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**REPORT OF
THE SCIENTIFIC, TECHNICAL AND ECONOMIC
COMMITTEE FOR FISHERIES**

REVIEW OF SCIENTIFIC ADVICE FOR 2004

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This report does not necessarily reflect the view of the European Commission and in no way anticipates the Commission's future policy in this area.

Scientific Technical and Economic Committee for Fisheries

REVIEW OF SCIENTIFIC ADVICE FOR 2004

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1.Introduction

This review presents summary information on the state of stocks and management advice for stocks of Community interest throughout the world including those in Third Countries 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. For some stocks the review remains unchanged from the 2002 report since no new information on the status of or advice for such stocks was available at the time the review took place. This does not mean that no such information exists, merely that STECF did not have access to it. A comment to this effect is included in the relevant stock sections.

Nevertheless, the report provides summary assessment and management advice on about 300 stocks of interest to the Community.

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 errors, omissions or disagreement with assessment or advice where appropriate.

STECF notes that the form of ICES advice for 2004 has changed and that it now includes area/based fisheries advice for stocks taken in mixed demersal fisheries. Accordingly this report includes a new

Section 16 which addresses the mixed fishery advice from ICES together with STECF comments on that advice. The single stock summaries reflect the single stock advice provided by ICES.

Furthermore, brief overviews of the fisheries in some of the geographical regions where the Community has an interest have been introduced for the first time. These overviews are presently incomplete but it is the intention to extend the regional fishery overviews in future reports.

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.

The STECF review of scientific advice was drafted 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 27 – 31 October 2003, and subsequently finalised at the 17th STECF Plenary meeting (3 – 7 November 2003).

1.1. SGRST - stock review: participants

The following scientists attended the SGRST meeting:

Antonio Di NATALE

Celso FARIÑA

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Complete address details are given in Annex 1.

2. Resources of the North-east Atlantic for which the EU fixes a TAC or shares a TAC fixed multilaterally

2.1. Anchovy (*Engraulis encrasicolus*) in Division VIII (Bay of Biscay)

FISHERIES: Bay of Biscay Anchovy are exploited by fleets from France and Spain. Anchovy are mainly taken by French pelagic trawlers and Spanish purse-seiners. The Spanish purse-seiners operate mainly in the first half of the year in Divisions VIIIb,c. The French pelagic trawlers operate in Divisions VIIIa,b mainly in the second half of the year . This fishery is managed by TAC. Historically catches were highest during the 60's and 70's in the Southern of Bay of Biscay (Divisions VIIIb,c), while at this time catches in northern Biscay were low. During the 80's catches were low in both southern and northern areas. During the 1990s, catches of both fleets returned to levels similar to those observed in the 1970s. The total catch in 2002 was 17,507 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment (ICA) is based on catch-at-age data from French and Spanish fisheries and stock biomass estimates from egg (1987–2003) and acoustic surveys (1989–2003).

PRECAUTIONARY REFERENCE POINTS: ICES has revised in 2003 the reference points, due to the time-series of SSB and recruitment is short (1987-2002) and the stock-recruitment diagram does not show a clear relationship, e.g. the two very strong 1989 and 1991 year classes were generated from small SSBs and the small 2001 and 2002 year classes were generated from intermediate size SSB. ICES therefore concludes that the reference point ($\mathbf{B}_{pa}$) used previously is invalid for management advice. $\mathbf{B}_{loss}$, i.e. the level below which the dynamics of this stock are unknown is about 21 000 t, which would indicate that a $\mathbf{B}_{pa}$ around 33 000 t (=21 000*1.645, to account for assessment uncertainty and natural variability) would be more appropriate. There is no biological basis for defining $\mathbf{F}_{lim}$, and $\mathbf{F}_{pa}$ is proposed between F=1.0 - 1.2.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. The spawning stock biomass is estimated to be at 29 800 t in 2003, which is below $\mathbf{B}_{pa}$. Fishing mortality since 1998, has remained at moderate levels below the historical average. The SSB has declined because the year classes 2001 and 2002 are weak.

RECENT MANAGEMENT ADVICE: ICES recommends that a preliminary TAC for 2004 be set to 11,000 t. A catch of this size will, in the case of poor recruitment, maintain the fishing mortality at the current level. This TAC should be re-evaluated in the middle of the year 2004, based on the development of the fishery and on the results from the acoustic and egg surveys in May-June 2004. Alternatively, the TAC could be calculated based on average recruitment. Such a TAC would be about twice the preliminary TAC proposed above. But in that case the allocation for the first half year should only be half of the preliminary TAC to assure that the total amount is not fished before the mid-year adjustment. This adjustment would include the possibility that the final TAC is below the preliminary TAC.

STECF COMMENTS: STECF agrees with the ICES assessment. STECF also considers that there are large inter-annual fluctuations in the spawning stock because recruitment is highly variable combined with anchovy's short life span. The preliminary TAC should be set at a level where this TAC, should it become the total catch in the quota year, would provide a low risk of stock collapse even if the incoming year class is low. The year classes 2001 and 2002 were weak. A prediction based on a weak year class in 2004, suggest that fishing in 2004 should be restricted below 10,000 t and a preliminary TAC should be set at this level. ICES cannot in October predict the fishing possibilities for anchovy in the following year and ICES has therefore in recent years advised on TAC levels for the coming year, based on the setting of a preliminary TAC and later adjusting this TAC based on DEPM and acoustic survey results that become available in June.

STECF also agree that the development of harvest control rules should be investigated.

2.2. Anchovy (Engraulis encrasicolus) in Sub-areas IX and X

2.2.1. Anchovy (Engraulis encrasicolus) in Sub-area IX

This review relates to anchovy in Division IXa only.

FISHERIES: There is a regular fishery for anchovy in Division IXa South (Gulf of Cádiz) conducted by a Spanish purse-seine fleet. Anchovy also occurs in some years off the North of Portugal and southern Galicia, as well as off central Portugal, but is not a regularly targeted species due to its high variability. Whenever the abundance is high in the west of Division IXa, this species is targeted by Spanish and Portuguese purse-seiners, which usually exploit sardine. Anchovy in IXa is managed by TAC. Historically, during the 1940s and 1950, catches peaked at 13,000 t in the Portuguese region of Division IXa. During the1970s and early 1980s, catches decreased to a lower level of around 1,000 t. Catches rose again in the late 1980s and 1990s peaking again at about 13,000 t in 1995. In 2000 catches in Division IXa South decreased, probably as a result of a large reduction in the fishing effort by the Barbate single-purpose purse-seine fleet. Most of these vessels accepted a tie-up scheme in 2000 and 2001 because the EU-Morocco Fishery Agreement was not renewed. In 2002 these vessels resumed fishing in the Gulf of Cadiz resulting in a large increase in fishing effort to the highest recorded in recent years. ICES notes that this rapid increase in the effort directed towards this stock is undesirable, given the uncertain state of the stock. The total catch in 2002 was 8,806 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No assessment was made for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS. The state of the stock in relation to safe biological limits is unknown. There are large inter-annual fluctuations in the spawning stock due to the short life span of anchovy. The fishery depends largely on the incoming year class, which abundance is driven by environmental conditions. There is insufficient information to estimate appropriate reference points. Anchovy biomass in Division IXa was estimated at 32,959 t in November 1998 and at 25,359 t in March 1999 from acoustic surveys, 90% of this estimated biomass was found in the Gulf of Cadiz in both surveys. Anchovy biomass in the Gulf of Cadiz was estimated as 6,569 t in an acoustic survey in 1993.

RECENT MANAGEMENT ADVICE: ICES recommends that catches in 2004 be restricted to 4700 t (mean catches from the period 1988–2002 excluding 1995, 1998, 2001 and 2002). This level should be maintained until the response of the stock to the fishery is known.

STCEF COMMENTS: STECF agrees with the advice of ICES. Due to fact that the fishery is largely dependent on the incoming year class, STECF also considers that in-year monitoring and management should be considered.

2.2.2. Anchovy (Engraulis encrasicolus) in Sub-area X

There is no information on Anchovy in Sub-area X.

2.3. Anglerfish (*Lophius piscatorius)* in IIa (EU zone), North Sea

FISHERIES: Anglerfish are taken as a by-catch by towed gears in the Northern North Sea and IIa, with an increasing directed trawl fishery in the deeper areas of the Northern North Sea (where 90% of the landings are taken). The fishery is dominated by the Scottish fleet, which takes around 80% of the total landings in this area. Landings of anglerfish from the North Sea show a rapid increase in the late 1980s from about 10,000 t to about 27.000 t (1996) followed by a continuous decrease about 12,000 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The stock in the North Sea was formerly treated as a separate unit, but the assessment is now combined with that in Sub-Area VI – see Section 2.4.

2.4. Anglerfish (*Lophius piscatorius)* in Vb (EU zone), VI, XII, XIV

FISHERIES: The main fishery is in Sub-Area VI where Anglerfish have become the subject of a

directed trawl fishery. They are also taken as a by-catch in trawl fisheries targeting roundfish species and *Nephrops*. The main exploiters are the UK, France and Ireland, with smaller landings reported by other nations including Norway, Spain and Denmark. Vessels from EU Member States take most of the catch. Landings of anglerfish in Division VI show a similar trend to those in the North Sea – a rapid increase in the late 1980s (from about 6,000 t in1989 to about 18,000 t in 1996) followed by a continuous decline since 1996 to about 4,000 t in2002. As in the North Sea, the fishery in this region has moved into deeper, more offshore areas.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The assessment now includes anglerfish from Sub-area IV.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary fishing mortality reference point for this stock is F_{pa} = 0.3 be chosen as F_{pa}. There is currently no biological basis for defining B_{lim} or F_{lim}. Therefore no precautionary biomass reference point has been proposed.

STOCK STATUS: Based on the most recent estimate of the fishing mortality, ICES classifies the stock is harvested outside of safe biological limits. An assessment for the combined area indicates that the recent F's have been well above F_{pa}. Historical catches for the combined are believed to have been adequately estimated based on the long history of mis-reported catches, the correct allocation of catches to Subareas is not possible. Even though the historical perspective of SSB, fishing mortality and recruitment is not well estimated, it is likely that fishing mortality has increased since the 1980s as the fishery has expanded into deeper water with an associated increase in catches, although these have shown a sharp drop over 1997–1999. The fishery has expanded into areas, which are believed to have been refugia for adult anglerfish, increasing the vulnerability of the stock to over-exploitation. Immature fish are subjected to exploitation for a number of years prior to first maturity.

RECENT MANAGEMENT ADVICE: Despite the extension of the assessed area and the use of different model parameters, the perception of the state of the stock is consistent with the last year´s assessment. Therefore in October 2003, ICES recommended that the catch in the combined area (IV+VI) should be reduced substantially. The high catches of around 15,000 t that were sustained in the period 1973-1990 occurred before the recent expansion in the fisheries. Therefore the reduction of TAC for 2003 by almost two-thirds of that in 2002 may imply an increased incentive to discarding unless fishing effort is reduced accordingly. ICES recommends that the fishing mortality in 2004 should be reduced to less than $\mathbf{F}_{pa}$. This implies landings of less than 8,800 t for the combined Division IIIa, Subarea IV and Divisions VIa and VIb.

The ICES advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.2.

STECF COMMENTS: STECF agrees with the advice of ICES. STECF notes that in 2002 an assessment was accepted, for the first time, for anglerfish in the area IIa (EU zone) and the North Sea, which was carried on also in 2003

2.5. Anglerfish in Div. VII

Anglerfish within the two management areas VII and VIII a, b, d, e are assessed together and comprise of two species (*Lophius piscatorus & Lophius budegassa* The high catches of around 15,000 t that were sustained in the period 1973-1990 occurred before the recent expansion in the fisheries.) which are not always separated for market purposes. The management area for this stock also includes the Irish Sea (VIIa) where catches in recent years have been between 500 and 1300 t, but these catches are not included in the assessment.

FISHERIES: The trawl fishery for anglerfish in the Celtic Sea and Bay of Biscay developed in the 1970s. Anglerfish are also taken as a by-catch in other demersal fisheries in the area. Landings of *L.piscadorus* have declined from 23,7000 t in 1986 to 14,900 t in 2000 and increased to 20,200 t in 2003. Landings of *L. budegassa* were 8,217t in 1986, being 7,064t in 2000 and declined inrelation to 2000 on a level of 5,600 t in 2001 and 6,500 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: For *L.piscadorus* , the proposed Fpa = 0.24 and the proposed B_{pa} = 31,000t. For *L. budegassa* , the proposed F_{pa} = 0.23 and Bpa changed from 16,600t to 22,000t due to a correction of the maturity ogive. For both the stocks B_{lim} is not defined.

STOCK STATUS: The stock of *L.piscadorus* is outside safe biological limits, and the stock of *L. budegassa* is inside safe biological limits. The SSB of both stocks decreased continuously from 1986 until 1993, then increased in 1995/1996 and are presently decreasing. In 2002 fishing mortality is estimated to be at F_{pa} for *L. budegassa,* while for *L.piscadorus* the fishing mortality 2001 is above F_{pa}. Recent recruitment of *L.piscadorus* (1997 – 2000 year classes) are above average and there are indications of a strong year class of 2001. Also the recent recruitment of for *L. budegassa* (1997 – 2000 year classes) is well above of average.

RECENT MANAGEMENT ADVICE: The ICES advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1. In October 2003, ICES recommended that F should be reduced by 10% for both species, in order to maintain fishing mortality below F_{pa} for both stocks and prevent further decline of SSB. This corresponds to landings of less than 18,500t in 2004 for *L.piscadorus* , and landings of less than 8,200t in 2004 for *L. budegassa*). ICES pointed out, that based on the request by European Commission concerning a review of advice for 2003, a modest increase in TAC for 2003 should allow the fishery continue without major incentives for discarding small anglerfish and also should not represent an incentive for the fishery to focus on anglerfish. Already a significant part of 2003 has gone by and the increase would only apply to remaining part of 2003.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF points out, that the majority of the anglerfish catch consists of young fish, which have not yet reached maturity and the current exploitation pattern represents growth over-fishing.

2.6. Anglerfish in Div´s IVa, b, d, e

Anglerfish within the two management areas VII and VIII abde are assessed together and comprise of two species (*L.piscadorus and L. budegassa*) which are not always separated for market purposes. The management area for this stock also includes the Irish Sea (VIIa) but the catches of the Irish Sea are not included in the assessment (See section 2.5).

2.7. Anglerfish (*Lophius sp.)* in VIIIc, IX, X

FISHERIES: Anglerfish in the Iberian region are caught as part of a mixed demersal fishery byvessels using trawls and fixed nets. Two species (*L. piscatorius* and *L. budegassa*) are caught and they are not always separated for market purposes so the advice is combined for the two stocks. Between 1988 and 2002 landings of (*L. piscatorius*) have varied between 6,900t (1986) and about 790 (2001) at continuous negative trend. The same situation is to reported concerning *L. budegassa.* The landings have ranged between 3,700 (1988) and 770t (2002).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are proposed for this stock. The ASPIC model provides estimates of the biomass relative to BMSY and F relative to FMSY. The BMSY and FMSY points are used in the advice as a lower boundary for the biomass and an upper boundary for F.

STOCK STATUS: The combined stocks (*L. piscatoriuss and L. budegassa*) are outside safe biological limits. A surplus production model incorporating covariates (ASPIC) was used as in previous assessments. The biomass of both species combined is estimated to be around 71 % of the B_{MSY} in 2003, and the fishing mortality has been above the estimated F_{MSY} until 2001. In the last two years, fishing mortality is estimated to be under $F_{MSY,}$ with the 2002 value 69% of F_{MSY}.

RECENT MANAGEMENT ADVICE: Fishing mortality equal 0 in 2004 is required to bring SSB to B_{MSY} in short-term. If this it not possible then a recovery plan should established that will ensure rapid and safe recovery of the SSB above B_{MSY} in the medium-term.

The ICES advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.5.

STECF COMMENTS: STECF notes that within the recovery plan for hake and *Nephrops* in the Iberian region (Divisions VIIIc and IXa) the ICES recomendations for the anglerfish may be partially achieved.

STECF further notes that this recovery plan has been accepted (SGMOS, 2003) but it has not yet been implemented.

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2.8. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas I-IX, XII and XIV

Blue whiting is widely distributed in the eastern North Atlantic extending from the Strait of Gibraltar to the Barents Sea. It consists of several populations with genetic "leakage" between them, but it is treated as one stock since it has so far not been possible to define an unambiguous border between populations.

FISHERIES: Blue whiting is exploited mainly by fleets from Norway, Denmark, Russia, the Faeroe Islands, Iceland and Scotland, but Ireland, Spain, The Netherlands and Germany also participate in the fishery. The fishery for blue whiting was fully established in 1977. Most of the catches are taken in a directed pelagic trawl fishery in the spawning areas (Div. Vb, VIab, VIIbc). They are also caught in a mixed industrial fishery in IV and IIIa, and additionally in the directed pelagic trawl fishery in I, II, Va, XIVa,b. Over the last decade, catches in the northern areas have varied between 340 000t and 1 390 000 t. In the southern fisheries, catches have been stable in the range 25 000t to 34 000t. Total landings in 2002 were 1.6 million t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment is based on catch data, acoustic surveys and commercial CPUE data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $\mathbf{F}_{pa}$ =0.32, $\mathbf{B}_{pa}$ =2.25 million t.

STOCK STATUS: In the ACFM report of 2003, ICES considered the stock to be harvested outside of safe biological limits. Fishing mortality has increased rapidly in recent years, and is estimated at 0.5 in 2002. Although the SSB in 2003 is likely to be above the proposed $\mathbf{B}_{pa,}$ the estimate of stock size is uncertain. This is caused by conflicting signals in the catch and survey data which can be interpreted in different ways by different model formulations. The increase in the catches observed in recent years can be explained by increases in recruitment, increases in fishing mortality or a combination of the two. Even considering the uncertainties in the stock parameters ICES considers that the current exploitation rate is not sustainable with a high probability that F is above $\mathbf{F}_{pa}$. The advice implies a reduction in fishing mortality; however the absolute magnitude of the decrease cannot be ascertained from the current assessment. The spawning stock biomass reached a peak in 1999 due to the strong year classes 1995, 1996, and 1997. Even though the 1999, 2000, and 2001 year classes seem to be strong, the SSB is expected to decline at the present level of fishing mortality.

Furthermore, the proposed biological reference points for this stock may not be appropriate because the current assessment suggests that the stock has been at a higher level over a historical period than in previous assessments. However, biological reference points should only be revised once a reliable analytical assessment of the stock is available.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, recommends that catches should be less than 925 000 t in 2004 in order to achieve a 50% probability that the fishing mortality in 2004 is less than $\mathbf{F}_{pa}$ (0.32). This will also assure a high probability that the spawning stock biomass in 2005 will be above $\mathbf{B}_{pa}$.

The EU, Faroe Islands, Iceland, and Norway agreed to implement a long-term management plan aimed at constraining the harvest within safe biological limits. The agreed management plan has not been implemented yet. In the absence of agreements on a TAC for 2002 and 2003 and the allocation of the

TAC, the Coastal States and the Russian Federation implemented unilateral measures to limit blue whiting catches for these years.

Two special requests were made to ICES. Iceland, on behalf of the coastal states, requested information on juvenile exploitation. The response, contained in the ASFM report of 2003, was that immature fish removals in 2002 represented between 10-15% of the population of age 1 and 2 immature fish. In 2002, Iceland introduced a measure to limit the number of immature fish taken in the fishery in Va, whereby if the catch comprised 30% or more fish smaller than 25cm a temporary area closure is imposed. ICES consider this to be an effective measure to reduce directed fisheries for juveniles and recommends that this measure be extended to other areas where significant numbers of juvenile fish are taken. The introduction of a minimum size limit may limit the directed fishery for juveniles but might also lead to increased discarding.

All participating nations made an additional request for ICES to investigate discrpencies in the assessment of the stock which are similar to those in the assessment of the Norwegian Spring Spawning (Atlanto-Scandian) herring stock. The ICES Working Group on Methods on Fish Stock Assessments (WGMG), having looked extensively at the methods and data applied, concluded that the major problem with blue whiting is the inconsistency of the input data rather than problems with the assessment model. ICES recommended that a group of appropriate experts should review the data inconsistencies and the best assessment methodology to address these inconsistencies under different conditions.

ICES recommends that a coordinated survey be organised covering the main spawning grounds of blue whiting. Other countries than those presently taking part in these surveys are invited to take part.

STECF COMMENTS: STECF agrees with the advice of ICES. STECF notes that despite having one of the longest time series, ICES has previously suggested that the results from the 2002 blue whiting acoustic survey may be overestimates; reasons for this were not given in the ACFM report of 2003 and should be included in any future reviews of the methods.

2.8.1. Blue whiting (Micromesistius poutassou L.) in Sub -areas IIa(1)-North Sea (1)

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 2.8.

2.8.2. Blue whiting (Micromesistius poutassou L.) in Sub -areas Vb(1),VI,VII

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 2.8.

2.8.3. Blue whiting (Micromesistius poutassou L.) in Sub -areas VIIIabd

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 2.8.

2.8.4. Blue whiting (Micromesistius poutassou L.) in Sub -areas VIIIe

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 2.8.

2.8.5. Blue whiting (Micromesistius poutassou L.) in Sub -areas VIIIc,IX,X

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 2.8.

2.9. Brill (*Scophthalmus rhombus*) in the North Sea (IV)

No information is available on this stock

2.10. Capelin (*Mallotus villosus*) in Sub-areas I and II, excluding IIa west of 50W.

FISHERIES: Norway and Russia are the two main countries, which exploit the capelin stocks in these areas. No fishery took place between autumn 1993 and spring 1999. The fishery was re-opened in the winter of 1999. In 2002 the total catch was 651,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment and stock history is based on joint Russia-Norwegian acoustic surveys during September each year. A model incorporating predation from cod has been used for predicting SSB and for estimating the historical time series of SSB.

PRECAUTIONARY REFERENCE POINTS: The proposed limit reference point for biomass is B_{lim} = 200,000 t. No precautionary fishing mortality, or biomass reference points have been proposed.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. The maturing component in autumn 2003 was estimated to be 0.28 million t and is predicted, without fishing, to be 0.09 million t at the time of spawning in 2004. This is, with a very high probability, below the proposed **B**lim.

RECENT MANAGEMENT ADVICE: ICES recommends that no fishing take place in 2004. Even with no fishing at all, there is a very high probability of the spawning

stock in 2004 falling below Blim.

STECF COMMENTS: STCEF agrees with the advice of ICES.

2.11. Cod (*Gadus morhua*) in area I and II (North East Arctic cod)

FISHERIES: North east arctic cod is exploited predominantly by Norway and Russia with smaller landings by countries including the UK, the Faeroe Islands, Spain and Germany. The fishery for North east Arctic cod is conducted both by an international trawler fleet operating in offshore waters and by vessels using gillnets, long-lines, hand-lines and Danish seine operating both offshore and in the coastal areas.

