to the exponent to the independent variable:

$$Pbase = a \cdot Qbase^{\alpha} \Rightarrow a = \frac{Pbase}{Qbase^{\alpha}} and \frac{\partial Pbase}{\partial Qbase} = \alpha \cdot a \cdot Qbase^{\alpha - 1}$$

$$flex = \frac{\frac{\partial Pbase}{Pbase}}{\frac{\partial Qbase}{Qbase}} = \frac{Qbase}{Pbase} \cdot \frac{\partial Pbase}{\partial Qbase} = \frac{Qbase}{f(Qbase)} \cdot \frac{\partial f(Qbase)}{\partial Qbase}$$

By proper substitution we get:

$$flex = \frac{Qbase}{a \cdot Qbase^{\alpha}} \cdot \alpha \cdot a \cdot Qbase^{\alpha - 1} = \alpha$$

This result also applies to stock abundance-catch flexibility rate.

6. Special Features of the EIAA Calculations

The purpose of this section is to throw light on two features of the EIAA model and its application. First, the possible application and related process is discussed. Secondly, the way the model works, and in particular how it handles effort and effects of stock abundances is described. The EIAA model is set out in detail in Salz and Frost (2000)[12].

The work with the EIAA model aims at producing advice that could form the basis for the final determination of the TACs. The following procedure has been proposed but it has been difficult to implement in practice:

- The Annual Economic Report, containing data on fleets, costs and earnings of fleets, etc. should be finalised in draft form before November 1st. This is the case now for a large number of fleet segments.

- ACFM advice on TACs should be available in late October and could then be applied in the EIAA model together with the information from the AER.

- An EIAA Report could be presented to the STECF together with the developed model at the STECF meeting in November.

- Any changes to the ACFM advice made by the STECF could be substituted into the model for economic assessment for selected fleet segments and afterwards be conveyed to the Commission.

A number of factors have made this procedure difficult to pursue. One is that there is still some work to do in the development of the interface between the species list in the EIAA model and the TAC list for the EU management areas. Another and more important reason is that the ACFM information arrives very late and is incomplete with respect to the EU management areas and the data needed.

The EIAA model requires the following data:

- TACs allocated to the EU, and the biomass levels, for all management areas for the short run calculations.

- Estimation of TACs and biomasses under long-term sustainable conditions for the long run calculations.

[12] Salz, P. and H. Frost (2000): Model for economic interpretation of ACFM advice (EIAA) page 165-181, in E. Lindebo and N. Vestergaard edt. Proceeding of the XIIth Annual Conference of the European Association of Fisheries Economics (EAFE)

In the short run the aim is to improve the EIAA calculations by including more fleet segments. What is required to accomplish this is that data for the catch composition (landings) for a number of fleet segments is improved.

The EIAA model has further been developed to assess the medium to long run sustainable situation with respect to fish stocks, which requires data about the fish stock biomasses. This area is not subject to the same time restriction as is the information about the TAC's for the short-term assessments but on the other hand the data information about long run biomasses and TAC's is at present incomplete in the EIAA model and could without doubt be improved.

In the following sections some particular features of the EIAA calculations are highlighted. The EIAA model is designed to calculate the required effort measured from the output side i.e. landings to catch the TACs. This is contrary to many models that work from the input side i.e. calculate how much could be caught varying the effort.

An explicit functional form for the effort calculation in the EIAA model is:

$$E = a * \frac{L^{\chi}}{X^{\beta}}$$

where

L: landings

X: spawning stock biomass

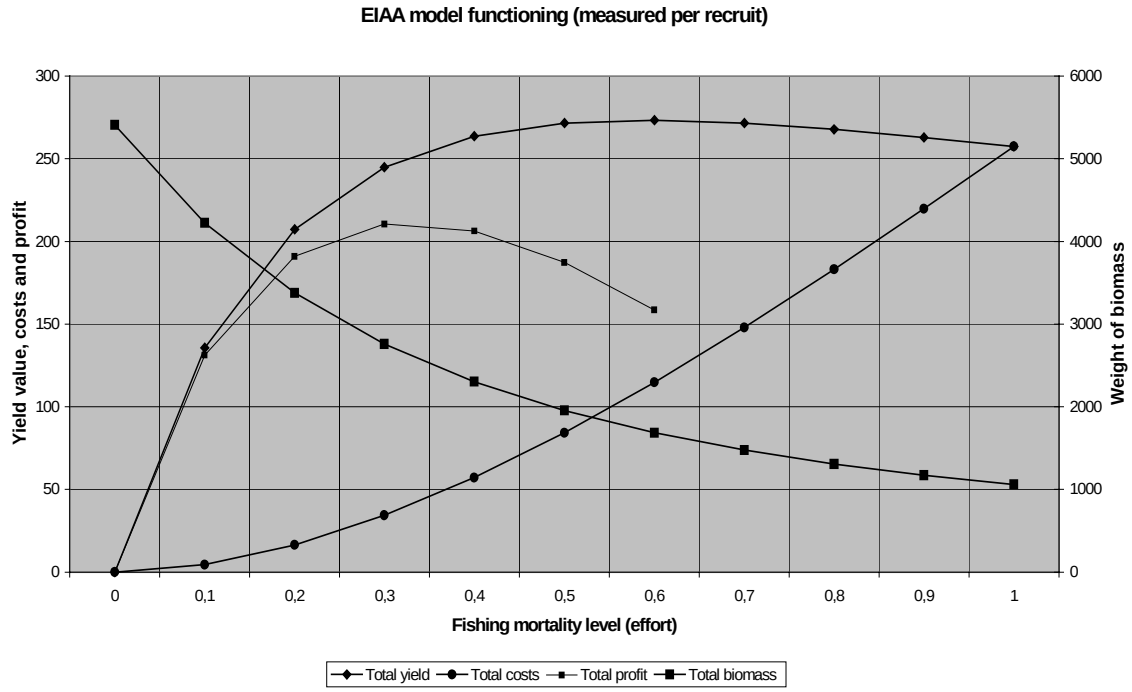
chi and beta are parameters ("elasticities")

Effort is positively correlated with the size of the landings and negatively correlated with the size of the fish stocks X. The way the model works is that once E is determined for the future years for the country in question where L is equal to the quotas, the variable costs determined in the base case are adjusted linearly up or down for the future years. The landings are exogenously given by the quotas and the landing value is determined by the quota multiplied with the prices. The management authorities fix the quotas following biological advice. The biological calculations that form basis for the TAC advice also calculate and advise upon the stock abundance X.

The relationship between E and X is very important for the calculation in the EIAA model because it controls the CPUE, and this relationship forces effort backwards to the peak point, or to the left of the peak, of the yield curve. If X is high enough effort will decrease for a given TAC.

When and if the EIAA model is to be used for long term assessment the inclusion of the fish stock abundances is imperative, and that type of information has to be introduced in cooperation with biological expertise.

In a stylised form the EIAA model is shown in the subsequent figure for a single species, plaice, reflecting growth and mortality characteristics in an age structured biological model. If the current situation is described by the intersection between gross revenue and cost at fishing mortality level 1, an increase in the TAC in association with an increase in the stock biomass (i.e. moving to the left will increase costs to start with because of the higher landings but this increase is more than counterweighted because of the stock abundance effect).



The EIAA model works in such a way that it is assumed that the TACs are taken, but it also works on fleet segment levels rather than by species. That means that a number of species are included in the pertinent fleet segments' catch composition at the TAC point and the stock abundances for each segment differ.

The equation that determines effort in the EIAA model for each country is:

$$E_{0+t,j} = \sum_i \left(\frac{VQUOTA_{0+t,i,j}}{\sum_i VQUOTA_{0,i,j}} \cdot \left(\frac{QUOTA_{0+t,i,j}}{QUOTA_{0,i,j}} \right)^{(\chi)} \cdot \left(\frac{SSB_{0+t,i}}{SSB_{0,i}} \right)^{(-\beta)} \right)$$

The indices *t, i, j* are time, species, and fleet segment, and 0 is the base year that is constituted by three years average to level out variations in landings and prices.

The first element in the equation says that fishermen direct their effort according to the landings value of the species, the second element determines the accessibility to the species which is controlled by the χ exponent; if χ is zero the fish is easily accessible, and χ increases if accessibility becomes harder. The default value in the model for χ is zero (the element becomes 1) but the inclusion of the element makes it possible to distinguish between different accessibilities in particular for demersal and pelagic species. Finally, the SSB element accounts for the effect of the biomass on effort. The default value of $\beta = 0$ implies that there is no stock abundance effect on effort. With a full effect $\beta = 1$.

A numerical example shows how the equation works with a price for each species equal to 1. Although the landings increase by 50% (135 to 202.5), the effort (and costs) stays almost the same (increases 5%). This is the net effect of an increase in effort due to higher landings at 50%, but counterweighted by the increase in stock abundance.

Example of effort calculation with the EIAA formula

Species	Landings = quotas						Stock abundance				Effort
	Year 1		Year 2				Year 1	Year 2			Year 2
	Landings	Share (effort)	Quota	Share (effort)	Chi (χ)	Effort adjust.			Beta (β)	Effort adjust.	
	1	2	3	4	5	6	7	8	9	10	11
1	50	**0.370**	75.0	0.556	0.1	1.041	200	400	0.6	0.660	**0.382**
2	40	**0.296**	60.0	0.444	0.1	1.041	150	300	0.6	0.660	**0.305**
3	30	**0.222**	45.0	0.333	0.1	1.041	100	200	0.6	0.660	**0.229**
4	10	**0.074**	15.0	0.111	0.1	1.041	50	75	0.6	0.784	**0.091**
5	5	**0.037**	7.5	0.056	0.1	1.041	50	75	0.6	0.784	**0.045**
Total	135	**1**	202.5	1.500							**1.052**

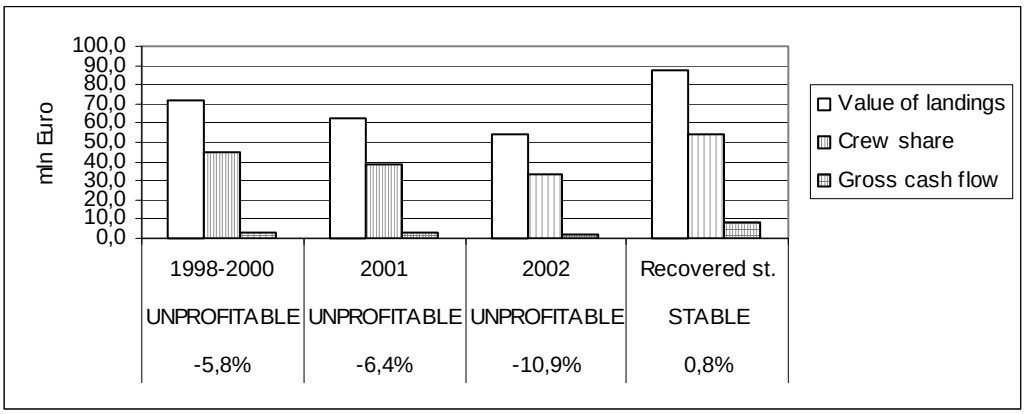
Note: Column 11 is calculated as Col.4 * Col.6 * Col.10

In the subsequent figures are shown examples of recovered stock situations for a Danish and a Dutch fleet segment for which reasonably good estimates for recovered stocks are available for the most important species such as cod, plaice and sole. The calculations are made with χ values at 1 and β values at 0.6. These assumptions imply that there are decreasing returns to scale in the fishery which is an often used assumption in economic calculations.