From a level of about 900,000 t in the mid-1970s, landings declined steadily to around 300,000 t in 1983-1985. Landings increased to above 500,000 t in 1987 before dropping to 212,000 t in 1990, the lowest level recorded in the post-war period. The catches increased rapidly from 1991 onwards, stabilised around 750,000 t in 1994-1997 but decreased to about 414,000 t in 2000. The catch in 2002 was 445,000 tonnes. The EU fleet landings were between 23 000 tons and 47 000 tons over the last 5 years.

Quotas were introduced in the trawl fishery in 1978 and for the fisheries with conventional gears in 1989. In addition to quotas the fisheries are regulated by mesh size limitations (including sorting grids), a minimum catching size, a maximum by-catch of undersized fish, maximum by-catch of non-target species, closure of areas with high densities of juveniles, and by seasonal and area restrictions. Since January 1997 sorting grids have been mandatory for the trawl fisheries in most of the Barents Sea and Svalbard area. The fisheries are controlled by inspections of the trawler fleet at sea, by a requirement of reporting to catch control points when entering and leaving the EEZs, and by inspections for all fishing vessels when landing the fish. Keeping a detailed fishing log-book on board is mandatory for most vessels, and large parts of the fleet report to the authorities on a daily basis. There is some evidence that the present catch control and reporting systems are not sufficient to prevent under-reporting of catches.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock.

The advice is based on analysis of catch-at-age data, using one commercial CPUE series and three survey series. Estimates of cannibalism are included in the natural mortality. Alternative assessment methods (Fleksibest) are in development, and carried out as a illustrative purpose.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ = 460,000 t, $\mathbf{F}_{pa}$ = 0.42The biological information on historic stock and recruitment sizes has been revised. These revisions have altered some of the historic values substantially, with two consequences. Spawning biomasses associated with some historic recruitment are now estimated to have been lower and current reference points may be revised. A dedicated Study Group on Biological Reference Points for Northeast Arctic cod [SGBRP] met for that purpose in January 2003. The impacts of both environmental and biological considerations to stock productivity were considered, including the issue of the age composition of the SBB which may influence egg production.

STOCK STATUS: Based on the most recent estimates of fishing mortality and SSB, ICES classifies the stock as being harvested outside safe biological limits. The current stock is above $\mathbf{B}_{pa}$, but the stock is harvested above $\mathbf{F}_{pa}$. The SSB is now estimated to be above $\mathbf{B}_{pa}$ after a period (1998-2001) when it was below $\mathbf{B}_{pa}$. The estimated fishing mortality for 2002 is just below $\mathbf{F}_{lim}$. Fishing mortality in the period

1997-2000 was among the highest observed and well above $\mathbf{F}_{pa}$, even above $\mathbf{F}_{lim}$. Surveys indicate a poor 2001 year class and an average 2002 year class.

RECENT MANAGEMENT ADVICE:

In order to harvest the stock within safe biological limits, ICES recommends a considerable reduction in fishing mortality to less than F_{pa} (0.40). This corresponds to catches in 2004 of less than 398 000 t.

The TAC for 2003 was set considerably higher than recommended by ICES, maintaining the fishing mortality well above $\mathbf{F}_{pa}$. The catch advised corresponds numerically to the TAC from 2003 but it represents a significant reduction in F.

Concerns about under-reporting of catches in recent years continue. Both discards and unreported landings will reduce the effect of management measures and it is important that management agencies ensure that all catches are counted against the TAC regulations.

The advice above is further emphasised by the need to rebuild the age structure of the SSB. The majority of the spawning stock consists of first time spawners. Evidence has shown that the eggs and larvae of first-time spawners are less viable than those of other mature fish, but also that the overall spawning period is reduced when the spawning stock consists of fewer age groups.

ICES has been asked to calculate management options for 2004 on the basis of a proposed harvest control rule. The calculated catches and SSBs are given in section 3.1.10. ICES notes that these options are not consistent with the Precautionary Approach as implemented in the ICES advice.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.12. Cod (*Gadus morhua*), in the North Sea (IIa, IIIa Skagerrak, IV and VIId)

FISHERIES: North Sea cod are exploited by fleets from Belgium, Denmark, The Netherlands, Germany, France, Sweden, Norway, and UK. Small catches are also taken by fleets from Poland and The Faeroe Islands. Cod are taken mainly by otter trawls, gill nets, long-lines and beam trawl. The stock is managed by TAC through joint negotiation between the EU and Norway. Historically, landings peaked at about 350,000 t in the early 1970s, subsequently declining to around 200,000 t by 1988. Since 1989 landings have remained between about 100,000 t and 140,000 t. Landings in 1999 were 96,000 t, they strongly decreased to 71,000 t in 2000 and then to 49,000 t in 2001and 54,400 t in 2002. The assessment area for this stock includes ICES Divisions IIIa (Skagerrak), VIId and Sub-area IV, which are different management areas and for which separate TACs are set.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on an analysis of catch at age data calibrated with commercial fleet and survey data.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points for fishing mortality and spawning stock biomass have been agreed as F_{pa} = 0.65, B_{pa} = 150,000t

MANAGEMENT AGREEMENT: In 1999 the EU and Norway have "agreed to implement a long-term management plan for the cod stock, which is consistent with the precautionary approach and is intended to constrain harvesting within safe biological limits and designed to provide for sustainable fisheries and greater potential yield. The plan shall consist of the following elements :

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 70 000 tonnes (B_{lim}).

2. For 2000 and subsequent years the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of 0.65 for appropriate age groups as defined by ICES.

3. Should the SSB fall below a reference point of 150,000 tonnes (B_{pa}), the fishing mortality rate referred to under paragraph 2, shall be adapted in the light of scientific estimates of the conditions then prevailing. Such adaptation shall ensure a safe and rapid recovery of SSB to a level in excess of 150,000 tonnes.

4. In order to reduce discarding and to enhance the spawning biomass of cod, the Parties agreed that the exploitation pattern shall, while recalling that other demersal species are harvested in these fisheries, be improved in the light of new scientific advice from *inter alia* ICES.

5. The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES."

STOCK STATUS: The stock is outside safe biological limits. The spawning stock is estimated to have been below Bpa since 1984 and in the region of Blim since 1990. Survey indices indicate that SSB is well below **B**lim. Fishing mortality has been near **F**lim since the early 1980s. Fishing mortality in 2002 is estimated to have decreased.

However, the absolute value of fishing mortality and SSB in recent years is uncertain due to suspected increase in the proportion of unreported landings. There have been no strong recruitments since the 1996 year class. The 1997, 2000 and 2002 year classes are estimated to be the poorest on record.

RECENT MANAGEMENT ADVICE: Given the very low stock size, the recent poor recruitments and the continued substantial catch [54 000 t in 2002], ICES recommends the implementation of a recovery plan to ensure a safe and rapid rebuilding of SSB to levels above Bpa. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above Blim or other strong evidence of rebuilding is observed. In accordance with such a recovery plan ICES recommends a zero catch in 2004.

The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

STECF COMMENTS:

1. STECF notes that the estimate of SSB for 2002 and 2003remains below 70,000 t (Blim) and that F is estimated to have decreased from 2000-2002. STECF agrees with ICES, that the recent

estimates of F and SSB are uncertain. Despite the uncertainty of these estimates the stock is clearly outside safe biological limits and in a state where the probability of stock recovery will remain low unless stringent management action is taken immediately.

2. STECF also notes that the results of the 2003 Fisherman's survey largely complemented the result of the assessment in that the stock has increased slightly or remained at about the 2002 level.
3. STECF notes that existing recovery measures, were evaluated during the expert group meeting 29 April-7 May 2003. The evaluation of the effect of technical measures introduced for demersal towed gears indicated negligible benefit to landings or spawning biomass in medium term.
4. The Expert group concluded that the emergency closure of14 Feb-30 Apr 2001, was ineffective at protecting spawning cod, since the area did not cover the major part of the spawning stock and was too late, in that compensatory fishing may have already taken place earlier in the year. STECF Agrees with the findings of the Expert Group.
5. STECF notes that the ICES advice and forecasts do not consider the potential reduction in fishing mortality resulting from decommissioning and effort regulation in 2003. Furthermore the level of effort limitation, if any, proposed for 2004 is also unknown and consequently its impact is similarly unaccounted for in the advice. (Note STECF considers that these factors will act as F multipliers on catch forecasts for 2003 and 2004. If the level of these factors is determined their impact on catch forecasts could readily be evaluated).
6. STECF considers that technical measures (including industry-initiated programs) could be a tool in rebuilding this stock. Furthermore STECF advises that these measures should become a permanent feature of the fishery if cod is to be fished sustainably once it has recovered.
7. STECF notes that ICES evaluated the proposed re-building plans for North Sea cod and concluded that they are unlikely to lead to safe and rapid rebuilding. STECF endorses this conclusion.
8. STECF considers that the ICES advice is consistent with the objectives of the EU Norway agreement, particularly the objectives of:
   - ensuring a safe and rapid rebuilding of the stock (even though safe and rapid is not defined) to a level in excess of 150,000 t (Bpa) and,
   - making every effort to maintain a minimum level of SSB above 70,000 t (Blim).

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2.13. Cod (Gadus morhua) in the Baltic Sea (Sub-div. 22-24)

FISHERIES: Cod in Sub-divisions 22-24 is exploited predominantly by Denmark and Germany, with smaller catches taken by Sweden. The fishery is conducted by trawl and gillnets. Landings fluctuated between 15,000 and 54,000 t (1965-1999), but increased in the 90´s because the fishery activities of Denmark and Germany shifted from the former traditionally fishing grounds of the eastern cod stock to the area of the western cod stock due to the decline of the eastern cod stock and its fishing possibilities. Additional to this fact the quota transfer (up to 2001) of cod from the eastern cod stock to the western cod stock from countries which are fishing normal on the eastern cod the fishing pressure increased on the western cod stock. Therefore the average for 1996-99 amounted to 43,000 t. After 2001 the landings decreased to a level of about 24,200 t in 2002. The fishery is largely based on recruiting year classes (3 years and younger), and as a result of IBSFC regulations the discardrate is substantial.

Technical measures including increasing of the minimum landing size and the use only of an authorized net (BACOMA window, mesh size 110 mm) have been introduced.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial as well as survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for spawning biomass is B_{pa} = 23,000 t and B_{lim} = 9,000 t. F_{pa} is not yet defined. An establishment of F_{pa} is problematic because of the large exchange of cod from this stock to adjacent stocks.

MANAGEMENT AGREEMENT: A long-term management strategy for both cod stocks in the Baltic Sea (Sub-div. 22-24 and Sub-div. 25-32) has been adopted by the IBSFC.

According to this strategy every effort should be made to maintain the spawning stock biomass (SSB) of the Western cod stock (Sub-divs. 22-24) above 9 000 t. Annual TACs for this fishery shall be set reflecting a fishing mortality rate of 1.0. Should the SSB fall below the reference point of 23 000 tonnes (B_{pa}) the fishing mortality rate, on which the TAC is based, will be adapted to ensure a safe and rapid recovery of SSB to above 23 000 t.

STOCK STATUS: The stock is being outside safe biological limits. The present fishing mortality is 1.2, above the fishing mortality of 1.0 agreed by IBSFC. SSB is estimated to be 18,300 t in 2002 and 18,900 t in 2003, and therefore below the B_{pa} (23 000 t). The 2001 year class is estimated to be close to average strength, but the 2002 year class is indicated far under this average strength.

RECENT MANAGEMENT ADVICE: ICES recommends that the fishing mortality in 2004 should be reduced below the F = 1.0 as agreed by IBSFC. The corresponding landings are less than 29.600 t.

This cod stock should be managed separately from the stock in Sub-Divs. 25-32 in order to better adapt the exploitation to the present development in the stock.

STECF COMMENTS: In view of the special problems with the management of the Baltic cod stocks STECF agrees with the ICES advice. However, as long as this cod stock is managed in combination with the cod stock in Sub-divs. 25-32, implementation of the advice is unlikely to improve stock in Sub-divs. 22-24.

2.14. Cod (Gadus morhua callarias) in the Baltic Sea (Sub-div. 25-32)

FISHERIES: Cod in Sub-divisions 25-32 is exploited predominantly by Poland, Sweden and Denmark, the remaining catches taken by Latvia, Lithuania, Russia, Germany, Finland and Estonia. The fishery is conducted by trawl and gillnets. The reported landings for the years 1992–1995 are known to be incorrect due to incomplete reporting and these landings have therefore been estimated. The extent of unreported landings in 1992–1995 and estimates for under- and mis-reporting of catches during 2000 – 2002 (estimate by ICES) reflects a chaotic situation in the fishery and problems in enforcing regulations at that time. Landings have fluctuated between 45,000 t and 390,000 t (1965-2001). From 1998 to 2001 landings have been at low levels, around 80,000 t and went down to about 68,000 t in 2002.

It is to notice that since the mid 90´s the fishery activities of Denmark and Germany shifted from the former traditionally fishing grounds of the eastern cod stock to the area of the western cod stock due to the decline of the eastern cod stock and its fishing possibilities.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are B_{pa} = 240,000 t and B_{lim} = 160,000 t , F_{pa} = 0.6.

MANAGEMENT AGREEMENT: Long-term management strategy see 2.13. Cod (*Gadus morrhua*) in the Baltic Sea (Sub-div. 22-24)

STOCK STATUS: The stock is outside safe biological limits. Although the actual status of the stock cannot be estimated precisely the available information indicates that the SSB in 2002 (88,000 t) and 2003 (107,000 t) is well below B_{pa} (240,000 t) and B_{lim} (160,000 t), also the fishing mortality and SSB cannot be estimated precisely. In the most recent years the stock has been below B_{lim} and the fishing mortality has been fluctuating around $F_{lim.}$ Recruitment since the late 1980s has been below average.

RECENT MANAGEMENT ADVICE: The stock status has not improved since 2001 and the biological justifications for advising no fishing remain. Under the recovery plan fishing mortality in 2004 and should be reduced by 90% (F < 0.10) to rebuild the SSB above B_{pa} in a shorter and above B_{pa} the medium term. This corresponds to landings of less than 13,000t in 2004.

At the 29th IBSFC meeting (Vilnius ,September 2003) IBSFC has requested ICES to provide calculations based on different assumptions regarding the outcome of the fishery in 2003. IBSFC presented two estimates on basis of two different estimation approaches (65,000 t and 80,000 t, both including an estimate of non-reported landings). On this basis ICES calculated that in order to increase SSB above 160,000 t by the end of 2004 landings must be kept below 37,000 t in 2004 if landings in 2003 are 80,000 t and landings must be kept below 56,000 t if landings in 2003 are 65,000 t.If a TAC share of 50,000t is taken in 2003 landings must be kept below 74,000 t in 2004. These calculation must be confirmed based on actual data landings in 2003 the full year. These data will be available in early 2004 together with additional information from the abundance surveys in the autumn of 2003. The TAC for this stock of Subdiv´s 25 -32 (IBSFC recommendation 32,000 t) is a preliminary one and is determined final in accordance of the additional calculation by ICES in the beginning of 2004.

STECF COMMENTS: STECF agrees with the advice of ICES and the revision clause. It should be stressed that as long as this cod stock is managed in combination with the cod stock in Sub-divs. 22-24, implementation of the advice is unlikely to improve stock in Sub-divs. 25-32.

2.15. Cod (*Gadus morhua*) in the Kattegat

FISHERIES: Cod in the Kattegat is exploited by Denmark, Sweden and Germany. The fishery is conducted by both trawl and gillnets. Landings fluctuated between 4000 and 20,000 t (1971-2001) and were all taken by EU Member States. Landings have decreased continuously onto a level from 9500 t (1997) to 2,500 t (2002) in the last years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: B_{pa} = 10,500 t. F_{pa} = 0.6.

STOCK STATUS: The stock is outside safe biological limits. The present fishing mortality is above F_{pa} and even above F_{lim}. The estimated SSB in 2003 (2,290 t) is less than 50% of B_{lim} (6,400 t). The spawning stock declined steadily from about 35,000 t in the early 1970s to about 10,000 t in the 1990s and at least to about 2,290 t in 2003. This development went along with simultaneous decrease in recruitment (age 1) from 20 –30 millions in the 1970s to around 10 millions in the 1990s and to the lowest observed level of about 2,5 millions in 2003.

RECENT MANAGEMENT ADVICE: ICES advises that there should be no fishing on this stock in 2004. ICES has responded to the request from the European Commission regarding recovery plans and management measures for cod in Kattegat. ICES notes that improved SSB is a prerequisite for the re-opening of this fishery, even under a recovery plan.

STECF COMMENTS: STECF agrees with the advice of ICES

2.16. Cod (*Gadus morhua*) in the Skagerrak

FISHERIES: Landings of Skagerrak cod fluctuated between 7,000 and 20,000 t (1984-2001). In 2002 landings were around 7,500 t. The EU fleet landings were around 7,000 t in 2002. The assessment of the Skagerrak cod stock is included in the North Sea cod assessment. For other information on this stock (see section 2.12, Cod - North Sea).

2.17. Cod (*Gadus morhua*) - Vb (EU zone), VI, XII, XIV

2.17.1. Cod in Vb1 (Faeroe Plateau cod)

FISHERIES: Faeroe plateau cod are taken in a mixed demersal fishery, which was initially international. Following the declaration of EEZs in the 1970s, the fishery became largely Faeroese and fishing mortality declined briefly but it has increased since to former high levels. Most of the vessels involved are trawlers and longliners. Landings have fluctuated between 6,000 and 40,000 t (1986-2002), almost entirely taken by non-EU fleets. The management area for this stock also includes cod in VI, Vb2, XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment tuned using commercial CPUEs.

PRECAUTIONARY REFERENCE POINTS: The proposed reference points for this stock are F_{pa} = 0.35 and B_{pa} = 40,000t and limit reference points of F_{lim} = 0.35 and $_{Blim}$ = .21,000 t .

STOCK STATUS: The estimate of the fishing mortality in 2002 is high, but is considered to be highly uncertain. The estimates of fishing mortality in the past, which is considered to be more reliable, indicates

that it has been above the proposed Fpa since 1996. The spawning stock biomass has been well above Bpa for several years, and the 1999 year class appears to be strong.

RECENT MANAGEMENT ADVICE: ICES advises an effort reduction of at least 25% compared to the recent level to bring the fishing mortality towards Fpa.

STECF COMMENTS: STECF **agrees with** the ICES advice.

2.17.2. Cod in area Vb2 (Faeroe Bank Cod

FISHERIES: Faeroe Bank cod was exploited in an international fishery until the declaration of EEZs in the 1970s. Since then, the stock has largely been exploited by Faeroese vessels. The stock was the subject of a summer trawl fishery but trawling is now banned. The fishery is mainly carried out by longliners. Landings have increased sharply from 300 in 1992 to around 3,500 t in 1997 and 1998. , Since 1999 (1,300 t) there has been a slight increase in the last three years to around 1,900 t in 2002. The landings are almost entirely taken by non-EU fleets. The management area for this stock also includes cod in VI, Vb1, XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on trends in commercial and survey CPUE.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: In 2001, the stock seems to have increased again and length distributions suggest strong incoming year classes. The 2002 survey estimate remained high, although slightly lower than in 2001. The 2003 survey estimate was at a record high although the uncertainty in the index casts doubts on the result. The ratio of landings to the survey CPUE index provides an exploitation ratio (Figure 3.3.2.b.2), which can be used as a proxy to relative changes in fishing mortality. The results suggest that fishing mortality has decreased over time and is now close to the lowest observed.

Although the stock biomass is not known, it appears to be above average based on survey indices.The Faeroese groundfish surveys on Faeroe Bank indicated a steep increase of the stock in 1996-1998 compared with previous years, followed by a decline to average biomass in 1999-2000.The survey suggests higher, possibly increasing biomass since 1995 and strong incoming year classes derived from the length distributions.

RECENT MANAGEMENT ADVICE: In 2003, ICES advised that fishing effort on the Faeroe Bank, should not exceed that exerted annually between 1996-1999.

STECF COMMENTS: STCEF agrees with the advice of ICES

2.17.3. Cod in Division VIa (West of Scotland)

FISHERIES: West of Scotland cod is exploited predominantly by Scottish vessels using towed gears. A by-catch of cod is taken by French vessels targeting saithe. Since 1976, Scottish heavy trawl and seine effort has decreased, whilst that of light trawlers has generally increased, particularly in more offshore areas. Scottish Nephrops trawlers take a by-catch of cod. Catch restrictions in the first half of the 1990s led to considerable misreporting. Landings are predominantly taken by EU fleets and were sustained at about 21,000 t until the late 1980's. Landings have since declined markedly to about 2,200 t. The management area for this stock also includes cod in VIb, Vb, XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points are F_{pa} = 0.6 and B_{pa} = 22,000 t.

STOCK STATUS: The stock remains outside safe biological limits. Fishing mortality has been above F_{pa} in all years since 1976 and above F_{lim} from 1983 to 2002. SSB has been declining since the early 1980s and the estimates for 2002 is the lowest recorded, well below B_{pa} and B_{lim}. At the average rate of exploitation estimated for recent years, the chance of continued poor recruitment is high. In the last fourteen years, only one year class has been above average and the seven poorest year classes have been recruited since 1995. The current SSB is so far below historic stock sizes that both the biological dynamics of the stock and the operations of the fisheries are unknown, and therefore historic experience and data are not considered a reliable basis for medium-term forecasts of stock dynamics under various rebuilding scenarios

RECENT MEASURES TO PROMOTE STOCK RECOVERY: Due to the poor state of the cod stock in Division VIa, emergency measures (closed area and additional technical measures) were introduced in 2001. Some of these have been continued through 2002 and 2003, while new measures have been added specifically fishing effort limitation and additional conditions for monitoring, inspection and surveillance in the context of the recovery measures for this stock.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.2.

Given the very low stock size, the recent poor recruitments and the continued high fishing mortality, the implementation of a recovery plan which ensures a safe and rapid rebuilding of SSB to levels above B_{pa} has been advised. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above B_{lim} or other strong evidence of rebuilding is observed. In 2004 such a recovery plan would imply zero catch.

STECF COMMENTS:

1 Whilst noting the ICES evaluation of the recovery plans and management measures for this stock STECF considers that the current SSB is sufficiently below historic stock size that both the biological dynamics of the stock and the operations of the fisheries are unknown. Consequently historic experience and data are not considered a reliable basis for medium-term forecasts of stock dynamics under various rebuilding scenarios. STECF considers that recovery plan scenarios for this stock may be realistically evaluated only after there is clear evidence that the stock has recovered to a point where historically observed productivity could be expected.

2 Whilst recognising that an evaluation of the benefit of improvements in selectivity resulting from changes in mesh size will always remain difficult STECF considers that recent regulatory changes in mesh size are insufficient for rapid rebuilding of the SSB (contributing an extra 250 tonnes of SSB in 2005 if implemented in the most optimistic circumstances). STECF does consider, however, that technical measures (including industry-initiated programs) could be a tool in rebuilding this stock. Furthermore, STECF advises that these measures should become a permanent feature of the fishery if cod is to be fished sustainably once it has recovered.

3 STECF notes that the ICES advice and forecasts do not consider the potential reduction in fishing mortality resulting from decommissioning and effort regulation in 2003. Furthermore the level of effort limitation, if any, proposed for 2004 is also unknown and consequently its impact is similarly unaccounted for in the advice. (Note: STECF considers that these factors will act as F multipliers on catch forecasts for 2003 and 2004. If the level of these factors is determined their impact on catch forecasts could readily be evaluated).

4 STECF notes that there is no agreed management plan with clearly defined objectives for this stock. STECF advises that agreeing such a management plan is desirable both during the recovery phase and thereafter if the fishery is to be managed in a sustainable manner.

5 Taking all of these factors into account, STECF considers that there should be zero catches of cod until there is clear evidence of recovery in this stock.

2.17.4. Cod in Division VIb (Rockall)

FISHERIES: Rockall cod is exploited predominantly by Scottish, Irish and Norwegian vessels using towed gears. Landings have fluctuated between 360 t and 2,000 t (1984-2001) but has shown a steady decline since 1995. Preliminary information on the 2002 catches is the lowest value in the time series with 98 t. The management area for this stock also includes cod in VIa, Vb, XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES but no explicit management advice is given for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: There is no information on the status of cod in Division VIb. Official catch data are incomplete. Due to the rapid decline in cod catches in Division VIa the official landings reported from this area now account for about 25 % of the catch in Subarea VI.

RECENT MANAGEMENT ADVICE: In October 2003, ICES commented that a TAC set for Division VIb cod should not jeopardise a rebuilding plan for cod in Division VIa nor management measures for haddock in this area.

STECF COMMENTS: STECF notes that because cod TACs are set to include all of Area VI, for management measures for VIb should be consistent with the management measures adopted for VIa cod, for which stringent management is advised. Because cod are taken in a mixed fishery with haddock, management measures adopted for VIb cod should also be consistent with the management measures adopted for VIb haddock, for which stringent management is advised.

2.17.5. Cod in areas XII and XIV

FISHERIES: The management area for this stock also includes cod in VI and Vb (see sections 2.17.1 and 2.17.4.

SOURCE OF MANAGEMENT ADVICE: No explicit management advice is given for cod in these areas.

2.18. Cod (*Gadus morhua*) in area VIIa (Irish Sea Cod)

FISHERIES: The Irish Sea cod fishery has traditionally been carried out by otter trawlers targeting spawning cod in spring and juvenile cod in autumn and winter. Activities of these vessels have decreased, whilst a fishery for cod and haddock using large pelagic trawls increased substantially during the 1990s. In recent years the pelagic fishery has also targeted cod during the summer. Cod are also taken as a by-catch in fisheries for *Nephrops*, plaice, sole and rays. Landings are taken entirely by EU fleets and were between 6,000 t and 15,000 t from 1968 to the early 1990s. There has since been a steep decline in landings to levels as low as 2,200 t. There has been a slight increase from this lowest level in the last two years to 4,400 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are B_{pa}=10,000 t, F_{pa}=0.72

STOCK STATUS: The stock remains outside of safe biological limits.

Fishing mortality has been above $\mathbf{F}_{pa}$ since 1980 and close to, or above $\mathbf{F}_{lim}$ since 1989. SSB is below $\mathbf{B}_{pa}$ and has been below or close to $\mathbf{B}_{lim}$ since 1995, and is projected to be below $\mathbf{B}_{lim}$ in 2004. In the last fifteen years, only one year class has been above average and the 2002 year class is the second lowest on record. The stock is thus estimated to decline below $\mathbf{B}_{lim}$ in the short-term. At the average rate of exploitation estimated for recent years, SSB will remain at sizes where the risk of continued poor recruitment is high.

RECENT MEASURES TO PROMOTE STOCK RECOVERY: To rebuild the SSB of the stock, a spawning closure was introduced in 2000 for ten weeks from mid-February which was argued to maximize the reproductive output of the stock (EU Regulations 304/2000 and 549/2000). The measures were revised in 2001, 2002 and 2003, involving a continued, but smaller spawning ground closure, coupled with changes in net design to improve selectivity.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.3.

Given the very low stock size, the recent poor recruitments, and the continued high fishing mortality, a recovery plan which ensures a safe and rapid rebuilding of SSB to levels above $\mathbf{B}_{pa}$ should be implemented. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above $\mathbf{B}_{lim}$ or other strong evidence of recovery is observed. The stock was close to $\mathbf{B}_{lim}$ at the start of 2003, but is expected to decrease to below $\mathbf{B}_{lim}$ at the start of 2004. Therefore, in 2004 such a recovery plan would imply zero catch.

STECF COMMENTS:

1. STECF notes that ICES evaluated a recovery plan proposals from the European Commission. The results of these evaluations indicate that SSB can be recovered above $\mathbf{B}_{pa}$ over a time frame of 7-8 years. These simulations assume 100% implementation efficiency, which has not been seen in the past management of the stock and hence are likely to underestimate the time needed for recovery.
2. Whilst recognising that an evaluation of the benefit of reduced fishing mortality resulting from recent decommissioning will always remain difficult STECF considers that recent decommissioning will be insufficient for rapid rebuilding of the SSB (contributing an extra 600 tonnes of SSB in 2005 if implemented in the most optimistic circumstances, "VIIa Cod Short Term Forecast Re-Calculations", Scott, R., Working Document to ACFM, October 2003). STECF does consider, however, that technical measures (including industry-initiated programs) could be a tool in rebuilding this stock. Furthermore, STECF advises that these measures should become a permanent feature of the fishery if cod is to be fished sustainably once it has recovered.
3. STECF notes that there is no clear evidence of a reduction in fishing mortality over the period from 2000 onwards when emergency and *ad hoc* measures were enacted. STECF therefore cannot determine the extent to which recent increases in SSB have resulted from the emergency measures.

4. STECF notes that there is no agreed management plan with clearly defined objectives for this stock. STECF advises that agreeing such a management plan is desirable both during the recovery phase and thereafter if the fishery is to be managed in a sustainable manner.

Taking all of these factors into account, STECF considers that a zero catch will provide the highest probability of stock recovery in the short term. However, STECF notes that the catch options provided

by ICES indicate that rebuilding of the SSB above $\mathbf{B}_{lim}$ in 2005 can be achieved without a zero catch in 2004.

2.19. Cod (*Gadus morhua*) - VIIb-k, VIII, IX, X

2.19.1. Cod (Gadus morhua) in area VIId

FISHERIES: Landings of cod from VIId has declined from 14,200 t in 1987 to 1,900 t in 1991. Since then landings have risen to 7,000 t in 1997 and 8,600 t in 1998. Then sharply decreased to 1,600 t in 2001. In 2002, 3,100 t cod has been landed. Cod from VIId are included in the North Sea cod assessment. For other information on this stock (see section 2.12, Cod - North Sea).

RECENT MANAGEMENT ADVICE: Given the very low stock size, the recent poor recruitments, ICES (2002) recommended that a recovery plan should be implemented to ensure a safe and rapid rebuilding of SSB to levels above B_{pa}. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above Blim or other strong evidence of rebuilding is observed. In accordance with such a recovery plan ICES recommends a zero catch in 2004.

The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

STECF COMMENTS: STECF agrees with the advice from ICES. See also section 2.12, Cod – North Sea

2.19.2 Cod (Gadus morhua) in areas VIIe-k

FISHERIES: Cod in Divisions VIIe-k are taken as a component of mixed trawl fisheries. Landings are made mainly by French gadoid trawlers, which prior to 1980 were mainly fishing for hake in the Celtic Sea. Landings peaked in 1989 at 20,000 t and have since been maintained at between 7,000 and 13,000 t (1990-2002), all taken by EU fleets.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data. The management area includes Divisions VIIe,f,g,h,j and k. The TAC covers the above Divisions, together with Sub-area VIII, IX and X and the CECAF area. The TAC for Division VIIa is based on a separate assessment for that Division and has a separate TAC. The assessment of the stock in Division VIId is combined with that of Sub-area IV. A separate TAC for VIId is based on a percentage (0.27% equivalent to about 4 000 t), of the combined TAC for both areas. If it is necessary to calculate a TAC for Sub-area VII - excluding Divisions VIIa and VIId - and including Sub-areas VIII, IX and X, then 1 000 t representing the average catches from the non-assessed areas should be added to the proposed TAC for Divisions VIIe–k.

PRECAUTIONARY REFERENCE POINTS: The proposed reference points for fishing mortality and biomass are F_{pa} = 0.68, B_{pa} = 10,000 t.

STOCK STATUS: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. SSB has decreased since 1996 and is currently below $\mathbf{B}_{pa}$. ICES considers recruitment to be highly variable. The 1999 and 2000 year classes are above average, whilst the 2001 and 2002 year classes are estimated to be very weak. Fishing mortality has generally increased, and has been mostly above $\mathbf{F}_{pa}$ since the mid-1980s, and has been close to or above $\mathbf{F}_{lim}$ since 1989.

RECENT MANAGEMENT ADVICE: A 90% reduction in fishing mortality in 2004 relative to $\mathbf{F}_{sq}$ is required to restore SSB above $\mathbf{B}_{pa}$ in 2005. If such a reduction is not possible, a recovery plan which includes a sustained reduction of fishing mortality should be implemented to rebuild the stock above $\mathbf{B}_{pa}$ in the medium-term. Direct effort reductions, rather than TAC controls, are required to promote such a reduction in fishing mortality (or effort control measure) must be set specifically for this area.

STECF COMMENTS: STECF notes that, in the absence of specific management objectives, the rationale for the ICES advice is to rebuild SSB above $\mathbf{B}_{pa}$ by 2005. STECF notes that recovery plan evaluations projecting F reductions to $\mathbf{F}_{pa}$ (32% reduction) achieve recovery of the SSB to $\mathbf{B}_{pa}$ within 5 years (Table 3.9.2.3, ICES ACFM Report, October 2003). STECF considers such recovery plan scenarios to provide acceptable prospects for stock recovery within acceptable time-frames. STECF therefore suggests that such recovery plan scenarios be adopted for this stock rather than the 90% reduction in fishing mortality in 2004 as advised by ICES. STECF notes that past TAC reductions have not resulted in desired reductions in fishing mortality. STECF therefore supports the ICES advice that direct effort reductions, rather than TAC controls, are required to promote a reduction in fishing mortality.

2.20. Dab (*Limanda limanda*) - IIa (EU zone), North Sea

There is no information on the status of this stock.

2.21. Flounder (*Platichthys flesus*) - IIa (EU zone), North Sea

There is no information on the status of this stock.

2.22. Flounder (*Platichthys flesus*) – IIIb,c,d,(EU zone), Baltic Sea

FISHERIES: All countries surrounding the Baltic report landings of flounder. It is mainly taken as by-catch in fisheries for cod, but there are also local coastal fisheries targeting this species. In the past 10 years total recorded landings have fluctuated between 8,000 and 18,000 t. It is likely that in this period total landings from SD 22 –26 are overestimated due to the misreporting of cod as flounder in the landings of the directed cod fishery, especially in the years in the mid 90s. The reported landings for 2002 (19.660 t) were the highest observed. In recent years, EU member states have accounted for approximately half of the total landings.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been

proposed for the flounder stocks in the Baltic.

STOCK STATUS: Baltic flounder is split up into several stocks. A tentative assessment of the stock in Sub-divisions 24 and 25 suggest a stable spawning stock in the entire period of the assessment (since 1978). This assessment shows one of the highest SSB values of about 32 000 t in 2001 and in 2002 since 1987 (long-term average 1978 – 2002= 27 200 t) and suggests a further onward trend of the SSB since 1995. The stock recovered during the end of 1990s and 2001 with the recruitment of several above-average year classes.

RECENT MANAGEMENT ADVICE: Data are insufficient for management advice., and no advice is available from ICES.

STECF COMMENTS: STECF has no comment.

2.23. Greenland halibut (*Reinhartius hippoglossoides*) in area I and II

FISHERIES:

The regulations enforced in 1992 reduced the total landings of Greenland halibut by trawlers from about 20,000 to 8,600 t. Since then annual trawler landings have varied between 9,000 and 20,000 t without any clear trend attributable to changes in allowable bycatch.

Since 1992, the fishery has been regulated by allowing a directed fishery only by small coastal longline and gillnet vessels. By-catches of Greenland halibut in the trawl fisheries have been limited by permissible by-catch per haul and an allowable by-catch retention limit on board the vessel

In recent years, EU member states catches has been insignificant, between 300 and 500 tons.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock.The analytical assessment is based on survey and commercial catch data. The assessment is considered uncertain due to age-reading problems and evidence of unreported landings that could not be taken into account.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: The status of the stock is uncertain. In the current assessment both the total stock size and SSB are considered to be low in historical terms but have been improving in recent years. In 2002, they are estimated to be above the average of the last 20 years. Fishing mortality in recent years is estimated to be slightly below the long-term average with the 2002 value the lowest since 1981. Recruitment has been rather stable but low since 1990. The catch of Greenland halibut in 2003 is expected to be higher (15,000t) than the corresponding ICES advice (<13,000t).

RECENT MANAGEMENT ADVICE: ICES recommends that catches not exceed 13 000 t for 2004 to allow continued increase in the stock. Furthermore, additional measures to control catch should be implemented.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.24. Greenland halibut (*Reinhartius hippoglossoides*) in area V, XII and XIV

FISHERIES: Most of the fishery for Greenland halibut in Divisions Va, Vb and XIVb is a directed fishery, only minor catches in Va by Iceland, and in XIVb by Germany and the UK comes partly from a redfish fishery. During the period 1982–1986, landings were stable at about 31 000–34 000 t. In the years 1987–1989 landings increased to about 62 000 t. From 1990 to 1999 there was a decrease to around 20,000 t. In 2001 and 2002 landings amounted to around 29,000 t. Catches not officially reported to ICES have been included in the assessment. Landings within Icelandic EEZ have traditionally been reported as caught in Division Va. Therefore, when referring to Division Va (or Icelandic waters) the area covers both Va and the Icelandic EEZ part of XIVb. Landings and fishery relates to the Greenland EEZ part of XIVb as well as international waters on the Reykjanes Ridge.

Catches in Icelandic waters have, due to quota regulations, decreased from 37 000 t in 1990 to 11 000 t in 1999. In the last two years landings have increased lightly to around 19,000 t..

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment is based on commercial catch and CPUE data.

REFERENCE POINTS: Advice is based on a production model. The results of this model suggests that an appropriate $\mathbf{F}_{pa}$ would be 2/3 of the estimated $\mathbf{F}_{MSY}$. The ratio $F/\mathbf{F}_{MSY}$ equal to 0.67 is used in the advice as an upper boundary for F.

STOCK STATUS: The stock is harvested outside safe biological limits. Recent Fs are estimated to be above the proposed $\mathbf{F}_{pa}$ and close to $\mathbf{F}_{MSY}$. Even though the recent historical development of SSB and fishing mortality are not well estimated, it is likely that fishing mortality has decreased and biomass increased in recent years. Survey biomass indices have and CPUE's in Division Va have increased from a low in 1996, but declined in 2002. The CPUE indices from Divisions XIVb and Vb are stable in that period.

RECENT MANAGEMENT ADVICE: ICES recommends that the fishing mortality be reduced below $0.67*F_{MSY}$. This corresponds to catches in 2004 for the total stock of less than 20 000 t.

ICES notes that For a number of years total catches have exceeded the advised TAC. There is no consistent management in the three areas (Divisions Va, Vb and XIVb). At present the fishery in Division Vb is subject to effort limitation and the fisheries in Divisions XIVb and Va are catch limited. The agreed TAC in Division Va has been close to the recommended TAC for the entire area. The combination of different management measures in different Sub-areas mean that there is no control over total fishing mortality for this stock.

STECF COMMENTS: STCEF agrees with the advice of ICES.

2.25. Haddock (Melanogrammus aeglefinus) in area I and II (North East Arctic haddock)

FISHERIES: The fishery is mainly a trawl fishery, in some periods only as by-catch in the fishery for cod. Occasionally there is also a directed trawl fishery for haddock. The fishery is restricted by national quotas, by a minimum landing size, a minimum mesh size in trawls and Danish seine, a maximum by-catch of undersized fish, closure of areas with high density of juveniles and other seasonal and area restrictions.

In recent years Norway and Russia have accounted for more than 90% of the landings. Before the introduction of national economic zones in 1977, UK (mainly England) landings made up 10–30% of the total. EU fishing in the last 5 years has decreased steadily from 4,800 t to 3000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment is based on catch-at-age data and 3 surveys, and it includes predation by NEA cod.

REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ = 80,000 t, $\mathbf{F}_{pa}$ = 0.35.

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality, ICES classifies the stock as being harvested outside safe biological limits. Fishing mortality in 2002 is estimated to be well above the proposed $\mathbf{F}_{pa}$. The SSB in 2003 is estimated to be 120 000 t, which is above the $\mathbf{B}_{pa}$ of 80 000 t, and is expected to increase further in the short-term at current fishing levels. The survey indices indicate that the year classes after 1997 are above the long-term average.

RECENT MANAGEMENT ADVICE: In order to harvest the stock within safe biological limits, ICES recommends a reduction in fishing mortality to less than F_{pa} (0.35). This corresponds to catches in 2004 of less than 120 000 t.

At the last meeting of the Joint Russian-Norwegian Fisheries Commission, the parties agreed upon the following procedure for the annual fixing of TACs for northeast Arctic cod from 2004:

• Estimate the average TAC level for the following three years based on F_{pa}. TAC for the following year is set on the basis of this average TAC level;

• The following year the estimation of the TAC level for the next three years is repeated based on updated information on stock development. However, the revision of TAC cannot be more than ±25% of the TAC level for the preceding year;

• If the spawning stock biomass falls below B_{pa} the Parties must consider fixing a lower TAC than the TAC set according to this procedure.ICES' interpretation of the harvest rule specified above, based on a literal understanding of it, is that the constraint on inter-annual variations of TACs becomes operational in the second year of implementation of the rule, *i.e.* as applying to the TAC in 2005 and subsequent years. This is subsequently referred to as harvest rule 1. However, it is also possible to interpret the rule to provide for a constraint on inter-annual TAC variations in its first year of operation, *i.e.* as first applying to the TAC in 2004, hereafter referred to as harvest rule 2. ICES present catch

options on the basis of both interpretations, but both are inconsistent with the precautionary approach, as they result in catches in 2004 that are greater than 120 000 t.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.26. Haddock (*Melanogrammus aeglefinus*) in IIa (EU zone), in Sub-area IV (North Sea) and Division IIIa (Skagerrak- Kattegat)

FISHERIES: North Sea haddock is exploited predominantly by fleets from the UK (Scotland), Norway and Denmark. Most landings are for human consumption and are taken by towed gears, although there is a small by-catch in the small-mesh industrial fisheries. Substantial quantities are discarded. Over 1963-1998, landings have ranged from 93 000 t to 930 000t. In recent years landings have decreased from 159,000 t in 1996 to 105,000 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using catch-at-age data from landings, discards and industrial by-catch, as well as survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.70, B_{pa} = 140 000 t.

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock as being inside safe biological limits, but the estimate of the fishing mortality is uncertain – fishing mortality has been above $\mathbf{F}_{pa}$ but is estimated to have decreased since 2000, to below $\mathbf{F}_{pa}$ in 2002. SSB in 2003 is estimated to be above the $\mathbf{B}_{pa}$. The 1999 year class is estimated to be strong and has led to the current increase in SSB, but it is the only above-average year class for several years and dominates both the stock biomass and the catches. The 2001–2003 year classes are all estimated to be well below average.

MANAGEMENT AGREEMENTS:

In 1999 the EU and Norway have "agreed to implement a long-term management plan for the haddock stock, which is consistent with the precautionary approach and is intended to constrain harvesting within safe biological limits and designed to provide for sustainable fisheries and greater potential yield. The plan shall consist of the following elements:

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 100 000 t (B_{lim}).

2. For 2000 and subsequent years the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of 0.70 for appropriate age groups as defined by ICES.

3. Should the SSB fall below a reference point of 140 000 t (B_{pa}), the fishing mortality rate referred to under paragraph 2, shall be adapted in the light of scientific estimates of the conditions then prevailing. Such adaptation shall ensure a safe and rapid recovery of SSB to a level in excess of 140 000 t.

4. In order to reduce discarding and to enhance the spawning biomass of haddock, the Parties agreed that the exploitation pattern shall, while recalling that other demersal species are harvested in these fisheries, be improved in the light of new scientific advice from *inter alia* ICES.

5. The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES."

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries in the North Sea (Section 16.1). The stock specific advice for haddock is that ICES recommends that fishing mortality in 2004 should be less than $\mathbf{F}_{pa}$. Recruitment of haddock has been well below average for all year classes after the strong 1999 year class. This will have a strong negative impact on the development of the spawning stock biomass in the near future. A low fishing mortality will allow the 1999 year class to contribute to spawning as long as possible.

STECF COMMENTS: STECF agrees with the advice from ICES. In the absence of a reliable catch forecast, STECF notes that catch in 2004 corresponding to that advice cannot be calculated.

2.27. Haddock (*Melanogrammus aeglefinus*) in areas Vb(EU zone), VI, XII & XIV

This management unit comprises three distinct haddock stocks (Vb, VIa and VIb), which are assessed separately.

2.27.1. Haddock in area Vb (Faeroe)

FISHERIES: Faeroe Haddock are taken as part of a mixed demersal fishery, with most taken by trawls or longlines. Landings are predominantly Faeroese, with only low EU landings. Since 1988 total landings from Vb have ranged from 4,000 t to 26,000 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are $F_{pa} = 0.25$ and $B_{pa} = 55\ 000$ t.