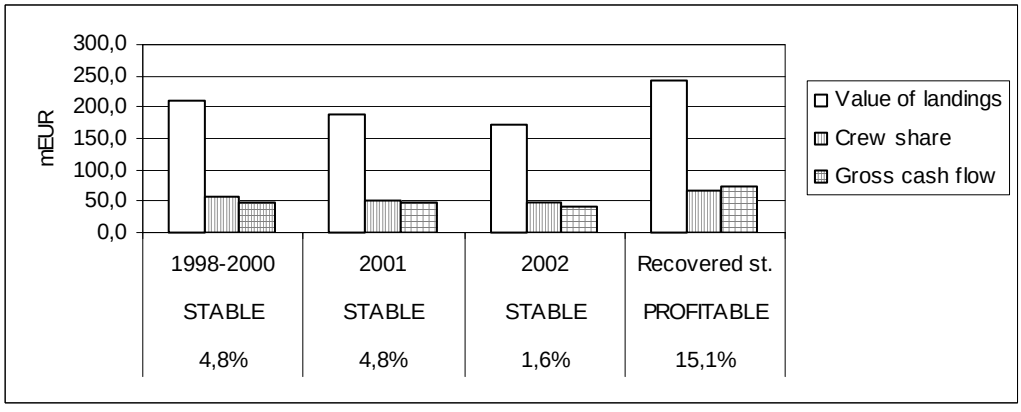
Effort ratios for one Danish and one Dutch segment (based on quota species only)

Period	Denmark, gill netters	The Netherlands, Beam trawlers > 811 kW
1998-2000	1.000	1.000
2001	0.716	0.812
2002	0.603	0.752
Long term	1.081	0.964

Denmark, Gill Netters



The Netherlands, Beam Trawlers > 811 kW



15 ANNEX IV SGRST REPORT ON SPINY LOBSTER RECOVERY PLAN IN CORSICA ISLAND

WORKING PAPER

SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES

SGRST-SGECA meeting WORKING GROUP

Brussels 28-31 October 2002

EVALUATION OF CORSICAN RECOVERY PLAN FOR SPINY LOBSTER (*Palinurus elephas*) STOCK

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1 INTRODUCTION

Council regulation (EC) No 2792/99 lays down the detailed rules and arrangements regarding Community structural assistance in the fisheries sector. In accordance with provision defined in Article 16.1(c) of the above regulation, the Commission requested STECF to provide its opinion on scientific and economic justifications of a recovery plan proposal submitted by French Administration.

The joint subgroup SGRST-SGECA, convened in Brussels 28-31 October 2002, was also requested to evaluate such a plan in order to prepare the work to be done by the STECF.

At the beginning of the meeting the Commission explained the terms of references for the meeting and the STECF responsibilities in relation to proposals for stock recovery plans. A brief discussion took place concerning the criteria that should guide the experts and particularly the following:

-diagnosis upon which the recovery plan is based: status of the stock and evolution of main fishery indexes.

-prognosis and expected results of the measures proposed, including benchmarks for recovery , appropriateness of the methodology to evaluate progress towards these objectives.

-congruence of the plan with the targets (e.g. timeframe, appropriateness of management measures with conservation objectives, likely effectiveness of proposed measures etc.) as well as with ongoing fishing practices and management measures already implemented/enforced.

-completeness of the plan: conservation, market, control, monitoring and research.

-short and long term socio-economic effects

The Commission also empasised that recovery plans under Art. 16(c) should be based on genuine conservation needs and be structured adequately for the searched objectives. This opportunity should not be used as an excuse to subsidise the fishing fleet,with the consequent high risk of eliminating the expected conservation results, as well as to delay other urgent conservation management measures.

The recovery plan refers to spiny lobster fisheries in Corsica Island (France).

The subgroup, based mainly on the report submitted, prepared a summary description of species biology, of the fisheries involved and of the management measures as presented in the submission.

Comments have been on the basis of the above recalled guidelines with particular evaluation of appropriateness and likely probabilities to improve the status of the stock.

2 Background information

2.1 Distribution and biology of spiny lobster (Palinurus elephas*)*

The spiny lobster (*Palinurus elephas*) is a very valuable species living in the coastal zone of the Western Mediterranean. The species population in Corsica shows a depth stratification, where the adults live deeper between 50-100 m of depth, in hard substrate,while the juveniles live inside the Posidonia meadows close to the coastline, . The configuration of the Corsican shelf, surrounded by deep marine canyons, delimit a narrow continental shelf along the east and west coast of the island and allows the communication of the stock with the Sardinian continental shelf and the island of Elba.

The species is active only during the night, preferring to stay in shelters or in repaired areas during the day. Their nocturnal activity increases during the summer, when the temperature is higher and males are generally more active than females. During the reproductive period , which in Corsica goes from July to end September, large number of spiny lobsters moves in open areas to mate and after that, the specimens return to their shelters, where females incubate their fertilized eggs for a period of five months, until next January or February. The larvae are pelagic and the juveniles can be found in the coastal zone between 15-25 m of depth.

Spiny lobster grows slowly. From the data reported in the Recovery plan proposal , specimens reache a total length of 10 cm after one year of life, 25 cm after 5 years, almost 35 cm after 10 years and 40 cm after 15 years. Generally, males grow faster than females. Male specimens weight 1 kg after 7,5 years of life but females reach the same weight after 9 years. The length at first maturity is almost 24 cm, corresponding at animals ageing 5 years and weighting about 0.5 Kg. 24 cm of total length is the current minimum landing size reported in the Council Regulation No 1626/94.

A similar species (*Palinurus mauritanicus*), lives in deeper waters, down to 250 m of depth and rarely is caught by the small-scale coastal fishery, that targets primarily the spiny lobster.

2.2 Fishery of spiny lobster

Spiny lobster is a valuable species in Corsica, especially in summer, during the touristic period and it is the main target species for the small-scale fishery vessels. There are 200 boats in this category, with a mean length of 8 m. and a mean power of 80,2 kW. This "petit métier côtier (PMC)", as it is currently classified, usually operate inside the 3 miles coastal zone and seasonally use either long lines or other specialised fixed nets.

In the island, there are other types of boats fishing spiny lobsters, including 7 boats categorized as "petit metier du large (PML)" using often drifting long line, in the open sea, and 12 bottom trawlers fishing along the East coast. From the data reported it is not clear if these boats catch the spiny lobster or the other species of Palinurus living in deeper waters. Furthermore, it is not clear which gear is used by the PML vessels to fish the spiny lobster. Another boat category, the "peche au corail" is not involved in the this fishery. The boats, as usually in the Mediterranean islands, are widespread in many small ports, where they land the catches, without any particular market organisation.

The spiny lobster fishery started in the area at the beginning of the century by using traps; spiny lobster production kept quite stable around 300 T/year and then fallen down to about 100 T/year in late fifties. In early 60's, fishermen introduced nylon trammel nets, with wide mesh size. Because trammel nets have a higher fishing power than traps, production of spiny lobster raised again up to 250 T/year ,but only for five years when the production fallen down again to 100 T/year. Then the production raised again along the sixties and seventies, most probably due to an increase of fishing effort (more vessels?, longer gears, longer soaking times), to reach an other maximum close to 250 T/year in 1983 and 1984. Then, the production began to decrease again and reached 127 and 117 t/year in 2000 and 2001 respectively; the above points are shown in figure 1 which presents also a trend-line that very roughly gives an idea of the trend.

Spiny lobster represents 90% of the current crustacean captures in the continental shelf of the island, however it is not clear whether such production include also *Palinurus mauritanicus*.

According to the data reported, the catch per boat has been decreasing from 8-18% in the four Prud'homie of the island, in the last 3 years. The decrease for the trawlers fluctuated from 15-61%, depending on the area. ,

It is reported that commercial catch rates passed from about 7-10 Kg/1000 m/48 h, two decades ago, to the current 0.7-1 Kg/1000 m/48 h.

Furthermore, it is reported that the mean length of the catches is constantly decreasing and undersized specimens, that is specimens smaller than 24 cm or 0.5 kg, are much more frequent than in the past in the commercial catches. Nevertheless, the report does not provide any length frequency diagram supporting this statement.