STOCK STATUS: The stock is harvested outside safe biological limits. SSB in 2003 is estimated to be well above $\mathbf{B}_{pa}$. Fishing mortality in 2002 is estimated to be above the $\mathbf{F}_{pa}$ and close to $\mathbf{F}_{lim}$. The SSB increased significantly in 1996–1998 due to the recruitment of the very strong 1993 year class and the well above average 1994 year class. The subsequent year classes were below average, but the 1999 year class is estimated as the highest on record, and all year classes after are estimated/predicted well above average. SSB is expected to stay above $\mathbf{B}_{pa}$ in the short term with a status quo fishing mortality.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, ICES advises that fishing effort in 2004 be reduced to correspond to fishing mortality below F_{pa} = 0.25, corresponding to an effort reduction of about 36%.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.27.2. Haddock in Division VIa (West of Scotland)

FISHERIES: Haddock to the West of Scotland are taken as part of a mixed demersal fishery, with most taken by UK (mainly Scottish) trawlers. Smaller proportions of the landings are taken by other nations including France, Ireland and Norway. From 1978 to 2002, reported landings have varied between about 7 000 t and 30 000 t. The large majority of the landings are made by EU-nations, with landings by non-EU fleets not exceeding 100 t over this period. Substantial quantities are discarded: in 2002 reported landings were about 7 000 t and discards were estimated at 8 500 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using catch-at-age data from landings and discards, and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are F_{pa} = 0.50 and B_{pa} = 30,000 t

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock as being inside safe biological limits. Fishing mortality has been above $\mathbf{F}_{pa}$ in every year since 1987 except for 2002. SSB varied around $\mathbf{B}_{pa}$ during the 1990s. The very strong 1999 year class, the fourth largest since 1965, has caused SSB to increase rapidly from its historic low in 2000 to above $\mathbf{B}_{pa}$ in 2001 and 2002.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries of the West of Scotland (Section 16.2). The stock specific advice for haddock is that fishing mortality should be less than $\mathbf{F}_{pa}$ (= 0.50). This would correspond to landings of less than 12 200 t in 2004.

STECF COMMENTS: Whilst, in general, agreeing with the ICES advice for this stock STECF also notes the following:

1. Whereas an evaluation of the benefit of improvements in selectivity resulting from changes in mesh size will always remain difficult STECF considers that recent regulatory changes in mesh size may be of significant benefit for building the SSB. In the case of this stock these changes may contribute an increase of about 16% in SSB in 2005 if implemented in the most optimistic circumstances (WGNSDS Technical Minutes, ICES/ACFM 2003). STECF considers that such technical measures (including industry-initiated programs) should become a permanent feature of this fishery.

2. The specific advice for this stock should be considered in light of additional comments in section 16.2 that considers Regional Mixed fishery advice for the ICES area.

2.27.3. Haddock in Division VIb (Rockall)

FISHERIES: The Rockall fishery had until recently taken place largely in the summer if fishing at Rockall was more profitable than in the North Sea or West of Scotland. A few Irish vessels exploit this stock on a more regular basis. There has been an increase in activity by non-EU fleets, notably Russian vessels, as part of the area now falls outside the EU EEZ. Scottish and Irish trawlers fish mainly for haddock, whilst Russian trawlers also fish for species such as gurnard. UK, Russian and Irish vessels account for the highest proportion of the landings, with smaller quantities taken by other nations including Iceland, France, Spain and Norway. Over 1985 to 2001, reported landings have varied between 1 900 t and 9 800 t. Landings in 2002 were approximately 2 500 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice in 2003 was based on an analytical assessment. Such an analysis was not possible this year, primarily because no biological samples were available for 2002 from the fleet that accounted for over 70% of the reported catch. The only indication of stock status currently available is a research survey index.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are $F_{pa} = 0.40$ and $B_{pa} = 9{,}000$ t

STOCK STATUS: The state of the stock is uncertain. Historical perspectives of fishing mortality indicate that they have been high, but the current exploitation rate is unknown. Survey-based indices of SSB indicate that that the stock was at a historical low in 2002, but may have increased in 2003. Stronger confirmation of substantial improvement in stock status is needed before it can be concluded that the stock is recovering.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries of the West of Scotland (Section 16.2). The stock specific advice for haddock is that catches in 2004 should be reduced to the lowest possible level.

The TAC applies to Subarea VI, with a limit on how much of the catch may be taken in Division VIa, but no such limit for Division VIb. In addition, part of Division VIb now falls within international waters where non-EU vessels are not subject to TAC. This allows for an unregulated fishery in the Rockall area. A separate TAC applicable only to Division VIb, including international waters, would ensure a sustainable fishery in Division VIb.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.28. Haddock (*Melanogrammus aeglefinus*) inVII, VIII, IX & X

This management unit comprises two distinct haddock stocks (VIIa and VIIb-k), that are assessed separately.

2.28.1. Haddock in Division VIIa (Irish Sea)

FISHERIES: The haddock stock is mainly confined to the western Irish Sea where important mixed-species fisheries for *Nephrops*, whiting and cod take place. A directed fishery has developed for

haddock during the 1990s. Large catches of haddock are taken in the *Nephrops* fishery during periods of high haddock abundance. A directed fishery for mature haddock in spring, using pelagic trawls and whitefish otter trawls, has been curtailed since 2000 by the cod spawning closure. Fishing effort of these vessels has been redirected to surrounding regions, and some vessels switched to using *Nephrops* trawls to take advantage of the derogation for *Nephrops* fishing during the closure. The current directed fishery for haddock in the Irish Sea is likely to generate bycatches of cod in the same area. Between 1984 and 1995 landings ranged from about 400 t to 1,750 t. There followed an increase in landings to 4,900 t in 1998. Landings have since declined to about 2,500 t in 2001and about 2000 t in 2002..

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment, using catch-at-age and survey data. The assessment in 2002 was considered very unreliable and the advice was based on the average catch of the previous two years. The advice in 2003 is based on a revised assessment using settings that gave the most robust retrospective forecast predictions.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary fishing mortality reference point for this stock is F_{pa} = 0.50. No biomass reference points are defined.

STOCK STATUS: Based on the most recent estimate of fishing mortality ICES classifies the stock as being harvested outside safe biological limits. Fishing mortality has been well above F_{pa} since 1993. No biomass reference points have been defined. Spawning stock biomass increased substantially as a result of the strong 1994 and 1996 year classes. The SSB has declined in the past year and remains dependent on the strength of the recruiting year classes.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries in Section 16.3. In October 2003, ICES recommended fishing mortality in 2004 should be reduced to less than F_{pa}, corresponding to catches no higher than 1500 t.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.28.2. Haddock in Division VIIb-k (Celtic Sea and West of Ireland)

FISHERIES: In this area, haddock is taken in mixed fisheries along with cod, whiting, plaice, Nephrops, sole and rays. Most catches come from otter trawlers, mainly from France and Ireland. The TAC has not been restrictive for haddock. Landings peaked at about 11,000 t in 1997 and have fluctuated between about 5,000 t and 8,000 t since then. In 2002, total landings were almost 7,000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment, using catch-at-age data. Assessing the state of this stock is difficult due to the short time-series of assessment data, but the available data is considered indicative of stock development.

PRECAUTIONARY REFERENCE POINTS: No fishing mortality or biomass reference points are defined for this stock.

STOCK STATUS: The state of the stock is unknown in relation to safe biological limits. However, the current assessment is considered to be indicative of recent trends, and indicates that the stock is currently at a relatively high level in response to high recruitment in recent years. F has been relatively

stable since 1996. Recruitment seems to be highly variable, and the 2001 year class is estimated to be the highest in the short series. This would be expected to be reflected in increased catch.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries in Section 16.4. ICES (2003) advises that fishing mortality should not increase. ICES recommends that a management plan, including monitoring of the development of the stock and of the fishery should be constructed and implemented.

STECF COMMENTS: STECF considers that any increase in TAC must be set taking into account the mixed nature of fisheries in this area (see Section 16.4).

STECF agrees with the advice from ICES that fishing mortality should not increase and notes that recent levels of F are consistent with F_{max}. However, STECF notes that the lack of provision of a short term forecast by ICES precludes an estimation of landings in 2004 consistent with *status quo* fishing mortality. STECF notes that using the average of recent landings (as adopted in previous years) is a poor basis for management advice in stocks such as Celtic Sea haddock where catches are expected to increase markedly in response to strong confirmed recent recruitment. STECF agrees with ICES that there are indications of a strong year-class (2001) in the fishery and that a TAC based on an average of recent landings would lead to increased discarding of marketable fish. In the 2004 catch forecast presented to ICES (but not reported by ICES), the 2004 landings of haddock at F_{SQ} were indicated to be around 18,300t (2.4 times the average landings of the last 3 years).

2.29. Hake (*Merluccius merluccius*) in Skagerrak, Kattegat, IIIb,c,d (1) (Northern hake)

Hake in the Skagerrak and Kattegat are assessed as part of the northern stock of hake (see section 2.31)

2.30. Hake (*Merluccius merluccius*) in Division IIa, North Sea (EU zone) (Northern hake)

Hake in the Division IIa and North Sea (EU zone), are assessed as part of the northern stock of hake (see section 2.31)

2.31. Hake (*Merluccius merluccius*) in Division Vb (1), VI and VII, and XII, XIV (Northern hake)

The management area covers Skagerrak, Kattegat, IIa, IIIb,c,d, , IV, VI, VII, VIII, XII and XIV with separate TAC's for these Divisions.

FISHERIES: Hake is caught in nearly all fisheries in Subareas VII and VIII. Three main gear types are used for hake: long-lines (UK, Spain), fixed-nets (UK, Spain and France) and otter-trawls (all countries). There is a decrease in the amount of small hake caught in recent years. During the period 1961-2002 landings have fluctuated between 36,000 t and 96,000 t. Since 1989 landings have a declining trend. Landings were 40,000t in 2002..

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data. Length composition data by fishery unit is available annually for 1978-1989 and quarterly for 1990-2002. Prior to 1992, these were converted to age compositions by numerical methods. For 1992-2002, age readings were used. Data include discards estimates.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points were updated this year following a revision of the assessment model and data in the recent years. The basis for setting reference points remained unchanged. The proposed reference points are: Blim: 100,000 t, Bpa: 140,000 t, Flim: 0.35, Fpa: 0.25.

STOCK STATUS: The stock is outside safe biological limits. Fishing mortality has been above Fpa, between 1987 and 2000. SSB has generally declined till the early 1990s and has stabilised at low level since then. SSB has been below B_{pa} since 1990, and very close to Blim during 1992-1994 and in 2000.. Recruitment estimates for 1997-2001 are the lowest recorded.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in 16.4. In light of the low stock size and the recent poor recruitment, ICES recommends that a recovery plan be implemented to ensure safe and rapid rebuilding of SSB above 140,000 t (B_{pa} level). This will require strong support from the fisheries, an effective monitoring of the fisheries, enforcement of the fishery regulations and an effective control of effort. Rebuilding the stock in the short term requires than less of 13,800 t be caught in 2004.

STECF COMMENTS : STECF agrees with the ICES assessment of the state of the stock and that a recovery plan is required to ensure a safe and rapid recovery of SSB to B_{pa}. STECF also agree that rebuilding of the hake can be obtained by reducing the overall fishing mortality, or by a reduction in overall F combined with an improvement in selection pattern. The emergency plan for northern hake implemented on 1 September 2001 (combining a low TAC and mesh size) in recent years has not been evaluated. However, STECF notes that an improvement of the selection pattern would increase the probability that a reduction in F will allow the rebuilding of SSB.

The recovery plan proposed by the EU Commision (Doc. COM2003-374 final) in July 2003 aims at an annual increase of the SSB of 10% with a limit on the annual TAC variation of 15%. ICES notes that the reductions indicated in the proposed plan are much less severe than the cuts in fishing mortality required to rebuild the stock in the short-term, and suggested a reduction in F of 70% in 2004 to rebuild the stock in the short-term. STECF agree with ICES advises that given the state of the stock, and the risk of impaired recruitment, any further delay in the implementation of a recovery plan will be detrimental the stock and the fastest possible rebuilding to B_{pa} is strongly needed. However, STECF considers that the proposed reduction in F is unlikely to be achieved, and that the ICES mixed fishery advice (Section 16.4) should be taken into account in determining appropriate exploitation rates for hake.

2.32. Hake (*Merluccius merluccius*) Divisions VIIIa,b,d,e.

Hake in the Divisions VIIIa,b,d,e are assessed as part of the Northern stock of hake (see section 2.31)

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

FISHERIES: This stock is exploited in a mixed species fishery by Spanish and Portuguese fleets using trawls, gillnets and longlines. Landings fluctuated between 6,700 and 35,000 t. (1972-2002). Landings in 2002 were at the lowest record, 6,700 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial CPUE and survey data. The assessment exludes the Gulf of Cadiz. Combined age-length keys are used prior to 1993. Discards information is not used in the assessment.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points are $\mathbf{B}_{pa}$: 35,000 t, F_{pa}: not defined. The previous reference points established in 2000 were revised ($\mathbf{B}_{pa}$, $\mathbf{B}_{lim}$) or left undefined ($\mathbf{F}_{lim}$, $\mathbf{F}_{pa}$) in 2003. The stock has been declining since the beginning of the time-series and there are clear indications of an impaired recruitment below SSB of about 25 000 t. $\mathbf{B}_{pa}$ was defined taking into account the uncertainties in the assessment. Appropriate fishing mortality reference points still need to be defined.

STOCK STATUS: The stock is outside safe biological limits. The SSB decreased sharply between 1982 and 1986 and then slowly until 1998 when the SSB reached its minimum so far. Fishing mortality reached its maximum value in 1995 and has been decreasing. The minimum of the series was obtained in 1982. Recruitment (age 0) declined continuously between 1984 and 1991. It remained at around this level until 1999 and decreased to low levels in the last 3 years.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.5.

ICES recommends that given the very low stock size, the recent poor recruitments, and the continued substantial catch, a recovery plan to ensure a safe and rapid rebuilding of SSB to levels above B_{pa} should be implemented. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above Blim or other strong evidence of rebuilding is observed. A zero catch in 2004 would be in accordance with such a recovery plan.

STECF COMMENTS: STECF agrees that the ICES advice is consistent with the accepted biomass reference point. However, since the perception of the stock has changed over the last decade, STECF points out that more investigations are needed to define appropiate fishing mortality reference points. STECF agrees with the ICES advice that a recovery plan should be applied.

STECF notes that the recovery plans for hake and *Nephrops* in the Iberian region prepared by SGMOS (June, 2003) has been accepted but it has not yet been implemented.

2.34. Herring (*Clupea harengus*) in Div. I and II. (Norwegian Spring Spawners)

FISHERIES: The Norwegian Spring-spawning herring in these areas is mainly by Norway, Iceland, Russia and The Faeroe Islands; lesser catches are taken by the EU fleets of Denmark, Sweden, Germany, Ireland, Netherlands, and UK. Trawlers and purse seiners carry out the fishery. The fishery collapsed around 1970. Landings in 1973 and 1974 were at around 7,000 t, and gradually increased during the late 1980s. Then, due to very strong year classes, landings increased substantially after 1992, reaching a figure of more than 1,400,000 t in 1997. In 2002 total landings were around 800,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment is based on an analysis of catch at age data calibrated with survey data (acoustic estimates of adults and recruits, and a larval index) and tagging data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ = 5 million t, $\mathbf{F}_{pa}$ = 0.15.

STOCK STATUS: In the ACFM report of 2003, ICES considered the stock biomass to be inside safe biological limits and the stock is harvested at or slightly below $\mathbf{F}_{pa}$ = 0.15. The recruitment of the very strong 1992 year class led to an increase in the SSB in 1997 to 8 million t, but this has since declined to just over 5 million t in 2002. The incoming year classes 1998 and 1999 are estimated to be relatively strong. Continued fishing under the present management agreement gives a probability of about 50% of the spawning stock falling below $\mathbf{B}_{pa}$ (5.0 million t) in the medium term.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, ICES advises that this fishery should be managed according to the agreed management plan with a fishing mortality of no more than 0.125 corresponding to a catch of 825,000 t in 2004. The catch forecasted for 2004 is higher than the catch forecasted for 2003. This is due to the recruitment of the relatively strong year classes 1998 and 1999. In 1999 EU, Iceland, Faroe Islands, Norway and Russia agreed on a long term management plan from 2001. The aim is to maintain the stock size above 2.5 million t and to maintain a fishing mortality rate of 0.125, which is lower than the $\mathbf{F}_{pa}$. These management measures shall be reviewed and revised on the basis of any new advice from ICES. Should SSB fall to below 5 million t ($\mathbf{B}_{pa}$) the fishing mortality rate shall be adapted to ensure a rapid recovery of SSB to the $\mathbf{B}_{pa}$ level.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.35. Herring (*Clupea harengus*) in Divisions IIIbcd, Baltic Sea

ICES has reviewed the stock assessment units of Baltic herring. Compared to previous years management units changes have been made as shown in the text table below:

Herring Unit	**Proposed Management Area**
Herring in Sub-divisions 22-24	South-western Baltic, Subdivisions 22,23,24
Central Baltic Herring	Sub-divisions 25,26,27,29, 32 and 28 (excl. Gulf of Riga)Central Baltic
Gulf of Riga herring	Gulf of Riga (part of Sub-division 28)
Herring in Sub- division 30	Bothnian Sea (Sub-division 30)
Herring in Sub-division 31	Bothnian Bay (Sub-division 31).

ICES states that there is enough scientific documentation to assess and manage the Gulf of Riga herring as a separate unit, and has therefore decided to provide advice for the herring in Central Baltic (Sub-divisions 25-29, 32 excluding Gulf of Riga herring) and separately for the Gulf of Riga herring. Thus, separate assessments have been made for these two units: Herring in Sub-divisions 25-29 and 32 and Gulf of Riga herring. However, as requested by IBSFC ICES has also presents an assessment and catch options for these stocks combined (Sub-divisions 25-29+32 including Gulf of Riga herring). This combined assessment has not been included in this overview.

The spring spawning herring in Sub-.divs. 22-24 (Western Baltic) and Kattegat & Skagerrak is dealt with in Sect. 2.3.7.

2.35.1. Herring in Sub-div. 25-29 (excluding Gulf of Riga) and 32.

FISHERIES: All the countries surrounding the Baltic, exploit the herring in these areas as part of fishery mixed with sprat. Over the last 29 years, landings of herring have decreased from a peak of 369,000 t in 1974 to 130,000 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Assessments have been made based on an analysis of catch at age data calibrated with survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for fishing mortality is $\mathbf{F}_{pa}$ = 0.19 There is no biological basis at present for determining biomass reference points.

STOCK STATUS: Although the exact stock size is uncertain, there is high confidence that the spawning biomass is close to the historic low. The fishing mortality increased throughout the late

1990s and the stock is currently harvested outside safe biological limits. Current fishing mortality is about twice the F_{pa}.

RECENT MANAGEMENT ADVICE: ICES recommends that fishing mortality in 2004 should be reduced below the F_{pa} = 0.19 to allow the SSB to increase. This corresponds to a TAC in 2004 of less than 80 000 t.

STECF COMMENTS: STECF agrees with the ICES advice.

2.35.2. Herring in the Gulf of Riga.

FISHERIES: Herring catches in the Gulf of Riga include both Gulf herring and open-sea herring, which enter the Gulf of Riga from April to June for spawning. In the past 25 years landings have fluctuated between 15000 and 40000 t. The herring in the Gulf of Riga is fished by Estonia and Latvia. The structure of the fishery has remained unchanged in recent decades: approximately 70% of the catches are taken by the trawl fishery and 30% by a trap-net fishery on the spawning grounds.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for SSB (Bpa) is set at 50000t and the proposed $\mathbf{F}_{pa}$ = 0.40.

STOCK STATUS: The stock component is at present considered to be within safe biological limits. SSB and recruitment have been high since 1990, with the exception of the 1996-year class. Fishing mortality has been below $\mathbf{F}_{pa}$ since 1989, except in 1997–1998.

RECENT MANAGEMENT ADVICE: ICES recommends that fishing mortality should be kept below the present level of 0.35 corresponding to catches of less than 39 000 t in 2004.

STECF COMMENTS: STECF agrees with the ICES advice.

2.35.3. Herring in Sub-div. 30, Bothnian Sea (Management Unit 3)

FISHERIES: Finland and Sweden carry out herring fishery in this area, mainly with bottom trawls. On average 90% of the total catch is taken by trawl fishery. The trap-net fishery is of minor importance. In the trawl fishery more effective and larger trawls have been introduced in the 1990s.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass and fishing mortality is $\mathbf{B}_{pa}$ = 200 000 t, $\mathbf{F}_{pa}$ = 0.21.

STOCK STATUS: Based on the most recent estimates of biomass and fishing mortality the stock is inside safe biological limits. The spawning stock biomass has been high since the late 1980s, and SSB is presently above $\mathbf{B}_{pa}$. The fishing mortality has increased since 1993, but has decreased since 1999

being below $\mathbf{F}_{pa}$ since 2001. The 1997, 1999 and 2001 year classes have been well above the long-term average.

RECENT MANAGEMENT ADVICE: ICES recommends to maintain the fishing mortality below $F_{pa,}$ corresponding to landings of less than 50 000 in 2004.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.35.4. Herring in Sub-div. 31, Bothnian Bay (Management Unit 3)

FISHERIES: Trawl fisheries account for the main part of the total catches. Normally the trawl fishing season begins in late April and ends before the spawning season in late May to July. It resumes in August/September and continues, until the ice cover appears, usually in early November.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No reference values have been established.

STOCK STATUS: The status of the stock is unknown, but the current assessment, although uncertain indicates that spawning stock biomass was high in the 1980s and has declined considerably since the mid-1990s to a very low level. There are indications of a record high year class 1999, which may have resulted in recent increase in SSB.

RECENT MANAGEMENT ADVICE: ICES advises that Catch should not be allowed to increase above recent levels. This corresponds to catches less than 3000 t in 2004. It is further noted that this stock is part of the IBSFC management unit 3. The herring TAC is set for IBSFC management unit 3, which includes Sub-divisions 29N, 30 and 31.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.36. Herring (*Clupea harengus*) in the North Sea (Sub-area IV) including components of this stock in Divs. IIa, IIIa and VIId

FISHERIES: The North Sea autumn spawning herring in this area is exploited by Denmark, France, Germany, Netherlands, Norway, Sweden, Russia and UK. Trawlers and purse seiners carry out the fishery. The fishing areas for this stock include ICES Sub-area IV and Divisions IIa, IIIa and VIId. At present, the stock is managed by separate TACs in three different management areas (IIa, IVa-b and IVc+VIId) through joint negotiations by EU and Norway. There is large scale misreporting of catches in several parts of the North Sea into adjacent management areas, and discard data are either incomplete or entirely missing. This stock complex also includes the Downs winter-spawning herring in Divisions IVc and VIId.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment of the entire stock is based on analysis of catch at age data calibrated with survey data (acoustic surveys of adults, larvae surveys and some information from trawl surveys).

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ =1,300,000 t, $\mathbf{F}_{pa}$ = 0.12 for age groups 0-1 and $\mathbf{F}_{pa}$ = 0.25 for age groups 2-6.

STOCK STATUS: The stock is inside safe biological limits. SSB in 2002 was estimated at 1.6 million t, which is above the $\mathbf{B}_{pa}$ of 1.3 million t: SSB is expected to increase to 2.2 million t in 2003. In 1996 the fishing mortality for the adult part of the stock reduced to 0.43. It has further decreased in subsequent years, being 0.24 in 2002. For juveniles the fishing mortality has remained below 0.1 since 1996. The 1998 and 2000 year classes appear to be very strong in all the surveys, but the incoming 2002 year-class is estimated to be one of the weakest in the time series.