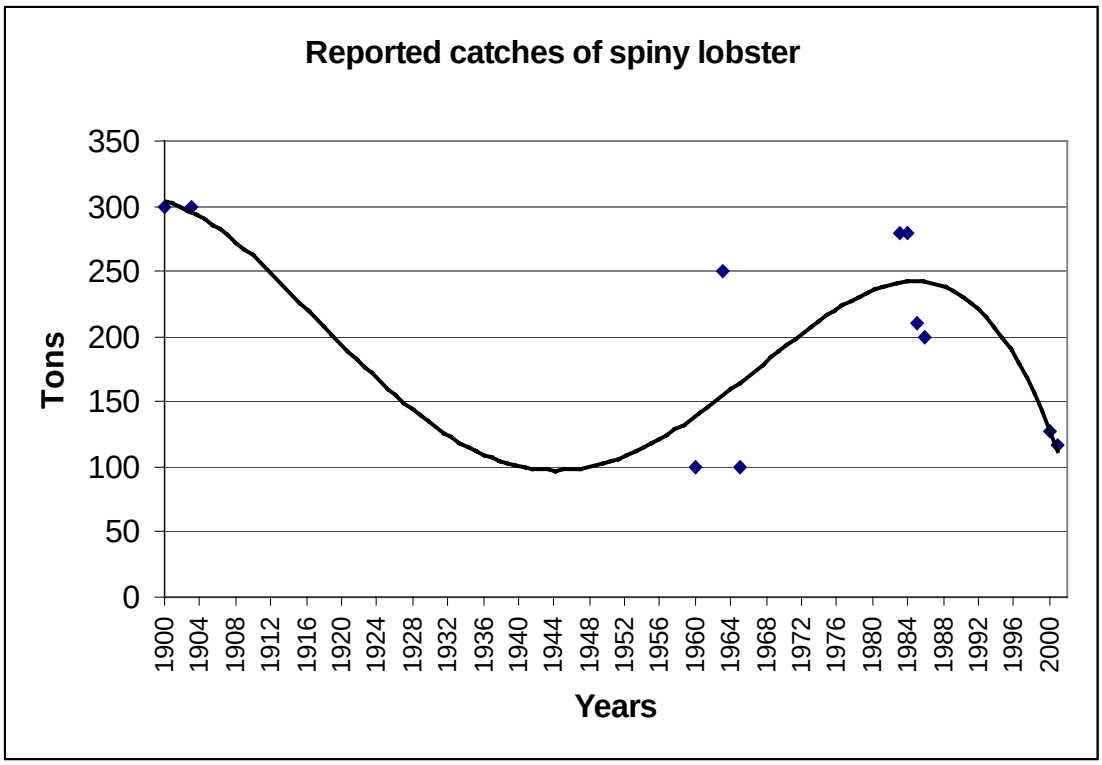

Fig. 1: Spiny lobster catches based on evidences reported in the submitted recovery plan project. Trend-line is given to provide a very rough idea of catch trend.

2.3 Current management measures

During the last 30 years some technical management measures have been applied in Corsica for spiny lobster fishery either under French-local authorities or Community law. Since 1968 a closed season for the spiny lobster fishery has been established, from beginning of October to the end of February, the period that females incubate their eggs in the shelters. The closed season was prolonged by 15 days in September 1999, but this extension was withdrawn in the following years. Since 1964 a number of small closed areas were created along the island coast, aiming to protect crustaceans stock.Since1994 the minimum landing size has been increased from 18 to 24 cm, close to the species length at first reproduction. and under the European regulation No 1626/94, the total length of the nets was established at 5.000 m./boat . Finally for the period 2000-2004, the scuba diving fishing is prohibited in the territorial waters of Corsica.

The spiny lobster catches are low during spring, but increase from June to September. In the latter month, before the closure of the fishing season, the production arises at almost 20% of the total annual catch. The female proportion in the catches increases during September, due to their movement from the shelters to the mating grounds.

2.4 Economic relevance

The spiny lobster fishery is important for the Corsican economy, even if the total fished quantity it is not known with precision. A mean annual production of 122 tones is reported for the years 2000-2001, reaching a total value of 5,58 million Euro. 219 fishing vessels are involved in spiny lobster fishery including 200 boats of "petit metiers cotiers", 7 boats of "petit metiers du large" and 12 trawlers. Concerning employment, the available data shows a number of 200 boat owners and 150 fishermen as crew.

3 Recovery plan

The *subgroup* reviewed the document provided by the Commission, concerning the recovery plan for spiny lobster fishery in Corsica. The plan has the objective to lengthen the closed season for spiny lobster fishery by one additional month aiming to decrease the fishing pressure on the stock. The lengthening of the closed season, according to the submitted report, will be a first step for the definition of the stock final management plan and is considered to be a precautionary measure. It is expected to facilitate the research for this species and to support the application of long term measures, which will allow the sustainable exploitation of a healthy stock.

In the report submitted, the recovery plan has the following additional objectives:

- To facilitate the scientific research in order to define additional management measures
- To prepare a code of responsible fishery to be signed by the fish skippers involved
- To guarantee the sustainable exploitation of the stock
- To enforce the fishery control through the co-ordination of different competent regional authorities.

The recovery plan is proposed only for Corsica but it is mentioned that a regional co-operation with Sardinian authorities will be sought in order to improve a common stock management in these bordering regions.

In details, the recovery plan proposes the extension of the closed season of spiny lobster fishery, by 30 days during September 2003 and 2004 that, possibly, could be extended by a further year. September is considered an important month for the stock recovery mainly because during September the animals are vulnerable due to their movement to the mating areas and because the catch in that month is almost 20% of the estimated total fished per year.

The plan will be applied to the whole fleet based in the island, irrespectively of the boat category. However it is not clear if all the boat categories are involved in the fishery of *Palinurus elephas* or some of them, particularly the bigger longliners and the trawlers, are fishing the second species, *Palinurus mauritanicus*, a species living in deeper waters. The scientific program should be focused on the stock evaluation, the recording of the relative production, the size/age structure of the landed quantities and the effort monitoring.. Moreover the interregional co-operation with Sardinia should be implemented through the submission of an INTERREG project, aiming to study the stock in both regions.

It is planned that the scientific research is carried out by the Corsican University, with support from IFREMER and the local fishermen organizations. It is not reported if the scientific plan is ready or if it will depend on the approval of the recovery plan.

Enforcement of control will be done in cooperation between thelocal authorities, the local administration and the professional fishermen.

Taken in consideration the mean species prize of 45,73 Euro/kg, a value reported for 2001, and a mean total production of 24,8 tones for September, the annual financial compensation amounts to 1.013.988 Euros per year of which 953.543 Euros for small scale coastal boats (185) and 60.445 Euros for trawlers (12).

4 Comments and SGRST-SGECA opinion

The subgroup considers that a recovery plan should be based on clear scientific evidence of the stock status including the size/age structure of the landings and at least a rough estimation of fishing mortality. In the case of the Corsican spiny lobster recovery plan, no scientific information is provided and consequently it is difficult to evaluate properly the current stock status.

The subgroup believes that a recovery plan needs clear objectives, from short to long-term, as well as benchmarks to measure how the recovery plan proceeds. Such a requirement is missing in the proposal.

The submitted proposal does not present clear objectives for the reduction of the applied fishing effort and it is always conceivable, even after the prolongation of the closed season, that effort could increase during the rest of the year when fishing is authorised. Some other measures as the application of a short week, the reduction of the net length, the limitation of soaking time as well as the establishment of larger protected areas could reduce the fishing pressure significantly providing, in addition, some alternative management options.

From the data reported it is evident a drastic decreasing trend both of catches and of nominal CPUE. Furthermore it is noted a decreasing mean length of the landed specimens. These data suggests a status of severe overexploitation of the stock and the subgroup recognises that there might be reasonable needs for a recovery plan for spiny lobster in the region .

The proposed plan does not foreseen to stop completely the fishing activity, but only to impede the use of a certain type of trammel net, the subgroup believes that there might be problems of important by-catches of spiny lobster in other fixed gears and, furthermore, bottom trawlers, being unselective, will continue to catch spiny lobster. Therefore, it is doubtful whether the envisaged approach will assure a real and relevant decrease in fishing mortality.

The subgroup notes that data collection and monitoring of commercial fisheries might have been unreasonably very poor in the last decades in Corsica island. Therefore, the subgroup understands that the poor information reported might be also the only available. However this lack of basic information makes very difficult for the subgroup to fully evaluate the reliability and likely expected effectiveness of the proposed recovery plan.

Notwithstanding, the subgroup considers that the current proposal, as it stands now, cannot be considered a recovery plan and there are doubts that could bring measurable conservation improvements.

Nevertheless, the subgroup also believes that the following information, even as rough estimates, should be somehow already available and should have been reported at least to support some statements in the report:

1) Spiny lobster by-catch rates of fixed fishing gears targeting fin-fishes have not been reported. It is therefore difficult to evaluate whether a simple interdiction to use the specific

crustacean trammel nets is sufficient to eliminate the catches of spiny lobster. Some rough estimates should be anyhow already be available to stakeholders

2) A statement in the report underline the decreasing number of fishing vessels occurred in past years, without providing any additional data. Trend of fleet capacity and number of vessels by fleet segment should have been included in the report.

3) It is reported that fishing gear characteristics, hanging ratio and soaking time differ among the different ”prud'homies”. Therefore such information should be already easily available to stakeholders, even though not scientifically measured, and should have been included in the report

4) Average number of days per year dedicated to fishing spiny lobster during the authorised fishing season should be available

5) more clarifications on the current fishing practice are needed, as for example whether the trammel nets are left quasi permanently in the waters during the authorised period or the net is bring back to the harbour each 48 h- 96 h.

In definitive, a more deeply and updated scientific knowledge of spiny lobster fisheries is urgently needed, irrespective of the recovery plan. In fact, a recovery plan to be reliable needs to be confronted with some reference situation and it is not the case now because no information is available.

The subgroup believes that if the Commission may wish to support such a plan the proponents should be requested to consider, in addition to more justifications for the points above, the following :

- Since spiny lobster is considered a shared stocks between Italy and France, it would be advisable that current data and knowledge of such a fishery be presented at the GFCM-SAC meetings to obtain a scientific evaluation of the status of the stock.
- Some measures aiming to reduce the juveniles fishing mortality should be implemented. Juveniles live also in Posidonia meadows where they find protection. The enlargement of current protected zones (cantonnement de peche), covering the areas with large concentration of young specimens, as well as the establishment of new ones could be crucial for the recovery of the stock.
- In the proposal there are actions aiming to impede trade and sell of spiny lobsters during the “closed season” . However, it is not clear whether there are legal basis to enforce and properly control such event. Since, it is a basic aspect of a possible recovery plan, the proponents should be asked to present a draft of legislation aiming to enforce it.
- It is well known that the trammel net for crustaceans has a very reduced selectivity, acting as entangling net, irrespectively of mesh size. These types of nets give high discarded quantities and by-catch and if they are used in areas covered by Posidonia, they increase the fishing mortality of juveniles. Then the introduction of a more selective gear and of different fishing practice could help the recovery of stock.
- In addition to the extension of the closed season, other possible measures could be helpful in reducing the fishing mortality, during the other months (June-August), as for examples a short week, reduction of net length etc..
- Considering the age at first maturity of spiny lobster the proposed duration for the recovery plan is considered not adequate and should be extended for not less than 6 years. A shorter recovery plan doubtfully is likely to bring improvement in the status of the stock and, furthermore, does not allow the detection of any possible future amelioration in the stock status.

16 ANNEX V MIXED FISHERY – EXAMPLE-RUN USING NORTH SEA LANDINGS FOR COD, HADDOCK, WHITING, SAITHE, SOLE AND PLAICE.

At the Commission's request a specific selected example of model input and output has been included here. The input data by species by fleet are given in Table 1 to 6 for cod haddock plaice saithe sole and whiting respectively. The weights by age by species are given in Table 7. The input options and run-log are presented in Table 8. The results are given in Tables 9 and 10. Other possible options can be found in the report of the subgroup on Resources Status (SGRST) dealing with mixed fisheries (SEC(2002) 1373). Scenario's based on landings value have been considered, but where not feasible in the timeframe of this meeting. STECF endorses the general methodology behind the model but have not validated the numerical calculations and the results cannot be guaranteed as correct. The data used to provide input to the model should be viewed with caution. The limitations are:

Catch is taken as landings only, excluding discards,

A common age structure is applied to all fleets

Nephrops catches are excluded

high proportions of catches (up to 70% for haddock and whiting) are not allocated to fleets

The input options for the model run, which are given in table 8 and were specified by the Commission. The model assumes stability of species linkages; this stability cannot be expected, given the associated changes in fishing opportunity implied by the resulting changes in TAC and any technical measures that are to being implemented in 2001 and 2002. STECF is not able to validate the suitability of the input data, the numerical veracity of the output or endorse the choice of this run as an appropriate management option.

The scenario for apportioning catch between fleets and the management objectives for restraint of catches of cod and other species is that requested by the Commission. STECF notes that these are not the only possible management objectives and other choices based either on biological or economic criteria could also be evaluated.

The example was run with parameters set as follows:

Fishery mortality set to 0.2xFsq for Cod, Fsq for Saithe and according to the ICES advice for Haddock, Whiting, Sole and Plaice.

Decision weight was set at 1.0 for cod and 0.01 for all the other species.

In put catch numbers are derived from landings by weight by fleet

Minimisation method chosen was Method 34 = Minimize abs. (SS.F-MS.F)/SS.F to estimate fleet effort.

The proportion of change from each fleet was proportional to the abundance by species within a fleet.

The species risk factor (weighting factor) by the proportion of the species in the catch within the fleet was not applied.

Subsequently STECF found an error in fleet allocation of haddock the database held in Denmark was updated and the subgroup chairman has carried out a further run. Differences between the two runs are negligible at less than 0.02 in all cases.

Table 1 Input data, landings by fleet by age used in the commission's example

COD

Fleet / age	0	1	2	3	4	5	6	7	8	9	10	11	Grand Total
B_MIS	0	36.375	343.266	102.724	19.210	17.749	2.452	1.390	0.458	0.225	0.096	0.016	
B_OTB	0	67.760	639.443	191.357	35.785	33.064	4.568	2.589	0.853	0.420	0.178	0.029	
B_TBB	0	357.414	3372.887	1009.358	188.758	174.403	24.097	13.656	4.501	2.213	0.939	0.153	
DK_GN	0	1056.427	9969.412	2983.409	557.923	515.493	71.225	40.365	13.304	6.540	2.774	0.453	
DK_MIS	0	194.395	1834.491	548.983	102.665	94.857	13.106	7.428	2.448	1.204	0.510	0.083	
DK_OTB1	0	30.944	292.018	87.388	16.342	15.100	2.086	1.182	0.390	0.192	0.081	0.013	
DK_OTB2	0	94.830	894.905	267.806	50.082	46.273	6.394	3.623	1.194	0.587	0.249	0.041	
DK_PTB1	0	18.641	175.911	52.642	9.845	9.096	1.257	0.712	0.235	0.115	0.049	0.008	
DK_PTB2	0	121.206	1143.808	342.292	64.011	59.143	8.172	4.631	1.526	0.750	0.318	0.052	
DK_SDN1	0	142.987	1349.358	403.804	75.515	69.772	9.640	5.463	1.801	0.885	0.375	0.061	
DK_SDN2	0	142.933	1348.842	403.649	75.486	69.745	9.637	5.461	1.800	0.885	0.375	0.061	
DK_TBB1	0	2.181	20.582	6.159	1.152	1.064	0.147	0.083	0.027	0.014	0.006	0.001	
DK_TBB2	0	16.941	159.872	47.843	8.947	8.267	1.142	0.647	0.213	0.105	0.044	0.007	
EW_GN	0	209.121	1973.460	590.570	110.442	102.043	14.099	7.990	2.634	1.295	0.549	0.090	
EW_MIS	0	174.659	1648.244	493.247	92.241	85.226	11.776	6.674	2.200	1.081	0.459	0.075	
EW_OTB1	0	168.767	1592.643	476.608	89.130	82.351	11.378	6.448	2.125	1.045	0.443	0.072	
EW_OTB2	0	381.453	3599.743	1077.246	201.454	186.134	25.718	14.575	4.804	2.362	1.002	0.164	
EW_SDN1	0	3.396	32.051	9.592	1.794	1.657	0.229	0.130	0.043	0.021	0.009	0.001	
EW_TBB1	0	4.902	46.260	13.844	2.589	2.392	0.330	0.187	0.062	0.030	0.013	0.002	
EW_TBB2	0	61.311	578.589	173.146	32.380	29.917	4.134	2.343	0.772	0.380	0.161	0.026	
FR_GN	0	32.283	304.648	91.168	17.049	15.753	2.177	1.233	0.407	0.200	0.085	0.014	
FR_MIS	0	1.213	11.450	3.426	0.641	0.592	0.082	0.046	0.015	0.008	0.003	0.001	

FR_OTB1	0	129.139	1218.671	364.695	68.201	63.014	8.707	4.934	1.626	0.800	0.339	0.055
FR_OTB2	0	21.213	200.188	59.908	11.203	10.351	1.430	0.811	0.267	0.131	0.056	0.009
FR_TBB	0	3.927	37.058	11.090	2.074	1.916	0.265	0.150	0.049	0.024	0.010	0.002
GER_GN	0	3.762	35.499	10.623	1.987	1.836	0.254	0.144	0.047	0.023	0.010	0.002
GER_MIS	0	0.385	3.638	1.089	0.204	0.188	0.026	0.015	0.005	0.002	0.001	0.000
GER_OTB1	0	54.425	513.607	153.700	28.743	26.557	3.669	2.080	0.685	0.337	0.143	0.023
GER_OTB2	0	88.718	837.225	250.545	46.854	43.291	5.981	3.390	1.117	0.549	0.233	0.038
GER_PTB1	0	22.841	215.546	64.503	12.063	11.145	1.540	0.873	0.288	0.141	0.060	0.010
GER_PTB2	0	53.779	507.512	151.876	28.402	26.242	3.626	2.055	0.677	0.333	0.141	0.023
GER_SDN1	0	24.764	233.698	69.935	13.079	12.084	1.670	0.946	0.312	0.153	0.065	0.011
GER_SDN2	0	58.058	547.891	163.960	30.662	28.330	3.914	2.218	0.731	0.359	0.152	0.025
GER_TBB1	0	11.702	110.434	33.048	6.180	5.710	0.789	0.447	0.147	0.072	0.031	0.005
GER_TBB2	0	14.447	136.332	40.798	7.630	7.049	0.974	0.552	0.182	0.089	0.038	0.006
N_OTB1	0	41.380	390.497	116.859	21.854	20.192	2.790	1.581	0.521	0.256	0.109	0.018
N_OTB2	0	28.640	270.276	80.882	15.126	13.975	1.931	1.094	0.361	0.177	0.075	0.012
N_TBB1	0	0.202	1.906	0.570	0.107	0.099	0.014	0.008	0.003	0.001	0.001	0.000
N_TBB2	0	6.998	66.036	19.762	3.696	3.415	0.472	0.267	0.088	0.043	0.018	0.003
NL_GN	0	19.249	181.649	54.360	10.166	9.393	1.298	0.735	0.242	0.119	0.051	0.008
NL_MIS	0	17.952	169.412	50.698	9.481	8.760	1.210	0.686	0.226	0.111	0.047	0.008
NL_OTB	0	2.334	22.030	6.593	1.233	1.139	0.157	0.089	0.029	0.014	0.006	0.001
NL_OTB1	0	161.935	1528.166	457.313	85.521	79.018	10.918	6.187	2.039	1.003	0.425	0.070
NL_OTB2	0	54.642	515.649	154.311	28.858	26.663	3.684	2.088	0.688	0.338	0.143	0.023
NL_PTB	0	1.467	13.848	4.144	0.775	0.716	0.099	0.056	0.018	0.009	0.004	0.001
NL_PTB1	0	41.191	388.714	116.325	21.754	20.099	2.777	1.574	0.519	0.255	0.108	0.018
NL_PTB2	0	110.738	1045.023	312.730	58.483	54.035	7.466	4.231	1.395	0.686	0.291	0.048
NL_TBB	0	4.119	38.874	11.633	2.176	2.010	0.278	0.157	0.052	0.026	0.011	0.002
NL_TBB1	0	31.588	298.094	89.207	16.682	15.414	2.130	1.207	0.398	0.196	0.083	0.014

NL_TBB2		0	440.078	4152.983	1242.806	232.415	214.740	29.671	16.815	5.542	2.725	1.156	0.189	
SC_OTB1		0	956.745	9028.729	2701.904	505.279	466.852	64.505	36.556	12.049	5.923	2.512	0.411	
SC_OTB2		0	62.539	590.175	176.614	33.028	30.516	4.216	2.390	0.788	0.387	0.164	0.027	
SC_OTB3		0	201.158	1898.313	568.082	106.236	98.157	13.562	7.686	2.533	1.245	0.528	0.086	
SC_PTB		0	620.987	5860.207	1753.704	327.958	303.016	41.868	23.727	7.820	3.845	1.631	0.267	
SC_SDN		0	508.015	4794.099	1434.664	268.294	247.891	34.251	19.411	6.398	3.145	1.334	0.218	
	Total	0	7119.259	67183.862	20105.194	3759.842	3473.905	479.988	272.019	89.657	44.076	18.695	3.056	1