MANAGEMENT AGREEMENTS: According to the EU-Norway agreement (December 2001):

1. Every effort shall be made to maintain a level of Spawning Stock Biomass (SSB) greater than the Minimum Biological Acceptable level (MBAL) of 800,000 tonnes.

2. A medium-term management strategy, by which annual quotas shall be set for the directed fishery and for by-catches in other fisheries as defined by ICES, reflecting a fishing mortality rate of 0.25 for 2 ringers and older and 0.12 for 0-1 ringers, shall be implemented.

3. Should the SSB fall below a reference point of 1.3 million tonnes, the fishing mortality rates referred under paragraph 2, will be adapted in the light of scientific estimates of the precise conditions then prevailing, to ensure rapid recovery of SSB to levels in excess of 1.3 million tonnes. The recovery plan referred to above may, inter alia, include additional limitations on effort in the form of special licensing of vessels, restrictions on fishing days, closing of areas and/or seasons, special reporting requirements or other appropriate control measures.

4. By-catches of herring may only be landed in ports where adequate sampling schemes to effectively monitor the landings have been set up. All catches landed shall be deducted from the respective quotas set, and the fisheries shall be stopped immediately in the event that the quotas are exhausted.

5. The allocation of the TAC for the directed fishery for herring shall be 29% to Norway and 71% to the Community. The by-catch quota for herring shall be allocated to the Community.

6. The parties shall, if appropriate, consult and adjust management measures and strategies on the basis of any new advice provided by ICES including that from the assessment of the abundance of the most recent year-class. A review of this arrangement shall take place no later than 31 December 2004

7. This arrangement entered into force on 1 January 2002.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, ICES advises that catches in 2004 should be within the constraints on fishing mortality agreed by EC and Norway, i.e. less than F_{2-6} = 0.25 and F_{0-1} = 0.12. Catch forecasts for different options of partitioning catch among fleets are given

in the ACFM report. The Downs herring TAC should not increase faster than the TAC for the North Sea as a whole, and the historic relative proportionality to the North Sea TAC as whole should be maintained (see Section 2.38). The fisheries on herring in Division IIIa should be managed in accordance with the management advice given on spring-spawning herring in Section 2.38.

STECF COMMENTS: STECF agrees with the advice from ICES, although it notes that there may be significant illegal landings which will influence the assessment of the stock. The EU/Norway management plan implies a rise in TAC for 2004. If the TAC is raised above the 2003 level, the incoming year class will be insufficient to replace the removed biomass, implying the need for a reduction in TAC in 2005 in order to conform to the EU-Norway agreement. A roll-over TAC (2003-2004) would maintain stability of catch in the short term and increase the likelihood of roll-over TAC in 2005.

2.37. Herring (*Clupea harengus*) in the Skagerrak, the Kattegat and in the Baltic Sea (Sub-div. 22-24).

FISHERIES: Herring of this stock are taken in the North-eastern part of the North Sea, Division IIIa and Sub-divisions 22–24. Division IIIa has directed fisheries by trawlers and purse seiners, while Sub-divisions 22–24 have directed trawl, gillnet and trapnet fisheries. The herring by-catches taken in Division IIIa in the small mesh trawl fishery for Norway pout, sandeel and sprat are mainly autumn-spawners from the North Sea stock; see Sect. 2.36 on herring (*Clupea harengus*) in the North Sea.. After a period of high landings in the early 1980s the combined landings of all fleets have decreased to below the long-term average The TACs in Division IIIa in 2003 were 80 000 t for the directed fishery, 21 000 t for bycatches in the small-mesh fisheries, and a total of 143 349 t for the overall IBSFC herring (Subdivisions 22–32). The TAC comprises both the autumn- and spring-spawning stocks in the area..

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Precautionary Approach Reference Points have not been defined. Based on a comparison to other herring stocks all likely candidates of $\mathbf{F}_{pa}$ will be less than $\mathbf{F}_{max}$.

STOCK STATUS: The status of this stock is unknown relative to safe biological limits, because reference points have not been determined. Although the assessment is uncertain SSB has been slightly increasing over the last 4 years. Fishing mortality is uncertain, but estimates for 2002 are 0.45 for adults and 0.17 for the juveniles (0- and 1-ringers), which is greater than $\mathbf{F}_{max}$. The age structure in the catch over the last three years consistently reflects the large 1999 year class now entering the spawning stock. The incoming 2002 year class seems to be above average.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, ICES recommends that the fishing mortality be reduced to less than F_{max} (0.37) corresponding to catches in 2004 of less than 92

000 t. According to the recent geographic distribution of catches, approximately half of the total catch should be taken from the Subdivisions 22-24.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.38. Herring (*Clupea harengus*) in Div. IVc and VIId.

FISHERIES: See also Section 2.36 on herring in the North Sea and adjacent areas. The Downs herring fishery (herring in IVc and VIId) is concentrated on the winter-spawning aggregations in a restricted area, which makes this stock component particular vulnerable to excessive fishing pressure. This stock component is managed by a separate TAC.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Assessment has only been made on the combined North Sea stock based on analysis of catch at age data (ICA) calibrated with survey data. No separate assessment has recently been made for the Downs component of the stock.

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ =1,300,000 t, $\mathbf{F}_{pa}$ = 0.12 for ages 0-1 and $\mathbf{F}_{pa}$ = .25 for ages 2-6 (c.f. Sect. 2.36).

STOCK STATUS: See the Section 2.36 on herring in the North Sea and adjacent areas. The stock complex in the North Sea also includes Downs herring which has shown independent trends in exploitation rate and recruitment but is not assessed separately. Larval surveys suggest that SSB in 1995 reached its lowest level since 1980. Abundance indices from larvae and trawl surveys indicate uncertainty with regard to this complex. In general it has experienced good recruitment since the mid 1990s, although the most recent year-class is very weak.

RECENT MANAGEMENT ADVICE: See the Section 2.36 on herring in the North Sea and adjacent areas. The TAC for Downs herring was reduced from 50 000 t to 25 000 t in 1996 and remained there until 2001. Catches have been significantly exceeded in all years since. The TAC for this component was increased in 2002 (to 42 673 t) following the advice of ICES in 2001 and to 59 542 t in 2003, although ICES did not recommend any change in TAC. Since 1989 the TAC for Downs herring has averaged 11% of the total TAC for herring in IV, VIId and IIIa (range 5.8-16.2%), and this proportionality of TACs is thought to be an appropriate guide to distributing the harvesting among Downs herring and other stock components. The TAC should also be enforced effectively in this area.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.39. Herring (*Clupea harengus*) - Vb (EU zone), VIaN, VIb

2.39.1. Herring (Clupea harengus) in Division Vb and VIb.

No assessment is made for these areas and no information was available to STECF from these areas.

2.39.2. Herring in Division VIa North

FISHERIES: Three main fleets exploit this stock: Scottish domestic pair trawl fleet and the Northern Irish fleet operate in shallower, coastal areas;: Scottish and Norwegian purse seiners operating in the northern part of VIa: and the offshore fleet (mainly Dutch and German freezer trawlers) operating in deeper water. Total estimated landings for this area have fluctuated between about 24,000 t and 90,000 t over the past 20 years. Misreporting of the catches has decreased in recent years. Better information on the catches has been obtained and biological sampling of catches has improved over the last 4-5 years. Satellite surveillance data has improved knowledge of vessel behaviour.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. . The assessment in 2003, based on catch data and acoustic surveys, is less uncertain than in previous years reflecting the stability of the input data over the last two or three years.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been adopted for this stock. Candidate reference points are under investigation.

STOCK STATUS: The state of the stock is uncertain and it has not been possible to assess the status of this stock with respect to safe biological limits. However, the assessment indicates that SSB has been increasing strongly since the late 1990s, and is currently high, and fishing mortality is low. The recent increase in SSB is due to a good year class that entered the fishery in 2001 and an increase in the proportion mature.**RECENT MANAGEMENT ADVICE:** In the ACFM report of 2003, ICES recommends that the fishing mortality should not increase above F_{SQ}, corresponding to a catch in 2004 not exceeding 30 000 t, which is consistent with the historic productivity of this stock and expected medium term yield from the stock.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.40. Herring in the Clyde (Division VIa)

FISHERIES: The UK exploits the small stock of herring in this area. For the last 10 years the landings have been between about 500 and 2,500 t; the catch in 2000 was the lowest on record (1 t), but has since risen to 480 t in 2001 and 381 t in 2002. There are two stock components present on the fishing grounds, resident spring-spawners and immigrant autumn-spawners.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No analytical assessment has been made in recent years and no independent survey data are available for recent years.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS In the absence of surveys, and no stock separation of catches, little is currently known about the state of the Clyde spring-spawning stock or the immigrant autumn-spawning component from elsewhere within Division VIa. The fishing mortality is not known.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, ICES recommends that until new evidence is obtained on the state of the local spring-spawning component, existing restrictions on the fishery should be continued.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.41. Herring (*Clupea harengus*) in Division VIa south and VIIbc

FISHERIES: . In recent years only Ireland and the Netherlands have recorded catches from this area , and most of the catch and the TAC is accounted for by Ireland Catches in 2002 have been the lowest observed (averaging 13,587 t) due to restrictive TAC's and reduced targeting of herring by pelagic vessels. However, there has been a considerable amount of misreporting of catches from the North Sea into this area and from this area into Div. VIa N. The fisheries exploit a mixture of autumn and winter/spring spawners. The winter/spring spawner component is distributed along the north and northwest coasts of Ireland, while the autumn spawners are occur along the west coast of Ireland.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is currently based solely on catch at-age data although an acoustic survey has been resumed on the stock.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $\mathbf{B}_{pa}$ =110,000 t. $\mathbf{F}_{pa}$ = 0.22.

STOCK STATUS: The state of the stock is unknown with respect to safe biological limits, because estimates of SSB and fishing mortality are highly uncertain in the recent 2-3 years. Current SSB is unknown, but is likely to be less than Bpa. For SSB to be above Blim, there would have to have been very strong recruitment in recent years, but there is no evidence of such year classes. F appears to have risen sharply in the late 1990s and although management measures since then have reduced F, the current F is unknown. Catches in the last three years have been the lowest observed due to restrictive TACs.

RECENT MANAGEMENT ADVICE: ICES recommends that catches do not exceed those of the past two years, corresponding to a catch of less than 14 000 t in 2004, which is expected to allow SSB to increase at the current productivity.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF supports the work of the Irish Northwest Pelagic Management Committee that has a rebuilding plan for this stock .

2.42. Herring (*Clupea harengus*) in the Irish Sea (Division VIIa)

FISHERIES: This fishery is exploited by the UK and Ireland and occurs in two spawning areas (Manx and Mourne). Since 1985 the landings have fluctuated between about 2,000 t and 10,000 t; although the catch in 1998 to 2002 is uncertain.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Assessments have been carried out on the combined Irish Sea stocks based on analysis of catch at age data calibrated with survey data. The catch data being poor, prevent the reliable estimation of SSB and F.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is $\mathbf{B}_{pa}$ = 9,500 t. $\mathbf{F}_{pa}$ is not defined.

STOCK STATUS: The state of the stock is uncertain with respect to safe biological limits, as

estimates of SSB and fishing mortality for recent years are highly uncertain. However, the trend in SSB has been relatively stable or increasing since the late 1990s. The stock appears to be moderately exploited. There are no recruitment indices for this stock.

RECENT MANAGEMENT ADVICE: In 2003, ICES advises that the catch in 2004 should not be allowed to increase above the advised 2003 catch (4 800 t).

STECF COMMENTS: STECF agrees with the advice from ICES .

2.43. Herring (*Clupea harengus*) in Division VIIe,f

No assessment is made for herring in Divisions VIIe,f and no information on catches or stock status was available to STECF.

2.44. Herring (Clupea harengus) in the Celtic Sea (VIIg and VIIa South), and in VIIj

FISHERIES: France, Germany, Ireland, Netherlands and UK have participated in the herring fisheries in this area. However in recent years the fishery has mainly been exploited by Irish vessels and Ireland has been allocated nearly 90% of the overall quota. From 1988 to 1998, the landings fluctuated between about 19,000 and 23,000 t. From 1998 to 2002, landings decreased from 20,300 to 10,500. The fishery exploits a stock which is considered to consist of two spawning components (autumn and winter). In 2003 the fishing pattern changed, with increased targeting of the fish outside the spawning season.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on analysis of catch at age data calibrated with acoustic survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is $\mathbf{B}_{pa}$ = 44,000 t. No precautionary fishing mortality reference point has been defined.

MANAGEMENT AGREEMENT: The Irish Southwest Pelagic Management Committee manages the Irish fishery for this stock and has stated the following management objective: "to maintain the stock at a level whereby it can sustain annual catches of around 20,000 t. In the event of the stock falling below the level at which these catches can be sustained the Committee will take appropriate rebuilding measures. The Committee will also introduce such measures as are necessary to prevent landings of small first time spawning herring including closed areas, and/or appropriate time closures". The committee also agreed to "manage this herring stock according to the best available scientific advice". The committee at present agrees that spawning box closures, like the ones presently in operation should be retained and may, if necessary, be expanded both in time and area.

STOCK STATUS: The state of the stock is uncertain with respect to safe biological limits, as estimates of SSB and fishing mortality are uncertain in the most recent 2-3 years. Fishing mortality appears to have declined sharply since 2000. Information from the catch and surveys suggests some years of poor recruitment in the mid- to late 1990s. SSB may have been below Bpa in the recent past, and the proportion of older fish in the catch increased in 2002.

RECENT MANAGEMENT ADVICE: ICES recommends that catches in 2004 should not exceed 60% of the average catches in 1997-2000, corresponding to catches less than 11 000 t, which is expected to allow SSB to increase.

STECF COMMENTS: STECF agrees with ICES that current management measures should be kept in place to allow the stock to recover. STECF also supports the actions of the Irish Southwest Pelagic Management Committee that has devised a rebuilding plan for this stock.

STECF notes that additional fisheries-independent indices are required to refine estimates of recruitment. This would help to reduce uncertainty in the assessment and provide a better basis for management advice than using recent catches.

STECF notes that the current ICES advice of catch appears to be similar to catches in 2002. STECF was unable to find the scientific basis for the advice of the catch in 2004 being 60% of the average (1997-2000).

2.45. Horse mackerel (Trachurus trachurus) in the North Sea (Divisions IIIa eastern part, IVbc, VIId).

FISHERY: Catches taken in Divisions IVb, c and VIId are regarded as belonging to the North Sea horse mackerel and in some years also catches from Division IIIa - except the western part of Skagerrak. The total catch taken from this stock in 2002 is 23,379 tonnes, 50% less than the catch in 2001 which was 2000 tonnes less than the largest catch on record in 2000 (48,425t). In previous years most of the catches from the North Sea stock were taken as a by-catch in the small mesh industrial fisheries in the fourth quarter carried out mainly in Divisions IVb and VIId, but in recent years a large part of the catch was taken in a directed horse mackerel fishery for human consumption.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are set for this stock as there is no sufficient information to estimate reference points.

STOCK STATUS: The state of the stock in relation to safe biological limits is unknown. Catches have been increasing in the recent years except for 2002 which was 50% lower than the highest catch on record in 2001. .

RECENT MANAGEMENT ADVICE: ICES recommends that catches in 2004 be no more than the 1982-1997 average of 18,000t in order to avoid an expansion of the fishery until there is more information about the sturcture of horse mackerel stocks and sufficient information to facilitate an adequate assessment.

In 1999, the advice was to constrain expansion of the fishery until there was a scientific basis for advice because high catch rates can be maintained in pelagic fisheries even when the stock is in decline. Despite this advice catches increased by one third, from about 37 000 t in 1999 to 48 000 t in 2000 and 46 000 t in 2001. For 2002 the catches were around 50% less than the 2001 catches, but still around 30% higher than the advised catches. ICES maintains this advice reflecting its concern over the potential impact of the recent expansion of the fishery.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes the comments by ICES that there has been a change in the age composition of the landings which now have a higher proportion of younger age groups.A direct ed juvinile fishery occurs in all three horse mackerel stocks.

ICES recommends that the TAC should apply to all those areas where the North Sea horse mackerel are fished, i.e. Divisions III, IVb,c and VIId. Northe Sea horse mackerel migrate out of the North Sea to area where they mix with the western horse mackerel stock. The present agreed TAC is for the North Sea and Division IIIa and this area does not correspond to the distribution area of the stock. The TAC should apply to all those areas where the North Sea horse mackerel are fished. Therefore, STECF recommends that Division VIId be transferred as soon as possible from the western horse mackerel management area to North Sea horse mackerel management area.

2.46. Horse mackerel (Trachurus trachurus) in the Western areas (Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k, VIIIa,b,d,e)

FISHERY: Catches increased in the 1980s with the appearance of the extremely strong 1982-year class. Changes in the migration pattern became evident at the end of the 1980s when the largest fish in the stock (mainly the 1982-year class) migrated into Divisions IIa and IVa during the 3rd and 4th quarters. Since 1987 considerable catches have been taken by the Norwegian purse seine fleet particularly in Division IVa in November, while most catches of other countries have been taken for human consumption purposes in Sub-areas VI, VII and Divisions VIIIa,b,d,e. The Norwegian catches have dropped considerably since 1996.

The total catch taken in 2002 is 172,182 tonnes, which is around 10% less compared to 2001. Recently, fisheries in VIIe,f have taken large catches of mainly juvenile horse mackerel from the western stock. There has been a clear change in the age structure of the catches from older to younger fish since 1996.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on an analysis of catch at age data calibrated with the results of the international triennial horse mackerel egg surveys. There are no explicit management objectives for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are proposed for this stock by ICES.

STOCK STATUS: As there are no proposed precautionary reference points for this stock, the state of the stock relative to these points is unknown. ICES states that the state of the stock is uncertain. This year's assessment is considered only indicative of trends in biomass and spawning stock biomass. The SSB has decreased compared to the mid-1980s. The strength of the 2001 year class is uncertain. ICES expressed concern about the high exploitation of juvenile fish at a time when the recruitment is low and the spawning stock is declining.

RECENT MANAGEMENT ADVICE: Deterministic forecasts are not appropriate as the stock assessment is highly uncertain. Despite this, in the ACFM report of October 2003, ICES advised that catches in 2004 be effectively limited to less than 130,000 t (based on what is considered to be sustainable yield).

ICES recommends that the TAC for this stock should apply to all areas in which Western horse mackerel are fished, i.e. Divisions IIa, IIIa (western part), Vb, IVa, VIIa-c, e-k, VIIIa,b,d,e. The present TAC area covers Divisions Vb, VI, VII, VIIIa,b,d,e.

ICES recommends that a management strategy is developed that takes into account fisheries both for juveniles and adults. So far, the juvenile fishery has mainly taken place in Divisions VIIe,f,g,h and VIIa,b,d. This may change if juveniles become targeted in other areas, or if a new strong year class appears.

In the absence of outstanding year classes, sustainable yield is unlikely to be higher than about 130,000 t. It is therefore clear that catches will have to be reduced unless an outstanding year class is produced.

STECF COMMENTS: STECF agrees with ICES that the size of the 2001 yearclass is uncertain. STECF notes that it would not be wise to increase the fishing mortality rate in 2004. STECF agrees with ICES that the TAC should apply to the all areas where western horse mackerel are caught, i.e. Division IIa, IIIa (western part), IVa, Vb, VIIa-c, VIIe-k and VIIIa,b,d,e.

2.47. Horse mackerel (Trachurus trachurus L.)in VIIIc + IXa

FISHERY: Atlantic Horse mackerel in these Divisions are exploited by trawl and purse seine fleets from Spain and Portugal fishing along the Atlantic Iberian shelves, along the Gulf of Cadiz, the Portuguese and Galician shelves and along the south of the Bay of Biscay. This species is mainly caught by bottom trawlers and purse-seiners on the shelf and on a smaller scale on the shelf slope by hooks and gillnets. Historically, landings were around 100,000 t during the 1960s and 1970s, peaking at about 160,000 t and decreased during the 1980s to a level around 50,000 t in the late 80's up to the present. The catch in 2002 was at the same level as 2001 (46,000 t).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The previously proposed precautionary reference points for biomass and fishing mortality are B_{pa} = 205,000 t, F_{pa} = 0.17. Based on a recent EU-project (HOMSIR), ICES states that these reference points may not be valid as the stock identoty appears to be

uncertain.This project indicates that horse mackerel in VIIIc and IXa may belong to two different stocks; The Western stock in the north and to a larger stock in the south with a distribution centre probably outside the current management area. If these results are confirmed, stock boundaries and management units will have to be revised.

STOCK STATE: The state of the stock is unknown, but seems to have been stable over the last decades. Catches have been stable since 1987 and the current exploiattion pattern seems to be sustainable.

RECENT MANAGEMENT ADVICE: ICES recommends that the catches in 2004 should not exceed the recent average of 47,000t (2000-2002). The available information, including SSB estimates from egg surveys, indicates that the stock has been relatively stable over a long period and can sustain the present catch level. The TAC for this stock should only apply to *Trachurus trachurus*. The current TAC set by management agencies for horse mackerel in Division IIIa and subarea IX also includes other *Trachurus* species. Recent catches of these species have been around 1900t.

STECF COMMENTS: Given the apparent stability in this stock dynamics in the last 2 decades, STECF agrees with the advice from ICES and stresses that a TAC for *Trachurus trachurus* in VIIIc and IXa be set in accordance with ICES advice. If a TAC for other species of *Trachurus* in VIIIc and IXa is required, it should be set independently.

STECF also notes that since 1987 catches from this stock have not been constrained by the agreed TACs.

2.48. Horse mackerel (*Trachurus* spp.) - CECAF (Madeira I.)

The ICES Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy reported that catches of this species have been around 1500 tonnes from 1986 to 1990. Since then catches have declined to less than 700 t. STECF did not have access to any other stock assessment information on horse mackerel in this area.

2.49. Horse mackerel (*Trachurus* spp.) - CECAF (Canary I.)

STECF did not have access to any stock assessment information on horse mackerel in this area.

2.50. Horse mackerel (*Trachurus spp*.) - X (Azores I.)

The 2002 ICES Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy reported that the catches of *Trachurus picturatus* have been around 3000 t between 1986 and 1990. Since 1999 catches have remained around 1500t. STECF did not have access to any new stock assessment information on horse mackerel in this area.

2.51. Lemon sole (*Microstomus kitt*) in the North Sea

STECF did not have access to any stock assessment information on Lemon sole in this area.