Table 2 Input data, landings by fleet by age used in the commission's example

Haddock

Fleet / age	0	1	2	3	4	5	6	7	8	9	10	Total
B_MIS	1.37586	34.002	248.078	12.678	3.483	1.616	0.612	0.512	0.076	0.025	0.007	302.465
B_OTB	2.205444	54.504	397.659	20.322	5.583	2.590	0.981	0.820	0.123	0.040	0.011	484.838
B_TBB	27.37724	676.585	4936.327	252.268	69.309	32.151	12.175	10.179	1.521	0.499	0.133	6018.524
DK_GN	10.55606	260.876	1903.338	97.269	26.724	12.397	4.695	3.925	0.586	0.192	0.051	2320.609
DK_MIS	17.94059	443.373	3234.826	165.314	45.419	21.069	7.979	6.670	0.997	0.327	0.087	3944.001
DK_OTB1	0.9000575	22.243	162.287	8.294	2.279	1.057	0.400	0.335	0.050	0.016	0.004	197.866
DK_OTB2	7.779861	192.267	1402.769	71.688	19.696	9.136	3.460	2.893	0.432	0.142	0.038	1710.300
DK_PTB1	2.140776	52.906	385.998	19.726	5.420	2.514	0.952	0.796	0.119	0.039	0.010	470.621
DK_PTB2	55.03999	1360.225	9924.133	507.168	139.341	64.637	24.478	20.464	3.058	1.004	0.267	12099.812
DK_SDN1	4.913952	121.440	886.023	45.280	12.440	5.771	2.185	1.827	0.273	0.090	0.024	1080.267
DK_SDN2	17.74564	438.555	3199.675	163.518	44.925	20.840	7.892	6.598	0.986	0.324	0.086	3901.143
DK_TBB1	0.0341147	0.843	6.151	0.314	0.086	0.040	0.015	0.013	0.002	0.001	0.000	7.500
DK_TBB2	0.5800976	14.336	104.596	5.345	1.469	0.681	0.258	0.216	0.032	0.011	0.003	127.527
EW_GN	1.348981	33.338	243.232	12.430	3.415	1.584	0.600	0.502	0.075	0.025	0.007	296.556
EW_MIS	9.617166	237.673	1734.049	88.618	24.347	11.294	4.277	3.576	0.534	0.175	0.047	2114.207
EW_OTB1	34.5994	855.068	6238.537	318.817	87.593	40.632	15.387	12.864	1.922	0.631	0.168	7606.219
EW_OTB2	111.2797	2750.099	20064.590	1025.390	281.718	130.682	49.489	41.373	6.182	2.029	0.539	24463.372
EW_SDN1	0.0964654	2.384	17.393	0.889	0.244	0.113	0.043	0.036	0.005	0.002	0.000	21.207
EW_TBB1	0.1560277	3.856	28.133	1.438	0.395	0.183	0.069	0.058	0.009	0.003	0.001	34.301
EW_TBB2	3.615969	89.363	651.987	33.319	9.154	4.246	1.608	1.344	0.201	0.066	0.018	794.923
FR_GN	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FR_MIS	8.449E-06	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002

FR_OTB1	5.220213	129.009	941.245	48.102	13.216	6.130	2.322	1.941	0.290	0.095	0.025	1147.595
FR_OTB2	33.95443	839.129	6122.245	312.874	85.960	39.875	15.101	12.624	1.886	0.619	0.164	7464.432
FR_TBB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GER_GN	0.025961	0.642	4.681	0.239	0.066	0.030	0.012	0.010	0.001	0.000	0.000	5.707
GER_MIS	0.0165187	0.408	2.978	0.152	0.042	0.019	0.007	0.006	0.001	0.000	0.000	3.631
GER_OTB1	1.312835	32.445	236.714	12.097	3.324	1.542	0.584	0.488	0.073	0.024	0.006	288.609
GER_OTB2	15.00022	370.706	2704.655	138.220	37.975	17.616	6.671	5.577	0.833	0.274	0.073	3297.600
GER_PTB1	1.659537	41.013	299.227	15.292	4.201	1.949	0.738	0.617	0.092	0.030	0.008	364.827
GER_PTB2	9.716772	240.134	1752.009	89.535	24.599	11.411	4.321	3.613	0.540	0.177	0.047	2136.104
GER_SDN1	1.166321	28.824	210.297	10.747	2.953	1.370	0.519	0.434	0.065	0.021	0.006	256.400
GER_SDN2	4.574537	113.052	824.824	42.152	11.581	5.372	2.034	1.701	0.254	0.083	0.022	1005.651
GER_TBB1	0.0477817	1.181	8.615	0.440	0.121	0.056	0.021	0.018	0.003	0.001	0.000	10.504
GER_TBB2	0.1353392	3.345	24.403	1.247	0.343	0.159	0.060	0.050	0.008	0.002	0.001	29.753
N_OTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_OTB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_TBB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_TBB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_GN	0.000169	0.004	0.030	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037
NL_MIS	0.2771845	6.850	49.979	2.554	0.702	0.326	0.123	0.103	0.015	0.005	0.001	60.935
NL_OTB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_OTB1	17.20151	425.108	3101.565	158.504	43.548	20.201	7.650	6.395	0.956	0.314	0.083	3781.525
NL_OTB2	12.01857	297.020	2167.041	110.746	30.427	14.114	5.345	4.468	0.668	0.219	0.058	2642.124
NL_PTB	0.0736582	1.820	13.281	0.679	0.186	0.087	0.033	0.027	0.004	0.001	0.000	16.193
NL_PTB1	0.9387349	23.199	169.261	8.650	2.377	1.102	0.417	0.349	0.052	0.017	0.005	206.368
NL_PTB2	2.638787	65.213	475.794	24.315	6.680	3.099	1.174	0.981	0.147	0.048	0.013	580.102
NL_TBB	0.1080052	2.669	19.474	0.995	0.273	0.127	0.048	0.040	0.006	0.002	0.001	23.744
NL_TBB1	0.2782407	6.876	50.169	2.564	0.704	0.327	0.124	0.103	0.015	0.005	0.001	61.168

NL_TBB2	5.763968	142.447	1039.288	53.112	14.592	6.769	2.563	2.143	0.320	0.105	0.028	1267.132
SC_OTB1	776.3574	19186.420	139983.200	7153.769	1965.445	911.722	345.269	288.646	43.131	14.156	3.760	170671.875
SC_OTB2	47.2536	1167.797	8520.188	435.420	119.628	55.493	21.015	17.569	2.625	0.862	0.229	10388.079
SC_OTB3	162.8633	4024.905	29365.510	1500.709	412.309	191.260	72.430	60.552	9.048	2.970	0.789	35803.344
SC_PTB	561.0441	13865.300	101160.600	5169.758	1420.353	658.867	249.513	208.593	31.169	10.230	2.717	123338.145
SC_SDN	625.8514	15466.910	112845.800	5766.927	1584.420	734.974	278.335	232.688	34.770	11.412	3.031	137585.118
Total	2594.8025	64126.363	467862.857	23909.887	6569.064	3047.230	1153.985	964.734	144.156	47.313	12.567	570432.959

Table 3 Input data, landings by fleet by age used in the commission's example

Plaice

Fleet / age	0	1	2	3	4	5	6	7	8	9	10	11
B_MIS	0	43.700	339.600	480.010	418.640	808.192	65.517	41.081	10.685	5.832	5.484	2.866
B_OTB	0	54.473	423.319	598.344	521.845	1007.432	81.669	51.209	13.319	7.270	6.836	3.572
B_TBB	0	968.309	7524.932	10636.180	9276.327	17908.130	1451.753	910.287	236.752	129.230	121.520	63.499
DK_GN	0	386.810	3005.979	4248.826	3705.607	7153.747	579.931	363.632	94.575	51.623	48.544	25.366
DK_MIS	0	236.502	1837.907	2597.805	2265.671	4373.922	354.579	222.331	57.825	31.563	29.680	15.509
DK_OTB1	0	220.439	1713.076	2421.361	2111.786	4076.845	330.496	207.230	53.897	29.420	27.665	14.456
DK_OTB2	0	267.860	2081.596	2942.249	2566.078	4953.864	401.593	251.810	65.492	35.748	33.616	17.566
DK_PTB1	0	2.241	17.417	24.618	21.471	41.449	3.360	2.107	0.548	0.299	0.281	0.147
DK_PTB2	0	12.087	93.930	132.767	115.792	223.539	18.122	11.363	2.955	1.613	1.517	0.793
DK_SDN1	0	525.774	4085.904	5775.256	5036.881	9723.796	788.276	494.270	128.552	70.169	65.983	34.479
DK_SDN2	0	77.653	603.460	852.965	743.912	1436.137	116.423	73.000	18.986	10.364	9.745	5.092
DK_TBB1	0	35.900	278.990	394.341	343.924	663.952	53.824	33.749	8.778	4.791	4.505	2.354
DK_TBB2	0	308.401	2396.648	3387.562	2954.457	5703.636	462.375	289.921	75.404	41.159	38.704	20.224
EW_GN	0	3.490	27.120	38.333	33.432	64.542	5.232	3.281	0.853	0.466	0.438	0.229
EW_MIS	0	2.087	16.220	22.927	19.995	38.602	3.129	1.962	0.510	0.279	0.262	0.137
EW_OTB1	0	38.424	298.598	422.056	368.096	710.616	57.607	36.121	9.395	5.128	4.822	2.520
EW_OTB2	0	68.902	535.450	756.837	660.074	1274.286	103.302	64.773	16.847	9.196	8.647	4.518
EW_SDN1	0	80.594	626.316	885.272	772.089	1490.532	120.833	75.765	19.705	10.756	10.114	5.285
EW_TBB1	0	36.288	282.005	398.602	347.640	671.126	54.406	34.114	8.873	4.843	4.554	2.380
EW_TBB2	0	1521.268	11822.100	16710.050	14573.640	28134.700	2280.787	1430.113	371.951	203.027	190.916	99.761
FR_GN	0	30.480	236.865	334.799	291.994	563.700	45.697	28.653	7.452	4.068	3.825	1.999
FR_MIS	0	0.626	4.866	6.878	5.999	11.581	0.939	0.589	0.153	0.084	0.079	0.041

FR_OTB1	0	30.659	238.256	336.765	293.709	567.011	45.966	28.822	7.496	4.092	3.848	2.011
FR_OTB2	0	0.201	1.565	2.212	1.929	3.725	0.302	0.189	0.049	0.027	0.025	0.013
FR_TBB	0	20.106	156.252	220.855	192.618	371.854	30.145	18.902	4.916	2.683	2.523	1.319
GER_GN	0	0.404	3.140	4.438	3.871	7.472	0.606	0.380	0.099	0.054	0.051	0.026
GER_MIS	0	0.155	1.205	1.703	1.486	2.868	0.233	0.146	0.038	0.021	0.019	0.010
GER_OTB1	0	253.338	1968.747	2782.742	2426.964	4685.301	379.822	238.158	61.941	33.810	31.793	16.613
GER_OTB2	0	27.444	213.273	301.452	262.911	507.554	41.146	25.799	6.710	3.663	3.444	1.800
GER_PTB1	0	0.762	5.922	8.371	7.301	14.094	1.143	0.716	0.186	0.102	0.096	0.050
GER_PTB2	0	1.254	9.744	13.773	12.012	23.190	1.880	1.179	0.307	0.167	0.157	0.082
GER_SDN1	0	15.550	120.839	170.801	148.964	287.578	23.313	14.618	3.802	2.075	1.951	1.020
GER_SDN2	0	0.796	6.184	8.741	7.624	14.718	1.193	0.748	0.195	0.106	0.100	0.052
GER_TBB1	0	164.718	1280.061	1809.313	1577.989	3046.339	246.957	154.848	40.274	21.983	20.672	10.802
GER_TBB2	0	200.638	1559.201	2203.866	1922.098	3710.648	300.810	188.616	49.056	26.777	25.180	13.157
N_OTB1	0	0.607	4.717	6.668	5.815	11.226	0.910	0.571	0.148	0.081	0.076	0.040
N_OTB2	0	0.742	5.767	8.152	7.110	13.725	1.113	0.698	0.181	0.099	0.093	0.049
N_TBB1	0	3.180	24.712	34.930	30.464	58.812	4.768	2.989	0.778	0.424	0.399	0.209
N_TBB2	0	113.136	879.203	1242.716	1083.833	2092.361	169.621	106.357	27.662	15.099	14.198	7.419
NL_GN	0	0.102	0.797	1.126	0.982	1.896	0.154	0.096	0.025	0.014	0.013	0.007
NL_MIS	0	14.958	116.241	164.302	143.296	276.635	22.426	14.062	3.657	1.996	1.877	0.981
NL_OTB	0	0.054	0.420	0.593	0.517	0.999	0.081	0.051	0.013	0.007	0.007	0.004
NL_OTB1	0	34.165	265.500	375.273	327.294	631.847	51.222	32.117	8.353	4.560	4.288	2.240
NL_OTB2	0	84.323	655.293	926.229	807.810	1559.492	126.423	79.270	20.617	11.254	10.582	5.530
NL_PTB	0	0.043	0.337	0.476	0.416	0.802	0.065	0.041	0.011	0.006	0.005	0.003
NL_PTB1	0	0.774	6.014	8.500	7.414	14.312	1.160	0.727	0.189	0.103	0.097	0.051
NL_PTB2	0	5.330	41.423	58.550	51.065	98.581	7.992	5.011	1.303	0.711	0.669	0.350
NL_TBB	0	63.042	489.911	692.469	603.936	1165.910	94.516	59.264	15.414	8.413	7.912	4.134
NL_TBB1	0	302.202	2348.476	3319.473	2895.074	5588.996	453.081	284.094	73.888	40.332	37.926	19.818

NL_TBB2	0	5275.829	40999.590	57951.220	50542.070	97572.440	7909.875	4959.699	1289.942	704.107	662.104	345.974
SC_OTB1	0	112.957	877.809	1240.747	1082.116	2089.045	169.352	106.188	27.618	15.075	14.176	7.407
SC_OTB2	0	13.350	103.745	146.639	127.891	246.896	20.015	12.550	3.264	1.782	1.675	0.875
SC_OTB3	0	9.754	75.797	107.136	93.439	180.386	14.623	9.169	2.385	1.302	1.224	0.640
SC_PTB	0	53.345	414.556	585.958	511.043	986.578	79.979	50.149	13.043	7.119	6.695	3.498
SC_SDN	0	60.756	472.145	667.358	582.035	1123.630	91.089	57.115	14.855	8.108	7.625	3.984
Total	0	11786.981	91599.143	129471.588	112918.443	217991.246	17671.829	11080.700	2881.921	1573.079	1479.238	772.957

Table 4 Input data, landings by fleet by age used in the commission's example

Saithe

Fleet / age	0	1	2	3	4	5	6	7	8	9	10	Total
B_MIS	0	0.000	0.046	0.390	0.413	0.524	0.082	0.081	0.033	0.027	0.007	1.603
B_OTB	0	0.013	5.728	48.851	51.831	65.672	10.297	10.147	4.135	3.399	0.872	200.944
B_TBB	0	0.004	1.618	13.801	14.642	18.553	2.909	2.867	1.168	0.960	0.246	56.767
DK_GN	0	0.058	26.338	224.637	238.342	301.989	47.350	46.661	19.013	15.628	4.010	924.028
DK_MIS	0	0.103	46.854	399.617	423.999	537.223	84.234	83.008	33.824	27.801	7.134	1643.797
DK_OTB1	0	0.001	0.589	5.020	5.326	6.748	1.058	1.043	0.425	0.349	0.090	20.649
DK_OTB2	0	0.072	32.776	279.546	296.602	375.806	58.924	58.067	23.661	19.448	4.990	1149.893
DK_PTB1	0	0.002	1.048	8.940	9.486	12.019	1.885	1.857	0.757	0.622	0.160	36.776
DK_PTB2	0	0.028	12.709	108.397	115.010	145.723	22.848	22.516	9.175	7.541	1.935	445.883
DK_SDN1	0	0.003	1.328	11.328	12.020	15.229	2.388	2.353	0.959	0.788	0.202	46.598
DK_SDN2	0	0.016	7.167	61.125	64.854	82.172	12.884	12.697	5.174	4.252	1.091	251.432
DK_TBB1	0	0.000	0.000	0.003	0.003	0.003	0.001	0.001	0.000	0.000	0.000	0.010
DK_TBB2	0	0.001	0.306	2.611	2.771	3.510	0.550	0.542	0.221	0.182	0.047	10.741
EW_GN	0	0.000	0.161	1.377	1.461	1.852	0.290	0.286	0.117	0.096	0.025	5.665
EW_MIS	0	0.000	0.036	0.305	0.324	0.410	0.064	0.063	0.026	0.021	0.005	1.255
EW_OTB1	0	0.030	13.562	115.670	122.727	155.500	24.381	24.027	9.790	8.047	2.065	475.799
EW_OTB2	0	0.218	98.845	843.043	894.478	1133.339	177.701	175.115	71.356	58.651	15.050	3467.795
EW_SDN1	0	0.000	0.004	0.032	0.034	0.043	0.007	0.007	0.003	0.002	0.001	0.131
EW_TBB1	0	0.000	0.010	0.089	0.095	0.120	0.019	0.019	0.008	0.006	0.002	0.368
EW_TBB2	0	0.000	0.175	1.495	1.587	2.010	0.315	0.311	0.127	0.104	0.027	6.151
FR_GN	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FR_MIS	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FR_OTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FR_OTB2	0	3.101	1406.925	11999.550	12731.670	16131.530	2529.333	2492.520	1015.650	834.812	214.217	49359.309
FR_TBB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GER_GN	0	0.001	0.252	2.152	2.283	2.892	0.454	0.447	0.182	0.150	0.038	8.850
GER_MIS	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GER_OTB1	0	0.000	0.009	0.080	0.085	0.108	0.017	0.017	0.007	0.006	0.001	0.331
GER_OTB2	0	1.349	612.111	5220.645	5539.165	7018.342	1100.437	1084.421	441.879	363.202	93.199	21474.750
GER_PTB1	0	0.000	0.022	0.186	0.197	0.250	0.039	0.039	0.016	0.013	0.003	0.765
GER_PTB2	0	0.000	0.034	0.291	0.309	0.392	0.061	0.061	0.025	0.020	0.005	1.198
GER_SDN1	0	0.000	0.042	0.356	0.377	0.478	0.075	0.074	0.030	0.025	0.006	1.463
GER_SDN2	0	0.024	11.086	94.556	100.325	127.115	19.931	19.641	8.003	6.578	1.688	388.948
GER_TBB1	0	0.000	0.001	0.005	0.006	0.007	0.001	0.001	0.000	0.000	0.000	0.022
GER_TBB2	0	0.000	0.013	0.108	0.115	0.146	0.023	0.022	0.009	0.008	0.002	0.445
N_OTB1	0	1.540	698.791	5959.932	6323.557	8012.199	1256.268	1237.984	504.453	414.634	106.397	24515.755
N_OTB2	0	2.061	935.214	7976.370	8463.021	10722.980	1681.304	1656.834	675.125	554.918	142.395	32810.223
N_TBB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_TBB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_GN	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_MIS	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_OTB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_OTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_OTB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_PTB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_PTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_PTB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_TBB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_TBB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NL_TBB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SC_OTB1	0	0.233	105.811	902.455	957.515	1213.209	190.224	187.456	76.384	62.784	16.111	3712.182
SC_OTB2	0	0.007	3.008	25.654	27.220	34.488	5.408	5.329	2.171	1.785	0.458	105.528
SC_OTB3	0	0.146	66.303	565.490	599.991	760.213	119.197	117.462	47.863	39.341	10.095	2326.101
SC_PTB	0	0.130	58.900	502.354	533.004	675.337	105.889	104.348	42.520	34.949	8.968	2066.398
SC_SDN	0	0.109	49.556	422.662	448.449	568.203	89.091	87.794	35.774	29.405	7.545	1738.589
Total	0	9.252	4197.380	35799.122	37983.292	48126.335	7545.940	7436.115	3030.061	2490.556	639.089	147257