2.52. Mackerel (*Scomber scombrus*) - combined Southern, Western and North Sea spawning components)

STOCK components: ICES currently uses the term **North East Atlantic Mackerel** to define the mackerel present in the area extending from ICES Division IXa in the south to Division IIa in the north, including mackerel in the North Sea and Division IIIa. The spawning areas of mackerel are widely spread, and only the area in the North Sea is sufficiently distinct to be clearly identified as a separate spawning component. Tagging experiments have demonstrated that after spawning, fish from Southern and Western areas migrate to feed in the Norwegian Sea and the North Sea during the second half of the year. Here they mix with the North Sea component in the North Sea. Since it is at present impossible to allocate catches to the stocks previously considered by ICES they are at present, for practical reasons, considered as one stock: the North East Atlantic Mackerel Stock.

Catches cannot be allocated specifically to spawning area components on biological grounds, but catches from the Southern and Western components are separated according to the area where they are taken.

In order to be able to keep track of the development of the spawning biomasses in the different spawning areas, the North East Atlantic mackerel stock is divided into three area components termed the Western Spawning Component, the North Sea Spawning Component and the Southern Spawning Component.

FISHERIES:

Western Component (VI, VII, VIIIa,b,d,e): The catches of this componentwere low in the 1960s, but increased to more than 800 000 t in 1993. The main catches are taken in directedfisheries by purse seiners and mid-water trawlers. Large catches of the western component are taken in the northern North Sea and in the Norwegian Sea. The 1996 catch was reduced by about 200 000 t, compared with 1995, because of a reduction in the TAC. The catchessince 1998 have been stable. The SSB of the Western Component declined in the 1970s from above 3.0million t to 2.2 million t in 1994, but was estimated to have increased to 2.7 million t in 1999. A separate assessment for this stock component is no longer required, as a recent extension of the time-series of NEAmackerel data now allows the estimation of the mean recruitment from 1972 onwards. Estimates of the spawning stock biomass, derived from egg surveys, indicate a decrease of 14% between 1998 and 2001.

North Sea Component (ICES Sub-area IV): Very large catches were takenin the 1960s in the purse seine fishery, reaching a maximum of about 1 million t in 1967. The component subsequently collapsed and catches declined to less than100 000 t in the late 1970s. Catches during the last five years have been assumed to be about 10 000 t. The 2002 egg survey in the North Sea with limited spatial and temporal coverage indicates a higher egg production inthe North Sea area than in 1999, due to a relatively strong 1999 year class. However, this component is still considered to be severely depleted and outside safe biological limits.

Southern Component (ICES Divisions VIIIc, IXa): Mackerel is a target species for the hand line fleet during the spawning season in DivisionVIIIc, during which about one-third of the total catches are taken. It is taken as a bycatch in other fleets. Thehighest catches (87%) from the Southern Component are taken in the first half of the year, mainly from DivisionVIIIc, and consist of adult fish. In the second half of theyear catches consist of juveniles and are mainly taken inDivision IXa. Catches from the Southern Component increased from about 20 000 t in the early 1990s to44 000 t in 1998, and are currently at close to 50 000 t. Estimates of the spawning stock biomass, derived fromegg surveys, indicate a decrease of about 50% between 1998 and 2001. However, the SSB estimated in 2001 is similar to the survey estimates in 1995.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical assessment is based on catch numbers at age for the period 1972 - 2002 and egg survey estimates of SSB from 1992, 1995, 1998 and 2001. This egg-survey data only becomes available once every 3 years and provides fishery independent information. In the 2 years following the most recent egg-survey, the assessment is an extraploration based on catch-at-age and landing data only. Inclusion of a new independent data point may result in quite large revisions of the stock-size, fishing mortality and consequently catch predictions and TAC advice.

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality proposed by ICES are $\mathbf{B}_{pa}$ = 2.3 million t, $\mathbf{F}_{pa}$ = 0.17. Agreements in force between the EU, Norway and the Faeroes specify a long-term management arrangement with a target fishing mortality in the region 0.15 to 0.2 and a minimum biomass of 2.3 million t.

The rationale for ICES proposing F_{pa}=0.17 is to have a high probability of avoiding exploiting the stock above F_{lim}. In addition, projections indicate that F=0.17 will optimise long-term yield and at the same time result in a low risk for the stock to decrease blow B_{pa}. If F on average is kept below 0.17, ICES regards the management plan as precautionary.

STOCK STATUS: Based on fishing effort, the combined stock is currently harvested outside safe biological limits. The spawning stock biomass in 2003 is estimated to be well above $\mathbf{B}_{pa}$, but the fishing mortality is above F_{pa} as it was in 2001. The North Sea component remains severely depleted since 1970s.

Exploratory assessment using different assessment models gave comparable results.

MANAGEMENT AGREEMENTS: The agreed record of negociations between Norway, Faroe Islands and EU in 1999 states:

- For 2000 and subsequent years, the Parties agreed to restrict their fishing on a TAC consistent with a fishing mortality in the range of 0.15-0.20 for appropriate age groups as defined by ICES, unless future scientific advice requires modification of the fishing mortality rate.

- Should the SSB fall below a reference point of 2 300 000 tonnes (Bpa), the fishing mortality rate, referred to under paragraph 1, shall be adapted in the light of scientific estimates of the conditions prevailing. Such adaptation shall ensure a safe and rapid recovery of the SSB to a level in excess of 2 300 000 tonnes.

- The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.

RECENT MANAGEMENT ADVICE: ICES (2003) advises a fishing mortality in 2004 of no more than Fpa (0.17), corresponding to landings in 2004 of less than 545 000 t. ICES advises that any agreed TAC shouldcover all areas where Northeast Atlantic mackerel are fished.ICES advises that the existing measures to protect theNorth Sea spawning component remain in place.These are:

- There should be no fishing for mackerel in Divisions IIIa and IVb,c at any time of the year.-
- There should be no fishing for mackerel in Division IVa during the period 15 February–31 July.
- The 30 cm minimum landing size at present in force in Subarea IV should be maintained

It was recommended the closure date for IVa be extended to the 15th February and not the 1st February, as stated in the advice in 2002. This was adopted form the 1999/2000 season onwards.

ICES aims at setting the conditions for making a recovery of the North Sea component possible as recruitment has failed since 1969, leading to a decline in the stock.

Following a review of the mackerel box by ICES in 2002, the mackerel box should remain closed to targeted mackerel fishing ICES is aware that juvenile fish are sometimes taken in large quantities in other areas where the NEA mackerel stock is distributed and is continually monitoring the situation. ICES will recommend management measures for those areas if appropiate.

The spawning stock has been stable and well above B_{pa} over a long period, also many age classes are well represented in the stock and annual fluctuations in recruitment are moderate. Together with the fishery independent information that is available once every three years, ICES considers NE Atlantic mackerel as a suitable candidate to be managed by a multi-annual TAC.

STECF COMMENTS: STECF agrees with ICES assessment and that the advice given by ICES is consistent with precautionary reference point of Fpa=0.17.

STECF agrees with ICES that NE Atlantic mackerel is a suitable candidate to be managed with a multi-annual TAC.

STECF notes that the advice is based on the proposed Fpa of 0.17, which falls within the range of the agreed management plan (0.15-0.20).

STECF notes that little is known about discards in the mackerel fishery and ICES again recommends that observers should be placed on vessels in order to estimate discards in those fisheries where discarding of mackerel is perceived to be a problem.

2.53. Megrim (*Lepidorhombus whiffiagonis.*) in IIa(EU zone), North Sea

FISHERIES: Megrim are mainly caught as a by-catch in trawl fisheries targeting anglerfish in Division IIa and Sub-area IV.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: No assessment of the stock of megrim in Division IIa and Sub-area IV has been undertaken by ICES.

RECENT MANAGEMENT ADVICE: None available

STECF COMMENTS: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

2.54. Megrim (*Lepidorhombus whiffiagonis.*) in Vb(EU zone), VI, XII & XIV

FISHERIES: The main fishery is in Sub-Area VI where megrim are a secondary target for vessels fishing for anglerfish. They are also taken as a by-catch in trawl fisheries targeting roundfish species and Nephrops. The main exploiters are the UK, France Spain and Ireland. From 1983 to 2001, reported landings have ranged from 2,600 t to 5,300 t, but the true level of recent landings is thought to be obscured by area misreporting. Landings of both anglerfish and megrim peaked in 1996 and have subsequently declined. In recent years the catch has been taken exclusively by vessels from EU nations.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The absence of a time-series of abundance indices and discards estimates

means that the historical perspective of SSB, fishing mortality, and recruitment is not well estimated for this stock.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.2. In October 2003, ICES recommended that ccatches in 2004 should be no more than the recent (1999-2001) landings in Divisions VIa and VIb and unallocated landings in Subarea IV of about 3,600 t.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.55. Megrim (Lepidorhombus whiffiagonis) in VII

Megrim in anagement areas VII and VIIIabde are assessed as a single stock.

FISHERIES: Megrim to the west of Ireland and Britain and in the Bay of Biscay are caught predominantly by Spanish and French vessels, which together have reported more than 60% of the total international landings, and by Irish and UK demersal trawlers. For most fleets, megrim is taken in mixed fisheries for hake, anglerfish, Nephrops, cod and whiting. Over the period 1984 to 2002, landings have ranged from 14,000t to 21,800t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are Fpa = 0.30, Bpa = 55,000t.

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality ICES classifies the stock of *Lepidorhombus whiffiagonis* as being harvested outside safe biological limits. SSB was high from 1984 to 1988, then declined until 1990 but has remained above B_{pa}. The fishing mortality has declined from the 1991 peak until 1997 and has increased since then to above F_{pa}. Recruitment at age 1 has been relatively stable with peaks for the 1997 and the 1999 year classes.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4. In October 2003, ICES advised that fishing mortality should be reduced to below F_{pa}, corresponding to landings of less than 19 200 t in 2004. Including a 5% contribution of *L. boscii* in the landings, the equivalent TAC for the two species combined would be 20,200 t.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.56. Megrim (*Lepidorhombus whiffiagonis*) in VIIIa,b,d,e.

Megrim in Divisions VIIIa,b,d,e are assessed together with megrim in Sub area VII (see section 2.55).

2.57. Megrim (Lepidorhombus whiffiagonis & Lepidorhombus boscii) in VIIIc, IX & X

FISHERIES: Megrim in the Iberian region are caught as part of a mixed demersal fishery by Portugueses and Spanish vessels using trawls and also in small quantities by the Portugueses artisanal fleet. Two species (Lepidorhombus whiffiagonis & L. boscii) are caught and they are not usually separated for market purposes so the advice is combined for the two stocks. Landings of L. whiffigonis have declined from over 900 t in 1990 to about 170 t in 2002. Landings of L. boscii have declined from about 2,600 t in 1998 to about 700 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

STOCK STATUS: The state of these stocks in relation to precautionary reference points is not known. The SSB for both species has decreased from the late 1980s until 1995-96, has since then increased for *Lepidorhombus boscii* and has remained stable at a low level for *Lepidorhombus whiffiagoni*s. Fishing mortality for both species has generally declined during the 1990s and 2000s. Recruitment has been below average since 1997 for *L. whiffiagoni*s, while for *L. boscii* recruitment is currently close to average

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.5. In 2003, ICES advice was that fishing mortality should not be increased above recent levels (0.17 and 0.15, respectively) for both species; at these levels SSB has been stable or possibly slightly increasing. This corresponds to landings in 2004 of less than 1110 t for *L. boscii* and less than 270 t for *L. whiffiagonis.*

STECF COMMENTS: STECF agrees with the advice from ICES.

2.58. Norway lobster (*Nephrops norvegicus*) in Skagerrak, Kattegat, IIIa.

FISHERIES: There are two Functional Units in this Management Area: a) Skagerrak (FU 3) and b) Kattegat (FU 4). The majority of landings are made by Denmark and Sweden, with Norway contributing small landings from the Skagerrak. During the last 10 years, landings from the Skagerrak varied between 1900 and 3,250 t, while landings from the Kattegat varied between 900 and 1,800 t (with the lowest landings recorded in 1994-1995). In 2002 total estimated landings amounted to 4,400 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stocks in this management area appear to be exploited at sustainable levels.

Skagerrak and Kattegat combined: XSA assessment of the stocks in FUs 3 and 4 combined (males and females combined) suggests that stock biomass has remained stable since the mid-1990s, at a higher level than the early 1990s. Since 1996 recruitment has fluctuated around a slightly lower level than was apparent in the early 1990s. There are some uncertainties about the reliability of the XSA, but the pattern in both the Danish and Swedish annual LPUEs fluctuations as well as in the fluctuations of the discards observed in the fishery for the period confirms this overall assessment. The estimated Fbar is at a low level. Age-based Y/R analysis indicates that current F may be well below Fmax.

RECENT MANAGEMENT ADVICE: There is no basis to change the previous advice for Division IIIa, given in 2001, and a total catch of less than 4 700 t for both 2004 and 2005 can be taken. Previous age-based assessments on these FUs (carried out in 2001) were performed for males and females separately. At the 2003 WG comparison of the results of XSA on males and females combined with those from XSAs on the two sexes separately did not show any significant differences. The proposed TAC of 4 700 t represents a *status quo* in the TAC. This is justified by the apparent stability of the stocks.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that the mismatch between minimum landing size (40 mm CL in Division IIIa) and the selectivity of the 70-mm diamond mesh cod-ends results in large quantities of *Nephrops* being discarded. STECF also notes that the use of two different minimum landing sizes for *Nephrops* in Divisions IIIa and IV potentially causes an enforcement and policy problem in countries where *Nephrops* from the two areas are being landed.

2.59. Norway lobster (*Nephrops norvegicus*) - IIa (EU zone), North Sea (EU zone)

Norway lobster is assessed in the following different units.

2.59.1. Norway lobster (Nephrops norvegicus) in Division IVa (rectangles 44–48 E6–E7 and 44 E8)

FISHERIES: There are two Functional Units in this Management Area: a) Moray Firth and b) Noup.

Only UK vessels fish for *Nephrops* in this Management Area. *Nephrops*directed trawlers account for 75-85% and 50-75% of the total landings from the Moray Firth and the Noup respectively. The use of 70-mm mesh on multi-rig trawls has declined in both fisheries following the UK national ban in 2000, but effort using multi-rig trawls with larger mesh sizes has increased in the most recent years. Moray Firth landings fell slightly in 2001 and dropped further in 2002. They remain, however, within the range of fluctuation in recent years. Landings from the Noup have fluctuated along the same overall pattern as effort, and following a fall in 2001, increased dramatically in 2002 to the second highest value in the time-series (401 t). Total estimated landings in 2002 were 1,600 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS:

a) Moray Firth: The age based assessment shows that stock biomass and recruitment in both males and females have been stable in the 1990s and early 2000s, although at a lower level than in the mid- and late 1980s. Annual LPUEs are fluctuating (without obvious trend), but were generally higher in the early and mid-1980s than in the 1990s. Abundance trends from the TV camera surveys (1993-2002) are in broad agreement with the VPA, but show an increase in stock abundance in the most recent years. F_{bar} fluctuates for both males and females, without obvious long-term trend.

b) Noup: Increasing trends in LPUE, and landings per area and effort per area indices, suggest that current levels of fishing effort are acceptable for this stock.

RECENT MANAGEMENT ADVICE: There is no basis to change the previous advice for the Moray Firth stock, and the 2001 advice for a TAC of 1 500 t continúes applies. The same applies to the Noup stock, so that the 2001 suggestion of 400 t continues to apply.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that in the North Sea TAC area, the present aggregated management approach runs the risk of unbalanced effort distribution. Adoption of management initiatives to ensure that effort can be appropriately controlled in smaller areas within the overall TAC area is recommended.

2.59.2. Norway lobster (Nephrops norvegicus) in Division IVa (other than Moray Firth and Noup)

FISHERIES: There is only one Functional Unit in this Management Area: Fladen Ground.

Most landings from this Management Area are reported by UK-Scotland (more than 90 % of the total international landings), together with much smaller quantities by Belgium, Denmark, Norway and UK-England. The Fladen Ground is exempt from the UK legislation banning 70 mm mesh multi-rig trawls, but the proportion of effort by multi-rig *Nephrops* vessels has strongly declined in the early 1990s. The overall trend in landings from the Fladen Ground is upward, with the highest figure recorded in 2002 (7,300 t).. Effort shows a long-term increase in the Scottish fleet.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on fishery data (LPUE, mean size, landings/area and effort/area).. Stock abundance and biomass estimated from TV surveys in 1992-2002 are considered to be reliable. TV surveys in 2001 and 2002 indicate a further increase in abundance.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The state of exploitation of the stock on Fladen Ground shows considerable spatial variation, with the most heavily fished parts considered to be exploited at sustainable levels. The stock is distributed over a large area.

The relatively high LPUEs, the evidence from the TV surveys, the low values of landings and effort per area indices (compared to other stocks), and the results of the length-based assessment all suggest that this FU remains in a healthy state. Parts of this stock are exploited at considerably lower levels than others. LPUEs and mean sizes in landings are generally stable. TV camera surveys continue to suggest that total stock biomass exceeds 100 000 t and has increased from the 1998 – 2000 level.

RECENT MANAGEMENT ADVICE: ICES advice indicate that landings of less than 12,800 t for this Management Area for 2004 and 2005 would be appropriate. This is based on an increase in abundance measured by TV surveys, and assuming a harvest rate of 7.5%, known to be sustainable in other areas. **STECF COMMENTS:** STECF agrees with the advice from ICES. STECF notes that due to the concern over the quality of the landings data, the advice has used fishery-independent estimates of abundance to estimate an appropriate landings level.

2.59.3. Norway lobster (Nephrops norvegicus) in Divisions IVa, East of 2° E + rectangles 43 F5-F7.

FISHERIES: There is only one Functional Unit in this Management Area: Norwegian Deep. The majority of the landings from this FU are made by Denmark and Norway. Since 1993 the overall trend in landings is increasing, with the highest values stabilished since 1999 (averaging 1,150 t in 1999-2002).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Landings have shown an increasing trend in recent years. Danish LPUE has decreased over the last three years. However, this might be caused by changes in trawl mesh size and fishing pattern.

RECENT MANAGEMENT ADVICE: The current TAC advice of 1,200 t should be maintained until further expansion of the fishery can be shown to be sustainable.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that at present, the stock appears not to be fully exploited. There may be scope for further cautious increases in landings and effort, but more evidence of sustainability is needed before such an increase could be recommended. Closer monitoring of this fishery is recommended.

2.59.4. *Norway lobster (Nephrops norvegicus) in Divisions IVb,c east of 1°E (*excluding rectangles 43 F5-F7)

FISHERIES: There are two Functional Units in this Management Area: a) Botney Gut - Silver Pit (FU 5) and b) Off Horn Ref. (FU 33). Belgium (mostly FU 5), Denmark (mostly FU 33), the Netherlands (mostly FU 5) and the UK (mostly FU 5) are involved in these fisheries. International landings from FU 5 have generally increased, from less than 200 t per year in the mid-1960s to 1,330 t in 2001. Belgian *Nephrops* directed effort has considerably decreased, particularly in the early 1990s, owing to the decommissioning of mostly older and less profitable vessels. A *Nephrops* directed fishery, using light beam trawls, has developed in the Netherlands in recent years. An almost exclusively Danish *Nephrops* directed fishery is expanding in FU 33, resulting in an almost tenfold increase of the landings, from about 75 t in 1991 and 1992, to 900 in 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on age-based assessment.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The Botney Gut - Silver Pit stock appears to be exploited at sustainable levels, and the Off Horns Reef stock may not be fully exploited.

Botney Gut - Silver Pit: Annual LPUEs show considerable variation and values for different vessel and gear types show different trends. Size composition data give evidence of a decrease in abundance of the larger size classes of *Nephrop*s. Age-based assessment suggests that stock biomass is fairly stable in both males and females. Estimates of recruitment are (owing to the lack of discard length frequency data). F_{bar} has recently increased, particularly in males.

Off Horns Reef: Upward trends in landings and LPUE indicate that the stock is not fully exploited, and might yield some further increases in landings.

RECENT MANAGEMENT ADVICE: For the overall Management Area, the fishery should be bounded by a TAC of 2,380 t for both 2004 and 2005, since the stocks in FU 5 and FU 33 appear to be able to sustain catches of the order of recent years. The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that in the North Sea TAC area, the present aggregated management approach runs the risk of unbalanced effort distribution between this and the other *Nephrops* Management Areas. Adoption of management at the level of the Management Areas is recommended.

2.59.5. Norway lobster (Nephrops norvegicus) in Divisions IVb,c west of 1°E

FISHERIES: There are two Functional Units in this Management Area: a) Farn Deeps (FU 6) and b) Firth of Forth (FU 8). Landings from this Management Area are mainly by UK directed *Nephrops* vessels.

Landings from this Management Area are almost solely by UK-England (FU 6) and UK-Scotland (FU 8) *Nephrops* directed vessels. Farn Deeps effort increased by about four times since the early 1970s to a peak in 1994. Landings in FU 6 have fluctuated considerably, between 3,700 t and 1950 t, in 1994 and 2002 respectively..

During 1993-2002 period, landings in Firth of Forth (FU 8) have a peak in 1993 (approx. 2400 t). Afterwards landings declined and increased again in 1997. Since 1999 the trend is declining and landings reached the lowest value in 2002 (1300 t).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on length and age-based assessment and on landings/area and effort/area indices. Since 1993 there is information from TV surveys.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: All stocks in this Management Area appear to be exploited at sustainable levels.

Farn Deeps: LPUEs appear to have been stable since the early 1990s. Age-based assessment shows that male stock biomass is fairly stable around a slightly increasing long-term trend. Recruitment of males is variable, with above-average values in the most recent years. The levels of recent increases in

female stock biomass and recruitment are likely to be above the long-term average in recent years. Fbar for both males and females has fluctuated, with values for the most recent years below the long-term average.

Firth of Forth: LPUEs fluctuating without obvious long-term trend, but with generally higher values in the early 1970s, the mid-1980s and the late 1990s – the 2002 value is at the lower end of the range of fluctuation. Age-based assessment suggests that stock biomass is generally stable in both sexes although male biomass has declined slightly in the most recent years. Recruitment appears stable. Results of TV surveys broadly confirm the trends in the VPA estimates of stock biomass. F_{bar} for both males and females is fluctuating without obvious trend.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1. There is no basis to change the previous advice. The single stock boundary should be for the Management Area 4 170 t for both 2004 and 2005.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that while effort has recently decreased in both FUs, there is still the potential for an imbalance in the exploitation rates. With the current large North Sea TAC area (which comprises eight *Nephrops* FUs), there is no mechanism for controlling effort locally. Management should therefore be carried out at the MA level recommended by ICES..

2.60. Norway lobster (*Nephrops norvegicus*) in Vb and VI

2.60.1. Norway lobster (Nephrops norvegicus) in Divisions Vb and VIb

There are no reported landings of *Nephrops* from this area. Given the perception that there are no *Nephrops* grounds in these Divisions ICES recommend a zero TAC be set to prevent mis-reporting.