Table 5 Input data, landings by fleet by age used in the commission's example

Sole

Fleet / age	0	1	2	3	4	5	6	7	8	9	10	11
B_MIS	0	13.297	388.653	324.723	298.886	251.577	21.456	12.541	4.125	2.538	7.630	0.922
B_OTB	0	9.236	269.958	225.553	207.606	174.745	14.903	8.711	2.865	1.763	5.300	0.640
B_TBB	0	242.633	7092.054	5925.485	5454.005	4590.728	391.522	228.847	75.271	46.321	139.238	16.819
DK_GN	0	91.740	2681.528	2240.444	2062.176	1735.768	148.036	86.528	28.460	17.514	52.646	6.359
DK_MIS	0	1.658	48.473	40.500	37.278	31.377	2.676	1.564	0.514	0.317	0.952	0.115
DK_OTB1	0	0.923	26.967	22.531	20.738	17.456	1.489	0.870	0.286	0.176	0.529	0.064
DK_OTB2	0	1.826	53.375	44.596	41.047	34.550	2.947	1.722	0.566	0.349	1.048	0.127
DK_PTB1	0	0.003	0.082	0.069	0.063	0.053	0.005	0.003	0.001	0.001	0.002	0.000
DK_PTB2	0	0.014	0.409	0.342	0.314	0.265	0.023	0.013	0.004	0.003	0.008	0.001
DK_SDN1	0	0.064	1.871	1.563	1.439	1.211	0.103	0.060	0.020	0.012	0.037	0.004
DK_SDN2	0	0.052	1.505	1.258	1.158	0.974	0.083	0.049	0.016	0.010	0.030	0.004
DK_TBB1	0	0.188	5.500	4.595	4.230	3.560	0.304	0.177	0.058	0.036	0.108	0.013
DK_TBB2	0	0.984	28.772	24.039	22.126	18.624	1.588	0.928	0.305	0.188	0.565	0.068
EW_GN	0	12.873	376.260	314.369	289.355	243.555	20.772	12.141	3.993	2.457	7.387	0.892
EW_MIS	0	2.290	66.933	55.923	51.474	43.326	3.695	2.160	0.710	0.437	1.314	0.159
EW_OTB1	0	17.196	502.626	419.950	386.535	325.353	27.748	16.219	5.335	3.283	9.868	1.192
EW_OTB2	0	1.474	43.092	36.004	33.139	27.894	2.379	1.391	0.457	0.281	0.846	0.102
EW_SDN1	0	0.001	0.039	0.033	0.030	0.025	0.002	0.001	0.000	0.000	0.001	0.000
EW_TBB1	0	5.405	157.976	131.991	121.488	102.259	8.721	5.098	1.677	1.032	3.102	0.375
EW_TBB2	0	41.834	1222.781	1021.646	940.356	791.513	67.504	39.457	12.978	7.986	24.007	2.900
FR_GN	0	80.014	2338.783	1954.077	1798.595	1513.908	129.114	75.468	24.823	15.275	45.917	5.546
FR_MIS	0	0.249	7.270	6.075	5.591	4.706	0.401	0.235	0.077	0.047	0.143	0.017

FR_OTB1	0	4.327	126.478	105.673	97.265	81.870	6.982	4.081	1.342	0.826	2.483	0.300
FR_OTB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FR_TBB	0	8.793	257.021	214.743	197.657	166.371	14.189	8.294	2.728	1.679	5.046	0.610
GER_GN	0	4.379	128.008	106.952	98.442	82.860	7.067	4.131	1.359	0.836	2.513	0.304
GER_MIS	0	0.007	0.201	0.168	0.154	0.130	0.011	0.006	0.002	0.001	0.004	0.000
GER_OTB1	0	2.197	64.207	53.645	49.377	41.561	3.545	2.072	0.681	0.419	1.261	0.152
GER_OTB2	0	0.193	5.645	4.717	4.341	3.654	0.312	0.182	0.060	0.037	0.111	0.013
GER_PTB1	0	0.014	0.422	0.352	0.324	0.273	0.023	0.014	0.004	0.003	0.008	0.001
GER_PTB2	0	0.000	0.003	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000
GER_SDN1	0	0.002	0.066	0.055	0.050	0.042	0.004	0.002	0.001	0.000	0.001	0.000
GER_SDN2	0	0.006	0.162	0.135	0.125	0.105	0.009	0.005	0.002	0.001	0.003	0.000
GER_TBB1	0	101.838	2976.683	2487.050	2289.160	1926.824	164.330	96.052	31.593	19.442	58.441	7.059
GER_TBB2	0	54.453	1591.634	1329.827	1224.015	1030.274	87.867	51.359	16.893	10.396	31.249	3.775
N_OTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N_OTB2	0	0.213	6.216	5.193	4.780	4.024	0.343	0.201	0.066	0.041	0.122	0.015
N_TBB1	0	0.016	0.482	0.403	0.371	0.312	0.027	0.016	0.005	0.003	0.009	0.001
N_TBB2	0	24.178	706.710	590.463	543.481	457.457	39.014	22.804	7.501	4.616	13.875	1.676
NL_GN	0	2.564	74.954	62.625	57.642	48.518	4.138	2.419	0.796	0.490	1.472	0.178
NL_MIS	0	1.577	46.105	38.522	35.456	29.844	2.545	1.488	0.489	0.301	0.905	0.109
NL_OTB	0	0.002	0.054	0.045	0.042	0.035	0.003	0.002	0.001	0.000	0.001	0.000
NL_OTB1	0	2.537	74.149	61.953	57.023	47.997	4.093	2.393	0.787	0.484	1.456	0.176
NL_OTB2	0	0.519	15.170	12.675	11.666	9.820	0.837	0.490	0.161	0.099	0.298	0.036
NL_PTB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NL_PTB1	0	0.077	2.242	1.873	1.724	1.451	0.124	0.072	0.024	0.015	0.044	0.005
NL_PTB2	0	0.119	3.465	2.895	2.664	2.243	0.191	0.112	0.037	0.023	0.068	0.008
NL_TBB	0	23.325	681.794	569.646	524.320	441.329	37.639	22.000	7.236	4.453	13.386	1.617
NL_TBB1	0	188.148	5499.488	4594.880	4229.274	3559.851	303.603	177.458	58.369	35.919	107.971	13.042

NL_TBB2	0	1773.477	51837.930	43311.130	39864.940	33554.990	2861.747	1672.711	550.181	338.573	1017.734	122.934
SC_OTB1	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SC_OTB2	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SC_OTB3	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SC_PTB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SC_SDN	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0	2716.915	79414.194	66351.386	61071.925	51405.266	4384.113	2562.545	842.861	518.684	1559.139	188.332

Table 6 Input data, landings by fleet by age used in the commission's example

Whiting

Fleet / age	0	1	2	3	4	5	6	7	8	Total
B_MIS	0	841.730	862.313	589.444	205.717	91.827	48.170	22.334	12.688	2674.221
B_OTB	0	921.862	944.404	645.559	225.301	100.569	52.755	24.460	13.896	2928.805
B_TBB	0	972.607	996.390	681.094	237.703	106.105	55.659	25.806	14.661	3090.026
DK_GN	0	20.967	21.479	14.682	5.124	2.287	1.200	0.556	0.316	66.612
DK_MIS	0	219.867	225.244	153.968	53.735	23.986	12.582	5.834	3.314	698.530
DK_OTB1	0	4.125	4.226	2.888	1.008	0.450	0.236	0.109	0.062	13.105
DK_OTB2	0	101.919	104.411	71.371	24.909	11.119	5.833	2.704	1.536	323.801
DK_PTB1	0	2.233	2.287	1.564	0.546	0.244	0.128	0.059	0.034	7.094
DK_PTB2	0	10.616	10.875	7.434	2.594	1.158	0.608	0.282	0.160	33.727
DK_SDN1	0	0.700	0.717	0.490	0.171	0.076	0.040	0.019	0.011	2.223
DK_SDN2	0	9.325	9.553	6.530	2.279	1.017	0.534	0.247	0.141	29.624
DK_TBB1	0	0.005	0.006	0.004	0.001	0.001	0.000	0.000	0.000	0.017
DK_TBB2	0	0.051	0.052	0.035	0.012	0.006	0.003	0.001	0.001	0.160
EW_GN	0	215.368	220.635	150.817	52.636	23.495	12.325	5.714	3.246	684.237
EW_MIS	0	258.765	265.093	181.207	63.242	28.229	14.808	6.866	3.901	822.111
EW_OTB1	0	3459.681	3544.280	2422.735	845.539	377.427	197.988	91.796	52.150	10991.595
EW_OTB2	0	5638.070	5775.937	3948.210	1377.933	615.073	322.650	149.596	84.986	17912.455
EW_SDN1	0	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.005
EW_TBB1	0	13.832	14.170	9.686	3.381	1.509	0.792	0.367	0.209	43.946
EW_TBB2	0	67.487	69.137	47.260	16.494	7.362	3.862	1.791	1.017	214.410
FR_GN	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FR_MIS	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

FR_OTB1	0	16641.280	17048.210	11653.510	4067.095	1815.445	952.332	441.547	250.843	52870.262
FR_OTB2	0	969.970	993.688	679.248	237.059	105.817	55.509	25.736	14.621	3081.647
FR_TBB	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GER_GN	0	1.409	1.443	0.986	0.344	0.154	0.081	0.037	0.021	4.475
GER_MIS	0	0.451	0.462	0.316	0.110	0.049	0.026	0.012	0.007	1.433
GER_OTB1	0	1190.922	1220.043	833.975	291.059	129.921	68.153	31.599	17.951	3783.624
GER_OTB2	0	180.564	184.979	126.445	44.129	19.698	10.333	4.791	2.722	573.660
GER_PTB1	0	19.843	20.328	13.896	4.850	2.165	1.136	0.526	0.299	63.042
GER_PTB2	0	74.300	76.117	52.031	18.159	8.106	4.252	1.971	1.120	236.056
GER_SDN1	0	56.012	57.382	39.224	13.689	6.111	3.205	1.486	0.844	177.953
GER_SDN2	0	8.517	8.725	5.964	2.081	0.929	0.487	0.226	0.128	27.057
GER_TBB1	0	122.416	125.410	85.725	29.918	13.355	7.006	3.248	1.845	388.923
GER_TBB2	0	154.094	157.862	107.909	37.660	16.811	8.818	4.089	2.323	489.566
N_OTB1	0	7.342	7.522	5.142	1.794	0.801	0.420	0.195	0.111	23.327
N_OTB2	0	0.253	0.259	0.177	0.062	0.028	0.014	0.007	0.004	0.802
N_TBB1	0	4.022	4.120	2.817	0.983	0.439	0.230	0.107	0.061	12.778
N_TBB2	0	13.567	13.898	9.500	3.316	1.480	0.776	0.360	0.204	43.102
NL_GN	0	10.050	10.295	7.037	2.456	1.096	0.575	0.267	0.151	31.928
NL_MIS	0	562.836	576.599	394.141	137.556	61.401	32.209	14.934	8.484	1788.161
NL_OTB	0	6.136	6.286	4.297	1.500	0.669	0.351	0.163	0.092	19.494
NL_OTB1	0	1935.290	1982.614	1355.239	472.981	211.126	110.751	51.349	29.172	6148.522
NL_OTB2	0	1377.194	1410.870	964.417	336.583	150.242	78.813	36.541	20.759	4375.420
NL_PTB	0	0.123	0.126	0.086	0.030	0.013	0.007	0.003	0.002	0.390
NL_PTB1	0	271.619	278.261	190.209	66.383	29.632	15.544	7.207	4.094	862.949
NL_PTB2	0	1869.858	1915.582	1309.419	456.990	203.988	107.007	49.613	28.185	5940.642
NL_TBB	0	62.619	64.150	43.850	15.304	6.831	3.583	1.661	0.944	198.942
NL_TBB1	0	484.916	496.774	339.576	118.513	52.901	27.750	12.866	7.309	1540.605

NL_TBB2	0	4902.685	5022.569	3433.237	1198.206	534.848	280.566	130.084	73.901	15576.096
SC_OTB1	0	26781.360	27436.240	18754.370	6545.310	2921.655	1532.619	710.595	403.690	85085.839
SC_OTB2	0	3242.837	3322.134	2270.884	792.543	353.770	185.578	86.043	48.881	10302.670
SC_OTB3	0	1908.188	1954.848	1336.260	466.357	208.170	109.200	50.630	28.763	6062.416
SC_PTB	0	21558.190	22085.350	15096.710	5268.778	2351.845	1233.713	572.008	324.958	68491.552
SC_SDN	0	17271.080	17693.410	12094.540	4221.017	1884.152	988.374	458.257	260.336	54871.166
Total	0	114449.150	117247.764	80146.115	27971.140	12485.586	6549.592	3036.703	1725.152	363611.203

Table 7 Mean weights at age by species used in the Commission's example.