2.60.2. Norway lobster (Nephrops norvegicus) in Division VIa

FISHERIES: There are three Functional Units in this Management Area: a) North Minch (FU 11), b) South Minch (FU 12) and c) Firth of Clyde (FU 13).

Only UK vessels are involved in these fisheries. In FUs 11 and 12, *Nephrops* directed trawlers and creelers account for 75-85 % and 10-15 % of the landings respectively. In FU 13, over 95 % of the landings are taken by *Nephrops* directed trawlers. Total estimated landings in 2002 accounted 10,500 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice for area VIa is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: All stocks in this Management Area appear to be exploited at sustainable levels.

North Minch: Annual LPUEs have fluctuated without trend over the longer term, but show an increase in the most recent years. Estimates of stock biomass, recruitment and F are relatively stable, and there is no evidence of long-term trends. Relatively stable biomass levels are also evident from the results of the TV camera surveys. F_{bar} of both males and females fluctuating, without long-term trend.

South Minch: Annual LPUEs fluctuating without trend, and more stable in recent years. Male and female stock biomass has fluctuated without trend over the whole time-series. Recruitment in recent years has generally been slightly below the long-term average, particularly in males. TV camera surveys suggest that abundance is fluctuating without trend. Fbar of both males and females is fluctuating without trend, and has been low in recent years.

.**Clyde:** LPUEs were at a low level in the early 1990s, but have markedly increased since then and are currently at the highest recorded level. Stock stock biomass is stable. Recruitment in the last seven years appears to have been just above the long-term average. TV camera surveys suggest a slight increase in abundance from the 2000 levels. Fbar for males showed a long-term trend of increase up to 1997, since when it has declined. Fbar for females has been fairly stable.

RECENT MANAGEMENT ADVICE: There is no basis to revise the advice given previously, and therefore ICES advises a *statu quo* TAC of 11300 t for the years 2002 and 2003.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that the creel fisheries in these FUs are taking higher proportions of berriedfemales than the trawl fisheries. This could result in higher losses to the female spawning stock than in other FUs, where berried females are less vulnerable to fishing.

2.61. Norway lobster (*Nephrops norvegicus*) – VII

Norway lobster in Division VII is split up into four components: VIIa, VIIbcjk, VIIde and VIIfgh.

2.61.1. Norway lobster (Nephrops norvegicus) in Division VIIa (excluding rectangles 33E2-E5)

FISHERIES: There are two Functional Units in this area Irish Sea East (FU 14) and Irish Sea West (FU 15). Most of the landings are taken by the UK and the Republic of Ireland. Irish Sea East landings and effort increased to a peak in the late 1970s and early 1980s, and have now stabilised at about 60 % of that level. In the Irish Sea West, both landings and effort have declined in recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice was based on an age-based assessment using commercial data. Fishery data on CPUE, LPUE and mean size data are also available.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Both stocks are considered to be fully exploited.

Irish Sea East: Annual LPUEs fluctuating, but generally lower in the 1990s and 2000s than in the late 1970s and early 1980s. Landings fairly stable since the mid-1980s. Tentative age-based assessment suggests fairly stable biomass and recruitment, but owing to the short time-series and uncertainties about discarding in some years this assessment is considered uncertain. F_{max} for females.

Irish Sea West: CPUEs and LPUEs for the Northern Ireland fleet have remained relatively constant since 1995, with the slight drop in 2000 and 2001 being recovered in 2002. Republic of Ireland CPUE data available from 1995 showed a steady increase followed by a slight drop since 1999. Age-based assessment indicates a relatively stable biomass in both males and females. Recruitment appears to have been relatively high in 2000. Recruitment levels in more recent years are uncertain. Fbar of both sexes is the lowest of the time-series.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.3. There is no basis to revise the advice given previously of a TAC from this Management Area in 2004 and 2005 be kept at the level recommended in 2001, i.e. 9,550 t.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that ICES suggests a separate *Nephrops* TAC for Division VIIa, as is done for several finfish stocks (such as cod, whiting, plaice, and sole). Although exploited throughout the year, increased effort in the Irish Sea West generally occurs during the summer months, when females are more available for capture.. This results in higher annual F rates on females than in most other northern *Nephrops* stocks. The high F values on both sexes in the Irish Sea West suggest that the situation should be very carefully monitored.

2.61.2. Norway lobster (Nephrops norvegicus) in Divisions VIIb,c,j,k

FISHERIES: There are four Functional Units in this Management Area: a) Porcupine Bank (FU 16), b) Aran Grounds (FU 17), c) Ireland NW coast (FU 18), and d) Ireland SW and SE coast (FU 19).

Landings from the Porcupine Bank are mainly by France, the Republic of Ireland, Spain and the UK. Landings have declined significantly since the start of the time-series. Landings from the other FUs are mostly by the Republic of Ireland. Landings from FU 17 have generally increased since the start of the time-series but have fluctuated in recent years around 1 000 t. Landings from FU 19 have largely fluctuated, with very high landings in 2002. These fluctuations appear to be related to the *Nephrops*-directed effort that varies, depending on the availability of other species. Landings from other statistical rectangles have been around 400 t. FU 16 was expanded to include adjacent rectangles with considerable catches and no new FUs were defined.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. CPUE, LPUE and mean size data were available for Porcupine Bank (FU 16). Length-based assessment in the case of Aran Grounds stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock in FU 16 is considered to be overexploited. Stocks in FU 17, FU 18, and FU 19 in this Management Area are considered to be exploited at sustainable levels.

Porcupine Bank: Both landings and LPUEs for all fleets show downward trends and there are indications of decreasing effort in some fisheries. Landings in 2000 were the lowest in the time-series.

LPUEs for all fleets reached historic lows in 2000. Some declines in effort are apparent, but this does not appear to have resulted in favourable changes in LPUE.

Aran Grounds: This stock is considered to be exploited at sustainable levels. Landings in recent years have been around 1000 t. The LPUEs are relatively stable, although the time-series is very short. Length-based Y/R analyses indicate that the current F is above Fmax in both males and females.

Ireland coastal stocks FU 18, FU 19 and other statistical rectangles: There are only landings, LPUE, and effort data for these stocks. Landings from FU 19 have increased substantially in 2002. Although the time-series of LPUE data is short, recent LPUEs are the highest in the time-series and more than double the 1999 LPUE.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4. Catches in 2004-2005 in FU 16, should be constrained to the recent low average of 2000-2002 i.e.1,100 t. In other FUs of the Management Area L, the catches should not be allowed to exceed the average of 1995-2002, i.e. 2,200 t. The combined catches should thus not exceed 3,300 t.

STECF COMMENTS: STECF agrees with the advice from ICES. ICES suggests a separate *Nephrops* TAC for Division VIIa, as is done for several finfish stocks (such as cod, whiting, plaice, and sole). This is particularly important in the current context where the stock in FU 16 appears to be overexploited and other stocks within the TAC area are fully exploited and relatively stable. Hake are taken in this fishery. It should be noted that there is a requirement to rebuild the northern hake stock.

2.61.3. Norway lobster (Nephrops norvegicus) in Divisions VIId,e

FISHERIES: There are no reported landings of *Nephrops* for this area. Given the perception that there are no *Nephrops* grounds in this area, ICES suggested that a zero TAC be set to prevent mis-reporting.

2.61.4. Norway lobster (Nephrops norvegicus) in Divisions VIIf, g, h and VIIa rectangles 33E2–E5

FISHERIES: There are three Functional Units in this Management Area but they are treated as one: a) Celtic Sea (Units 20, 21 and 22 combined) Landings from this stock are reported by France, the Republic of Ireland and the UK. Until 1993, the French landings represented at least 80 % of the total, and has declined since then. There has been a considerable increase in Irish landings, from around 700 t in the early 1990s to 1500 t at present. Total landings have increased over recent years, reaching levels of around 4,600 t in 2000-2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on fishery data and an age-based assessment for males. The lack of a regular discard sampling programme means that assessment should be considered cautiously.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have proposed for this stock.

STOCK STATUS: The stock in this Management Area appears to be exploited at sustainable levels.

Celtic Sea (FUs 20, 21, and 22 combined): Age-based assessment on males shows relative stability in stock biomass. Fbar has been fairly stable until 2001, but has increased in 2002. However, the assessment has a tendency to over-estimate F in the most recent years.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries in Section 16.4. In view of the relative stability of LPUE and stock biomass, ICES advice that landings from this Management Area should not exceed 4,600 t for both 2004 and 2005, based on average landings over the last 10 years.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that the lack of a regular discard sampling programme prevent a standard quality of the length composition data and means also that estimates of recruitment should be considered cautiously.

2.62. Norway lobster (*Nephrops norvegicus*) in Divisions VIIIa, b

FISHERIES: There are two Functional Units in this Management Area: a) Bay of Biscay North (FU 23) and b) Bay of Biscay South (FU 24), together called Bay of Biscay. Nearly all landings from FUs 23 and 24 are taken by French trawlers. Landings have been generally high, though fluctuating (between about 4 500 and 7 000 t) until the early 1990s, but have decreased to a much lower level since then. The fishing effort has decreased since 1994, but effective effort has been stabilised or even increased in recent years, owing to increased gear efficiency.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: ICES considers the stock in this Management Area to be currently at a low level. Annual LPUEs have been fairly stable, but in recent years this may be due to increased gear efficiency. An age-based assessment indicates that biomass levels decreased in the late 1980s up to 1999. Despite a slight recovery in the last 3 years, biomass remains at a low level. Recruitment estimates show a trend of decline from the late 1980s up to the late 1990s. Recruitment in the most recent years is uncertain. Fbar has fluctuated without trend over the assessment time-series.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4. ICES recommends in order to

reverse the negative trend in the spawning biomass landings in 2004 should be no more than 3 300 t. An effective change in the exploitation pattern would assist in the reversal of the negative trend.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that ICES advice suggest landings in 2004 should be no more than 3 300 t in order to reverse the negative trend in the spawning biomass. An effective change in the exploitation pattern would assist in the reversal of the negative trend. The current fishing pattern causes high mortality of juveniles. Improvement of the fishing pattern would improve the state of the stock. Any selective device or changes in the fishing tactics that are able to prevent the catch of small *Nephrops* should be encouraged. Hake are taken in this fishery. It should be noted that there is a requirement to rebuild the northern hake stock.

The results of this year's assessment confirm trends in the assessments performed in 2002 and indicate that the Bay of Biscay *Nephrops* stock is currently at a low level. SSB levels have been revised upwards slightly compared with the 2002 assessment. This year the advice calls for less stringent measures to be implemented in the fishery than the advice provided last year as the perception of the rate of the stock decline has changed.

It is likely that effective effort has been stabilised or even increased in recent years, owing to increased gear efficiency. The effort data used in the assessment do not take these efficiency gains into account, so it is likely that there is some overestimation of recent abundance.

The historical trend of biomass and recruitment shows a decreasing trend in biomass at observed levels of F. In order to halt the decreasing trend in biomass the advice is to reduce F.

2.63. Norway lobster (*Nephrops norvegicus*) in Division VIIIc

FISHERIES: There are two Functional Units in this Management Area: a) North Galicia (FU 25) and b) Cantabrian Sea (FU 31). All catches from these FUs are taken by Spain. Landings and effort in the North Galicia fishery have declined and are now at extemely low levels compared to earlier years. .

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Time series of fishery data available for both stocks. Age-based assessment performed in 2003. There was no assessment in 2003 for Cantabrian Sea, but previous in 2002.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are proposed for this stock.

STOCK STATUS: Both stocks have collapsed.

a) North Galicia: Landings are currently at very low levels although with a slight increase in 2002. The mean sizes in the landings show an overall increasing trend, confirming declining recruitment in recent years. Age-based assessment gives evidence of sharp declines in stock biomass and recruitment for both males and females. Current levels of stock biomass for males and females combined are about 60% lower than in the late 1980s. Recruitment is at the lowest recorded level. Fbar values for males and females have fluctuated and have recently declined.

b) Cantabrian Sea: Previous age-based assessments give evidence of drastic declines in recruitment and biomass of both males and females. LPUEs are strongly fluctuating, with high values in 1988-1990 and

1994 and much lower values in the other years. Mean landed sizes of both males and females were higher in 1999-2001 than in any previous year.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.5. ICES repeats its advice for a zero TAC for this Management Area.

STECF COMMENTS: STECF notes that the mixed nature of these demersal fisheries has prevented directed management of *Nephrops* stocks in this Management Area. The management measures for hake have determined the exploitation level of the *Nephrops* stocks.

A recovery plan for the hake and *Nephrops* fisheries has been prepared (SGMOS, 2003) but has not yet been implemented. STECF further notes that with the present situation for the Iberian *Nephrops* stocks, the effort reduction scheme proposed for southern hake and *Nephrops* in this recovery plan (SGMOS, 2003) must be complemented with the closure of selected *Nephrops* fishing grounds to all fishing. STECF suggests that there be a zero catch in 2004 if the recovery plan and complementary closure areas are not implemented.

2.64. Norway lobster (*Nephrops norvegicus*) in Divisions VIIId, e

FISHERIES: There are no reported landings of *Nephrops* from this area

RECENT MANAGEMENT ADVICE: ICES suggested that a zero TAC be set for this area toprevent misreporting.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.65. Norway lobster (*Nephrops norvegicus*) in Division IX and X.

FISHERIES: There are five Functional Units (FU) in Division IXa: a) West Galicia, b) North Portugal, c) Southwest Portugal, d) South Portugal and e) Gulf of Cadiz. There are no reported landings of *Nephrops* from Division IXb and Subarea X.

The fishery in West Galicia, North Portugal and Gulf of Cádiz is mainly conducted by Spanish vessels, and that in Southwest and South Portugal by Portuguese vessels, on deep water grounds (200-750 m). The Portuguese fleet comprises two components: demersal fish trawlers and crustacean trawlers.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice for Division IXa is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: Stocks in West Galicia, North Portugal have collapsed while in Southwest and South Portugal are seriously overexploited. There is no information whether current levels of fishing in FU 30 are sustainable.

a+b) West Galicia and North Portugal: LPUEs for West Galicia are declining. The mean landed sizes of both males and females have fluctuate widely without trend. . There is an evidence of sharp and continuous decline in stock biomass and recruitment in both males and females since the early 1990s. **F**bar has fluctuated around relatively high levels. Bottom trawl survey indices of abundance confirm the picture of a declining stock.

c+d) SW and S Portugal: CPUEs for Portuguese trawlers sharply declined in 1989–1996, but have remained relatively stable since then. The SSB and recruitment of both males and females have sharply declined during the early 1990s. Despite a slight increase in males biomass after 1995, the total stock biomass and recruitment remain at a low level. Fbar for both males and females has fluctuated around relatively high levels. The results of crustacean directed trawl surveys, usually carried out in June-August, support the perception of low levels of abundance compared with the late 1980s.

e) Gulf of Cádiz: Limited data only are available for this FU. There is an overall trend of decrease in landings, with a decline from a peak in 1987 to a record low in 1996. Landings have increased in 2001 and 2002 compared to 2000.

RECENT MANAGEMENT ADVICE: For West Galicia and North Portugal, ICES

advises a zero TAC in order to allow the stock to rebuild from the current low biomass levels. ICES advises a zero TAC for SW and S Portugal, in order to allow the stock to increase.

Given the declining stocks in neighbouring areas and the absence of information for Gulf of Cádiz, ICES advises that landings from this stock be kept at the lowest level of recent years, i.e. 50 t.

The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.5.

Given the perception that there are no *Nephrops* grounds in División IXb and Subarea X, ICES recomends that a zero TAC be set to prevent mis-reporting.

STECF COMMENTS: STECF notes that the mixed nature of these demersal fisheries has prevented directed management of *Nephrops* stocks in this Management Area. The management measures for hake have determined the exploitation level of the *Nephrops* stocks.

A recovery plan for the hake and *Nephrops* fisheries has been prepared (SGMOS, 2003) but has not yet been implemented. STECF further notes that with the present situation for the Iberian *Nephrops* stocks, the effort reduction scheme proposed for southern hake and *Nephrops* in this recovery plan (SGMOS, 2003) must be complemented with the closure of selected *Nephrops* fishing grounds to all fishing. STECF suggests that there be a zero catch in 2004 for this Management Area, except for the Gulf of Cadiz, if the recovery plan and complementary closure areas are not implemented.

2.66. Northern shrimp (*Pandalus borealis*) in IIIa and IVa East

FISHERIES: *Pandalus borealis* is fished by bottom trawls at 150–400 m depth throughout the year by Danish, Norwegian and Swedish fleets. Total catches have varied between 11 000 and 16 000t. in the period 1985-2002. In 2002 total catches were around 12 000 t. EU fleet catches constitute around 40% of total catches.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on commercial catches, survey indices of available shrimp biomass, recruitment, and predator biomass.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points are not defined due to the large influence of predation (natural mortality).

STOCK STATUS: The state of this stock cannot be classified in relation to precautionary reference points because no precautionary approach reference points have been defined for this stock. Stock size is estimated to have increased since the beginning of the 1990s and is above the long-term average.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this stock is now presented in the context of the mixed fisheries in the North Sea (Section 16.1). The stock specific advice for Northern shrimp is that the present exploitation level should not increase, corresponding to a catch of less than 15 300 t in 2004.The perception of the state of the stock in 2003 is based on an assessment that takes predation into account. The assessment shows that predators annually remove a much larger fraction of the stock than the fishery. The exploitable biomass comprises only few age groups (1-3) of which age group 2 and older constitute around 70% in weight of the total catch.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.67. Northern shrimp (*Pandalus borealis*) in the North Sea

FISHERIES: In the EU zone of the North Sea, *Pandalus* on the Fladen Grounds (Div. IVa) is the main shrimp stock exploited. This stock is mainly exploited by Danish and UK trawlers. The fishery targets *Pandalus borealis,* with low by-catches of other species. In the last 10 years total landings have fluctuated between 500 and 6000 t. Total effort has been relatively low since 1999 - no UK fisheries targeting *Pandalus* were conducted in 2001 and 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No assessment of this stock has been made since 1992.

PRECAUTIONARY REFERENCE POINTS: There is no basis for defining precautionary reference points for this stock.

STOCK STATUS: The current state of the stock is unknown. The fishery is highly dependent on year-class strength. Only age groups 2 and 3 at the beginning of the year and age groups 1 and 2 at the end of the year are caught. Because of the few age groups constituting this stock predictions for the Fladen fishery are possible only if very reliable information on recruitment is available.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this stock is now presented in the context of the mixed fisheries in the North Sea (Section 16.1). No stock specific management advice is given by ICES. However,ICES recommends that sorting grids or other means of facilitating the escape of fish should be implemented in this small meshed fishery.

STECF COMMENTS: STECF does not have any further information.

2.68. Northern Shrimp (*Pandalus borealis*) in Sub-areas I & II

FISHERIES: The fisheries for Northern shrimp in Sub-areas I & II (Barents Sea & Svalbard area) are by far the largest shrimp fisheries in the North east Atlantic. Norway and Russia take the majority of the landings. In the early 1980s total landings were above 100,000 t, but have since declined.

Reported landings for all countries increased between 1995 (25 000 t) and 2000 (83 000 t), but have since decreased slightly in 2001 (55 000 t) and 2002 (60 000 t). In recent years, EU fleet landings constitute around 5-10 % of total landings.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. ICES has been approached for advice on biological assessment and management of this stock.

No analytical assessment is available. Commercial CPUE series and survey series are considered to be of reasonable quality, although in the future account will have to be taken of efficiency increases due to the use of multi-rig trawls.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: This stock is probably within safe biological limits. Surveys indicate that the biomass index is close to the long-term mean (1985–2002). No good estimates of fishing mortality are available.

RECENT MANAGEMENT ADVICE: There are no explicit management objectives for this stock, although ICES advises that current catch rates are sustainable.

Shrimp is an important prey for several fish species, especially cod. Consumption by cod significantly influences shrimp population dynamics and should be taken into account in management. Cod consumption estimates are on average much higher than shrimp landings.

STECF COMMENTS: STECF has no other information.

2.69. Norway pout (*Trisopterus esmarki*) in IIa, IIIa and the North Sea

FISHERIES: The fishery is mainly prosecuted by Danish and Norwegian vessels using small mesh trawls in the northern North Sea at Fladen Ground and along the edge of the Norwegian Trench. The fishery is mainly by Danish and Norwegian vessels using smallmesh trawls in the northern North Sea. Main fishing seasons are 1st, 3rd, and 4th quarters of the year.

The fishery targets both Norway pout and blue whiting. The stock is managed by TACs. Landings fluctuated between 110,000 and 735,000 t. in the period 1971-1997, and apart from 2000 (184,000 t) decreased substantially in the following years with landings of around 80,000 t.,

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is analytical using catch-at-age analysis based on quarterly catch and cpue data.

PRECAUTIONARY REFERENCE POINTS: No F_{pa} is set for this stock, the proposed B_{pa} = 150,000t.

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock being within safe biological limits. Recruitment is highly variable and influences SSB and total stock biomass (TSB) rapidly due to the short life span of the species. Recruitment has been low within the last three years. Fishing mortality has generally been lower than the natural mortality.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries in Section 16.1.

The stock can on average sustain current F. However, in managing this fishery, by-catches of other species should be taken into account, in particular haddock and whiting. Existing measures to protect other species should be maintained.Recent recruitment (including the 2003 year class) has been low. Stock biomass (SSB) is estimated to be above **B**pa but is likely to decrease below **B**pa in the short-term.

ICES considers that stock size and catch possibilities are largely dependent on the size of recruiting year classes. The size of this year class cannot be predicted with the precision required for traditional catch predictions for traditional TAC based management. Alternative management approaches are required, and ICES considers that management procedures using surveys and "in season monitoring" of the fishery should be explored.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.70. Plaice (*Pleuronectes platessa*) in Subarea IV (North Sea)

FISHERIES: North Sea plaice is taken mainly in a mixed flatfish fishery by beam trawlers in the southern and southeastern North Sea. Directed fisheries are also carried out with seine and gill net, and by beam trawlers in the central North Sea. Fleets involved in this fishery are the Netherlands, UK, Belgium, Denmark, France, Germany and Norway. Landings fluctuated between 81,000 and 170,000 t (1987-2001) and are predominantly taken by EU fleets. The 2002 landings of 70,200t were the lowest since 1957.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for fishing mortality and biomass are F_{pa} = 0.30, B_{pa} = 300,000t. B_{pa} is based on B_{lim}=210,000 tonnes.

MANAGEMENT AGREEMENTS: In 1999, a long-term management plan for plaice in the North Sea (area IV) has been agreed between the EU and Norway. The plan shall consist of the following elements:

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 210,000 tonnes (B_{lim}).

2. For 2000 and subsequent years the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of 0.3 for appropriate age groups as defined by ICES.

3. Should the SSB fall below a reference point of 300,000 tonnes (B_{pa}), the fishing mortality rate referred to under paragraph 2, shall be adapted in the light of scientific estimates of the conditions then prevailing. Such adaptation shall ensure a safe and rapid recovery of SSB to a level in excess of 300,000 tonnes.