Species	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
COD	0	657	986	1902	3399	5497	7414	9161	10370	11519	11918	12400	0	0	0	0
HAD	21	109	216	309	466	697	754	971	1892	1198	2114	0	0	0	0	0
PLE	0	237	262	286	327	418	509	635	701	769	738	786	802	905	916	1029
POK	0	521	750	807	1079	1314	2075	2598	3551	4229	6607	0	0	0	0	0
SOL	0	150	178	205	249	284	319	356	385	402	366	501	539	650	734	755
WHG	0	72	191	227	283	270	300	287	293	0	0	0	0	0	0	0

Table 8 Option input and run-log for the Commission's example run

```
#Remove all objects
  rm(list = ls())

#set path to directory including data
data.path<-"location of the data e.g. c:\\MTAC\\DATA\\"



#set path to directory functions
prog.path<-"     location     of     the     program     e.g.
c:\\MTAC\\PROGRAM\\"



#OPTIONS
##############################################################
#####
#  Estimate  catch  number  from  total  catch  weight  (file
total_catch.dat)
# estim.catch  no=0
# estim.catch yes=1
estim.catch<-1


# method for calculating mixed-species TAC
#  method=10   scaling  of  mean  status  quo  F  by  fleet  to
estimate MS-TACS
# method=20  Scaling of staus quo F by fleet to estimate MS-
TACS
# method=31  Minimize (SS.F-MS.F)^2 to estimate fleet effort
# method=32  Minimize ((SS.F-MS.F)/SS.F)^2 to estimate fleet
effort
# method=33  Minimize abs(SS.F-MS.F) to estimate fleet effort
# method=34   Minimize  abs(SS.F-MS.F)/SS.F  to  estimate  fleet
effort
method<-34


#  proportion  of  change  from  each  fleet  and  species
combination
# prop=0  equal weight,
# prop=1  proportional to species composition within a fleet
#  prop=2   proportional  to  species  composition  all  fleet
catches combined
```

```
# prop=9  read from input file proportion_in.dat
prop<-1


# Weight species risk factor by the proportion of the species in the catch within the fleet
# weight.species.risk  0=no, 1=yes
weight.species.risk<-0


# Make a detailed print of catches
# Print.catch  0=no, 1=yes
Print.catch<-0


# Run as a batch job with limited output and an additiona bacth program
# batch=0 no batch job
# batch=1 batch job;
batch<-0


#################################################################
######
# do NOT change the code below this line, if you are not familiar with R
if (batch==1) {
 source(paste(data.path,"batch.R",sep=""))
}
if (batch==0) {
  # Read various functions and the program
  source(paste(prog.path,"functions.R",sep=""))
  source(paste(prog.path,"MTAC.R",sep=""))
}
```

Table 9 – Output of F_Multiplier table for the different species in the Commission's example run.

The scenario for apportioning catch between fleets and the management objectives for restraint of catches of cod and other species is that requested by the Commission . STECF notes that these are not the only possible management objectives and other choices based either on biological or economic criteria could also be evaluated .

Prediction results

Species	F_staus_quo	SS_F_mult.	MS_F_mult.	MS_TAC/SS_TAC	Decision_weight
COD	1.107	0.20	0.200	1.00	0.952
HAD	0.830	0.60	0.197	0.38	0.010
PLE	0.384	0.60	0.613	1.02	0.010
POK	0.246	1.00	0.825	0.85	0.010
SOL	0.524	0.77	0.675	0.89	0.010
WHG	0.435	0.60	0.225	0.40	0.010

COD = Cod
HAD = Haddock
PLE = Plaice
POK = Saithe
SOL = Sole
WHG = Whithing

SS_F_mult = Single species F multiplier
MS_F_mult = Multi species F multiplier
SS_TAC = Single species TAC
MS_TAC = Multi species TAC
Decision_weight = Weight given to that species (Sum of all species=1.0)

Table 10 - Output of Factors for species specific fleet effort changes and weighted factor in the Commission's example run.

The scenario for apportioning catch between fleets and the management objectives for restraint of catches of cod and other species is that requested by the Commission . STECF notes that these are not the only possible management objectives and other choices based either on biological or economic criteria could also be evaluated .

Fleet	COD	HAD	PLE	POK	SOL	WHG	Fleet.Factor
B_MIS	0.000	0.983	0.789	1.000	0.902	0.880	0.043
B_OTB	0.000	0.981	0.820	1.000	0.953	0.910	0.044
B_TBB	0.180	0.975	0.657	1.000	0.869	0.990	0.214
DK_GN	0.000	0.990	0.864	1.000	0.951	1.000	0.046
DK_MIS	0.000	0.954	0.764	1.000	0.997	0.994	0.045
DK_OTB1	0.515	0.994	0.467	1.000	0.997	1.000	0.533
DK_OTB2	0.201	0.974	0.652	1.000	0.996	0.996	0.236
DK_PTB1	0.000	0.890	0.955	1.000	1.000	0.999	0.046
DK_PTB2	0.000	0.724	0.977	1.000	1.000	0.999	0.045
DK_SDN1	0.171	0.989	0.530	1.000	1.000	1.000	0.206
DK_SDN2	0.000	0.905	0.839	1.000	1.000	0.999	0.045
DK_TBB1	0.770	0.999	0.415	1.000	0.995	1.000	0.775
DK_TBB2	0.791	0.997	0.413	1.000	0.997	1.000	0.795
EW_GN	0.000	0.992	0.992	1.000	0.954	0.985	0.047
EW_MIS	0.000	0.934	0.994	1.000	0.991	0.980	0.047
EW_OTB1	0.000	0.883	0.950	1.000	0.966	0.866	0.044
EW_OTB2	0.000	0.851	0.964	1.000	0.999	0.914	0.045
EW_SDN1	0.836	0.998	0.400	1.000	1.000	1.000	0.838
EW_TBB1	0.595	0.995	0.537	1.000	0.895	0.995	0.609
EW_TBB2	0.849	0.996	0.421	1.000	0.976	0.999	0.850
FR_GN	0.207	1.000	0.885	1.000	0.537	1.000	0.240
FR_MIS	0.000	1.000	0.830	1.000	0.897	1.000	0.045
FR_OTB1	0.246	0.988	0.972	1.000	0.994	0.557	0.277
FR_OTB2	0.977	0.985	1.000	1.000	1.000	0.995	0.978
FR_TBB	0.548	1.000	0.643	1.000	0.761	1.000	0.564
GER_GN	0.000	0.996	0.977	1.000	0.612	0.998	0.044
GER_MIS	0.000	0.959	0.852	1.000	0.990	0.987	0.046
GER_OTB1	0.378	0.994	0.553	1.000	0.994	0.938	0.403
GER_OTB2	0.791	0.986	0.990	1.000	1.000	0.998	0.801
GER_PTB1	0.000	0.915	0.985	1.000	1.000	0.988	0.047

GER_PTB2	0.000	0.824	0.991	1.000	1.000	0.985	0.046
GER_SDN1	0.000	0.961	0.798	1.000	1.000	0.979	0.045
GER_SDN2	0.000	0.930	0.995	1.000	1.000	0.999	0.047
GER_TBB1	0.845	1.000	0.663	1.000	0.682	0.993	0.846
GER_TBB2	0.796	0.999	0.563	1.000	0.819	0.990	0.800
N_OTB1	0.908	1.000	1.000	1.000	1.000	1.000	0.912
N_OTB2	0.952	1.000	1.000	1.000	1.000	1.000	0.954
N_TBB1	0.768	1.000	0.436	1.000	0.996	0.979	0.773
N_TBB2	0.811	1.000	0.529	1.000	0.846	0.998	0.814
NL_GN	0.000	1.000	0.997	1.000	0.903	0.993	0.047
NL_MIS	0.000	0.992	0.829	1.000	0.972	0.810	0.044
NL_OTB	0.000	1.000	0.988	1.000	0.999	0.961	0.047
NL_OTB1	0.000	0.914	0.934	1.000	0.992	0.889	0.045
NL_OTB2	0.000	0.911	0.758	1.000	0.998	0.883	0.043
NL_PTB	0.000	0.937	0.986	1.000	1.000	0.999	0.047
NL_PTB1	0.000	0.974	0.992	1.000	0.999	0.913	0.046
NL_PTB2	0.000	0.978	0.983	1.000	0.999	0.821	0.046
NL_TBB	0.830	0.998	0.598	1.000	0.773	0.988	0.832
NL_TBB1	0.780	0.999	0.675	1.000	0.691	0.985	0.784
NL_TBB2	0.779	0.999	0.591	1.000	0.790	0.989	0.784
SC_OTB1	0.088	0.704	0.983	1.000	1.000	0.884	0.127
SC_OTB2	0.182	0.753	0.973	1.000	1.000	0.807	0.216
SC_OTB3	0.073	0.700	0.993	1.000	1.000	0.960	0.114
SC_PTB	0.157	0.696	0.989	1.000	1.000	0.867	0.193
SC_SDN	0.285	0.648	0.987	1.000	1.000	0.889	0.315