4. In order to reduce discarding and to enhance the spawning biomass of plaice, the Parties agreed that the exploitation pattern shall, while recalling that other demersal species are harvested in these fisheries, be improved in the light of new scientific advice from *inter alia* ICES

5. The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.

STOCK STATUS: The stock is outside safe biological limits. SSB in 2003 is well below B_{pa} and fishing mortality in 2002 was above F_{pa}. Spawning stock biomass has declined from 1989 to 1997, where it reached its historical minimum. SSB has increased from 1997 to 2000 due to the strong 1996 year class, but has decreased since 2000 and is currently close to the historic minimum. Since the 1996 year class the recruitment has been near or below average. Fishing mortality increased from the 1960s to the 1990s, reaching a record high above F_{lim} in 1997 and has declined, but remained above F_{pa} until 2001. In 2002 the fishing mortality increased again.

Weight-at-age has declined recently, and discards are not included in the assessment.

A fishermen survey has been carried out by the North Sea Fiseries Partnership. ICES notes that the assessment for this stock indicates that the SSB has been at a relatively low level for a number of years already, which may be consistent with the observations from the fishermen.

The effect of the plaice box was evaluated in 1999 and no new information has been available since then. Despite this, recent surveys show some indication that undersized plaice are distributed further offshore and may have become available to the fishery , which will generate additional discards.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

For the stock specific advice, ICES recommends that a recovery plan be established that will ensure a safe and rapid recovery of SSB to a level in excess of 300,000t. ICES states that rebuilding of the plaice stock can only be obtained by both reducing the fishing mortality and by reducing discards. Although projections based on the current exploitation pattern suggest that the stock can rebuild to B_{pa} in the medium term, it is unlikely that the required reduction in fishing mortality can be achieved without reducing discards. As plaice is mainly caught in a mixed fishery with a mesh size of 80mm in

the southern North Sea, measures to reduce discards in would greatly benefit the plaice and future yields.

STECF COMMENTS: STECF notes that the most recent assessment resulted in a marked downward revision of the SSB. This was due to a change in perception of the strength of the 1996 year-class and a declining trend in mean weight at age. STECF also notes that there were revisions to the assessment model settings for the age range over which average fishing mortality is calculated, and to the age range used in the assessment. STECF considers that such changes require a revision of reference points but notes that there has been no revision of the reference points.

Nevertheless, STECF agrees that a recovery plan be established to ensure a rapid recovery of the stock to a level above B_{pa}. This recovery plan should incorporate both reduction of fishing mortality and reduction of discards. STECF agrees with ICES that reduction of discards would benefit the plaice stock and future yields from sole and plaice. STECF notes that estimates of discards are not included in the assessment. STECF agrees with ICES that there is a need for continuous monitoring of discards and that special attention should be given to reconstructing recent discard trends so as to improve the assessment. STECF notes that as plaice are caught in a mixed fishery, the management measures for plaice should take into account management measures adopted for other species, especially North Sea cod for which stringent management is advised.

2.71. Plaice (*Pleuronectes platessa*) in the Baltic Sea (Div. IIIb,c,d)

FISHERIES: In the Baltic plaice is mainly taken in Sub-divs. 22-24 (the western Baltic). The total landings in the 1970s (about 7,000 t), but have decreased since the 1980s to the lowest on record in 1993 (269 t). Since 1995 at a continuous positive trend total landings have fluctuated between 1,500 and 2,700 t, mainly due to increased landings from Subdivision 22. In 2002 the total landings amounted to about 2,800 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points proposed for plaice in the Baltic.

STOCK STATUS: No information on stock status is available.

RECENT MANAGEMENT ADVICE: The available data are insufficient for assessing the current stock size and exploitation, and no management advice is given by ICES on the Plaice stocks in the Baltic.

STECF COMMENTS: STECF did not have any further information.

2.72. Plaice (*Pleuronectes platessa*) in Kattegat and Skagerrak (Div.IIIa)

FISHERIES: The plaice catches in this area are taken in fisheries using seine, trawl and gill nets targeting mixed species for human consumption. Plaice is an important by-catch in a mixed cod-plaice

fishery. Denmark and Sweden account for the majority of the landings while only minor landings are taken the German, Norwegian and, occasionally, Belgian vessels. Landings fluctuated between 7,500 and 15,500 t. (1980-1999). Landings in 1998 and 1999 were at a low level, around 8,500 t. The landings increased to 11560 t in 2001 and decreased after that from again onto the level from the years 1999 and 2000 (in 2002 about 8700 t).There are 2 management areas, Skagerrak and Kattegat, for which separate TACs are set.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The

advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS : The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.73$, $B_{pa} = 24{,}000$t.

STOCK STATUS: The stock is harvested outside safe biological limits. The estimated SSB in 2003 is well above B_{pa}, and fishing mortality is just above F_{pa}. The estimates of fishing mortality for plaice in Division IIIa are substantially higher than the corresponding estimates for plaice in the North Sea (Subarea IV). Recruitment of year classes 1998 and 1999 are the highest in the time series and these year classes have resulted in a substantial increase in SSB.

RECENT MANAGEMENT ADVICE: Fishing mortality in 2004 should be less than F_{pa} (0.73), i.e. close to the current levels of exploitation. Because of the uncertain assessment ICES does not present a forecast for 2004. The ICES advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

STECF COMMENTS: STECF agrees with the advice from ICES and agrees with the advised management measures referring to the stringent restrictions in catches and discards of cod in the North Sea and Skagerrak.

2.73. Plaice (*Pleuronectes platessa*) - Vb (EU zone), VI, XII, XIV

STECF did not have access to any stock assessment information on plaice in these areas.

2.74. Plaice (*Pleuronectes platessa*) in Division VIIa (Irish Sea)

FISHERIES: Plaice are taken mainly in long-established UK and Irish otter trawl fisheries for demersal fish. They are also taken as a by-catch in the beam trawl fishery for sole. The main fishery is concentrated in the northeast Irish Sea. Catches are predominantly taken by the UK , Belgium and Ireland, with smaller catches by France and at the end of the 1990s by The Netherlands. Landings were sustained between 2,900 t and 5,100 t from 1964-1986. Landings have since declined from the 1987 peak of 6,200 t to historical lows, of around 1,550 t in the last 2 years, well below the agreed TAC.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.45, B_{pa} = 3,100 t.

STOCK STATUS: The stock is considered to be within safe biological limits. The SSB in 2002 was above B_{pa} as it has been throughout the period of the assessment. The fishing mortality in 2002 increased compared to 2001, but was still below F_{pa}. Fishing mortality on this stock was above F_{pa} in most years between 1967 and 1997, but declined through the 1990s.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.3.

For the stock specific advice, ICES recommended that fishing mortality in 2003 should remain below F_{pa}, corresponding to landings of 1600 tonnes.

STECF COMMENTS: STECF agrees with the assessment for VIIa plaice but notes that the management advice does not consider the catch of cod and whiting in fisheries also catching plaice. As plaice are caught in a mixed fishery, the management measures for VIIa plaice should be consistent with the management measures adopted for other species, especially cod and whiting for which stringent management is advised. STECF notes that the assessment is based on catch-at-age analysis with CPUE series from both commercial fleets and surveys, but no discard information is included.

2.75. Plaice (*Pleuronectes platessa*) in Division VIIbc

FISHERIES: Ireland is the major participant in this fishery with around 90% of the international landings between 1993-2001. Plaice are normally caught in mixed species otter trawl fisheries in Division VIIb. These vessels mainly target other demersal fish species and *Nephrops*.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No fishing mortality or biomass reference points are defined for this stock.

STOCK STATUS: The state of the stock in relation to biological reference points is not known. Catches have declined since 1995 (315t) to a historic low in 2002 (69t)

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES recommends that catches in 2004 be no more than the recent average (2000-2002) of around 90 t, in order to avoid an expansion of the fishery until there is more information to facilitate an adequate assessment.

STECF COMMENTS: STECF agrees with the advice from ICES. The exploitation of this stock should be conducted in the context of mixed fisheries protecting stocks outside safe biological limits. STECF notes that the proposed TAC is unlikely to constrain the fishery as the landings over the last years are below the proposed 90t.

2.76. Plaice (Pleuronectes platessa) – VIIde

Plaice in Divisions VII d and e are assessed separately.

2.76.1. Plaice (Pleuronectes platessa) in Division VIId (Eastern English Channel)

FISHERIES: The stock is exploited predominantly in a mixed flatfish fishery by otter and beam trawlers. French offshore otter trawlers have a directed fishery in winter. Countries involved in this fishery are Belgium, France and the UK. Landings fluctuated between 2,000 and 10,000 t (1976-2002). Landings were around 6,000 t for the last 8 years. The TAC is set for Divisions VIId and VIIe combined.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.45, B_{pa} = 8,000t.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. SSB in 2003 is estimated to be just below B_{pa}, and has fluctuated near this level since 1992. Fishing mortality in 2002 is estimated to be above F_{pa}. Recent recruitment has been approximately average. Due to the minimum mesh size (80mm) in the mixed beam trawl fishery, a large number of (undersized) plaice is discarded. As discarding is not included in the assessment, it may lead to underestimation of recruitment and the impast of the fishery on this stock. Measures to reduce discarding in the sole fishery would greatly benefit the plaice stock and future yields. Programs for sampling discards are currently underway.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

For the stock specific advice, ICES recommends that fishing mortality in 2004 be reduced to less than the proposed F_{pa} (0.45), corresponding to landings in 2004 of less than 5,400 t.

STECF COMMENTS: STECF agrees with the advice for VIId plaice.. STECF notes that large number of plaice are discarded but are not included in the assessment.

2.76.2. Plaice (Pleuronectes platessa) in Division VIIe (Western English Channel)

FISHERIES: Plaice in the Western English Channel are taken as part of a mixed demersal species otter trawl fishery, and as a by-catch in the sole beam-trawl fishery. Countries involved are Belgium, France and the UK. Landings fluctuated between 600 and 2,500 t. (1976-2001). Landings were around 1,200 t. for the last 8 years. The TAC for plaice in the English Channel is set for Divisions VIId,e combined

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.45, B_{pa} = 2,500t.

STOCK STATUS: The stock is considered to be outside safe biological limits. SSB peaked in 1989–1990, following a series of good year classes in the mid-1980s, but has declined rapidly to well below the proposed B_{pa} (2,500 t.) and is currently close to **B**lim. Fishing mortality increased in the 1980's and has fluctuated well above F_{pa} in the 1990's. In recent years recruitment has been below average, apart from the 2001 year class which appears to be stronger than average. SSB is expected to increase when this year class matures.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES recommends that fishing mortality should be reduced by 55% in 2004 in order to bring SSB above B_{pa} in 2005. This fishing mortality , corresponds to catches of less than 660 t in 2004. As the TAC for this stock is set together with VIId plaice, the results of this assessment need to be considered along with those for the much larges VIId stock.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that this advice is consistent with the advice for sole in this area.

2.77. Plaice (*Pleuronectes platessa*) in the Celtic Sea (Divisions VIIf and g)

FISHERIES: The fishery for Celtic Sea plaice involves vessels from France, Belgium, England and Wales and Ireland. In the 1970s, the VIIf,g plaice fishery was mainly carried out by Belgian beam trawlers and Belgian and UK otter trawlers. Effort in the UK and Belgian beam-trawl fleets increased in the late 1980s but has since declined. Recently, many otter trawlers have been replaced by beam trawlers, which target sole. Landings fluctuated between 750 and 2,100 t. (1977-2000) reaching a record low of 715 t in 2001, but declined to 630 t in 2002. All landings are reported by EU fleets. Landings have been declining in the last 5 years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = not defined, B_{pa} = 1,800t

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. SSB decreased from 1988 to 2000 and has been below B_{pa} since 1998. Fishing mortality has fluctuated around the average. Most recent year classes have been below average, and the 2001 year class is estimated to be the weakest in the series.

RECENT MANAGEMENT ADVICE: ICES (2003) advises that fishing mortality should be restricted to below 0.10 in 2004 corresponding to landings of less than 210 t. This would bring SSB above B_{pa} in 2005. If this is not possible then ICES recommends that a recovery plan which includes a sustained reduction of fishing mortality be implemented to rebuild the stock above B_{pa} in the medium-

term. Direct effort reductions, rather than TAC controls, are required to promote such a reduction in fishing mortality.

STECF COMMENTS: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4 of this report. STECF agrees with the advice from ICES.

2.78. Plaice (Pleuronectes platessa) in VIIhjk

FISHERIES: The fishery in Divisions VIIh–k is a trawl fishery but gill netting is increasing in importance in the area. This is mixed fisheries for cod, whiting, hake, sole and plaice. Landings of plaice from Division VIIj-k fluctuated between 300 and 600 t. (1988-2002) without any apparent trend. The largest share of the landings is taken by Ireland, with smaller shares for France and the UK. Ireland is the major participant in this fishery with around 60% of the international landings between 1993-2001.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment for this stock in 2002 was preliminary. In 2003, the data were screened but no assessment was carried out.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The state of the stock in relation to biological reference points is not known. Landings have been declining and landings in 2001 –2002 are the lowest in the time-series.

RECENT MANAGEMENT ADVICE: In 2003, ICES advises that catches in 2004 should be no more than the recent average (2000-2002) of around 320 t, in order to avoid an expansion of the fishery until there is more information to facilitate an adequate assessment.

STECF COMMENTS: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4 of this report. STECF agrees with the ICES advice.

2.79. Plaice (*Pleuronectes platessa*) in VIII, IX and X.

No information is available to STECF on these stock(s).

2.80. Pollack (*Pollachius pollachius)* in all areas.

Little information was available to STECF on the status and/or exploitation of Pollack in any area. In all cases the only management advice has originated from STECF and has taken the form of precautionary TACs based on the recent level of landings. This advice and landings data for 1989 to 1999 can be summarised as follows:

Area	Agreed TAC (kt)	Min. Landing (kt)	Max. Landing (kt)
Vb(EC),VI,XII,XIV	1.10	0.22	0.50
VII	17.00	3.81	6.08
VIIIab	2.60	1.00	1.95
VIIIc	0.80	0.05	0.11
IX	0.45	0.03	0.08

2.81. Redfish (*Sebastes mentella*) in Sub-areas I and II

FISHERIES: The only directed fisheries for *Sebastes mentella* (deep-sea redfish) are trawl fisheries. However, since 1 January 2003 all directed fishery for *S. mentella* have been forbidden in the Norwegian EEZ zone north of 62°N and in the Svalbard area. Additional protection for adult *S. mentella* comprise area closures. Outside permanently closed areas it is, however, legal to have up to 20% redfish (both species together) in round weight as by-catch per haul and on board at any time when fishing for other species.

By-catches are taken in the cod fishery and especially in the shrimp trawl fishery. By-catches of juvenile redfish in the shrimp fishery have been reduced following the introduction of sorting grids. Traditionally, the fishery for *S. mentella* was conducted by Russia and other East European countries on grounds located south of Bear Island towards Spitsbergen. The highest landings of *S. mentella* were 269,000 t in 1976, followed by a rapid decline to 80,000 t in 1980–1981 then a second peak of 115,000 t in 1982. The fishery in the Barents Sea decreased in the mid-1980s to the low level of 10,500 t in 1987. At this time Norwegian trawlers showed interest in fishing *S. mentella* and started fishing further south, along the continental slope at approximately 500 m depth. These grounds had never been harvested before and were inhabited primarily by mature redfish. After an increase to 49,000 t in 1991 due to this new fishery, landings have been at a level of 10,000–15,000 t until 1996 when they dropped to 8,000 t. Since 1991 the fishery has been dominated by Norway and Russia. EU catches amounted to 800 t in 2002, out of a total catch of 7 000 t in the fishery.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock. However, no explicit management objectives have been established for this stock.

The most recent analytical assessment was made in 1997, but not considered reliable, due to uncertainty regarding the absolute size of this stock. Advice is based on survey results.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock, but candidate reference points for biomass are under investigation.

STOCK STATUS: The stock is considered to be outside safe biological limits. Although the current assessment is only indicative of the relative trends in stock size, it shows that the spawning stock is close to its historical low. The 1991–2002 year classes are indicated to be well below those of the 1980s.

RECENT MANAGEMENT ADVICE: ICES recommends a continuation of the measures introduced in 2003, i.e. that there be no directed trawl fishery on this stock and that the area closures and low by-catch limits should be retained until a significant increase in spawning stock biomass (and a subsequent increase in number of juveniles) has been detected in surveys.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.82. Redfish (*Sebastes marinus*) in Sub-areas I and II

FISHERIES: The fishery for *Sebastes marinus* (golden redfish) is mainly conducted by Norway, which accounts for 80–90% of the total catch. Germany also has a long tradition of a trawl fishery for this species. The fish are caught mainly by trawl and gillnet, and to a lesser extent by Danish seine, longline and handline. Some of the catches are taken in mixed fisheries together with saithe and cod. Important fishing grounds are the Møre area (Svinøy), Halten Bank, the banks outside Lofoten and Vesterålen, and Sleppen outside Finnmark. Traditionally, *S. marinus* has been the most popular and highest value redfish species.

In the period 1984-90 landings of *S. marinus* were at a level of 23,000–30,000 t. In the period 1991-1999 the landinges were around 17,000 t but since then they have decreased and in 2002 landings were only around 10,000 t. EU landings reached 154 t. in 2002.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock.

No explicit management objectives have been established for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been established for this stock

STOCK STATUS: It has not been possible to assess the status of this stock with respect to safe biological limits. However, the current assessment raises great concern about the stock. Concerns are expressed about the low number of pre-recruit size groups in all the recent surveys suggesting that future recruitment to the fishery may be poor. Data from both the scientific surveys and commercial CPUE also show a substantial reduction in fishable biomass.

RECENT MANAGEMENT ADVICE: ICES recommends a continuation of the measures introduced in 2003, i.e. that there be no directed trawl fishery on this stock and that the area closures and low by-

catch limits should be retained until a significant increase in spawning stock biomass (and a subsequent increase in number of juveniles) has been detected in surveys.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.83. Redfish in Sub-areas V, VI, XII and XIV

In ICES sub-areas V, VI, XII and XIV there are at least 3 species of redfish: *S. marinus, S. mentella and S. viviparus*. The latter, *S. viviparus*, for which there is a small fishery in Va, has only been of minor commercial value.

One stock of S. marinus exists in the area of East Greenland - Iceland -Faroes. Large redfish, *S. marinus* type named "Giant", have been recorded and fished in different areas of. Within the entire *S. marinus* distribution area including the Reykjanes Ridge, there may be a genetically distinct component, "giant" *S. marinus*, with a different depth distribution than the typical *S. marinus*.

The stock structure of *S. mentella* is complex and uncertain, but there are indications that there may be at least "oceanic", "pelagic deep-sea", and "deep-sea" stocks or stock components. Both the "oceanic" and "pelagic deep-sea" forms in the Irminger Sea are sometimes referred to as pelagic redfish, to differentiate them from the redfish associated with the slope and shelf areas. Thus the redfish fisheries in Subareas V, XII, and XIV operate on several stocks.

2.83.1. Redfish (Sebastes marinus) in Sub-areas V, VI, XII and XIV

FISHERIES: *S. marinus* are mainly taken by trawlers in depths down to 500 m. In Division Va, the catch is mainly taken by Icelandic trawlers while in Division Vb, Faroese trawlers predominate. In Sub-area XIV, the catches are mainly a by-catch in shrimp fisheries. Total catches decreased almost continuously from 1983-1996 but have increased slightly since then. The decline occurred in all sub-areas. In order to reduce the catches of *S. marinus* in Division Va, an area closure was imposed in 1994 and the quotas have been reduced in recent years.

The total catch of *S. marinus* in Divisions Va and Vb and in the Sub-areas VI and XIV has decreased from about 130,000 t in 1982 to about 37,000 t in 2001. In 2002 total landings amounted to 51,000 t . This increase was due to a joint quota for *S. marinus* and *S. mentella* on the shelf, and within this quota an increased proportion is *S. marinus*. In recent years more than 90% of total catches are taken in Sub-area Va.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: ICES suggest that the relative state of the stock can be assessed through survey CPUE index series (U), which imply a maximum, U_{max}, as well as the present state. Given these data, the following reference points are proposed. U_{lim} = 20% of highest observed survey index. U_{pa} be set at 60% of highest observed survey index.

STOCK STATUS: The stock is considered to be outside safe biological limits. In Div. Va The Icelandic survey indicates, that the stock is around the precautionary value, U_{pa}. In Sub-area XIV the German

groundfish survey has shown an almost continuous decrease in biomass indices by more than 90% in the period 1986-2001, but there are signs of recovery in 2002. *S. marinus* in sub-area IV (East-Greenland waters) has been nearly depleted in the last decade. In Division Vb catches have declined since 1985 to a low level in recent years.

RECENT MANAGEMENT ADVICE: Advice on management: ICES advises that effort should be reduced by 25%, corresponding to catches in 2004 not exceeding a total of 37 400 t in ICES Divisions Va and Vb. In order to rebuild the stock further in the near future fishing effort should be kept low to secure that fishery will not expand on the incoming 1990 year class. TAC or effort allocated to demersal redfish fishery should be given separately for each of the redfish stocks. As the fishable stock of *S. marinus* in Subarea XIV is depleted, ICES advises that there be no direct fishery for *S. marinus* in that Subarea.

STECF COMMENTS: STECF agrees with the advice of ICES.

2.83.2. Deep-sea Redfish (Sebastes mentella) on the continental shelf in Sub-areas V, VI and XIV

FISHERIES: In Division Va, deep-sea *S. mentella* are taken mainly by Icelandic trawlers in depths greater than 500 m. In Division Vb, the fishery is carried out mainly by Faroese trawlers though some by-catch is taken by other countries fishing demersal species. In Sub-area XIV, the catch is taken largely by German freezer trawlers. Total annual catches almost doubled in the early 1990s, but since then have decreased to the level of the 1980s. The increase was mainly caused by an increase in Division Va, both in the demersal and a temporarily-developed pelagic fishery, and also by an increase in Sub-area XIV in 1993–1994. There were substantial catches of small redfish in Sub-area XIV in 1993–1994, and the number of small redfish discarded in the shrimp fishery is still expected to be very high.

Since 1978 total annual landings of deep-sea *S. mentella* from Divisions Va and Vb and Sub-areas VI and XIV have varied from a low of 17,000 t to a high of 83,000 t. In 2002 landings were around 24,000 t. In recent years the majority of landings are taken in Sub-divs. Va & Vb.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The maximum index in the CPUE series from the Icelandic commercial bottom trawl fishery is set as U_{max}. $U_{pa}= U_{max}/2$. $U_{lim}=U_{max}/5$. No precautionary reference points for fishing mortality or biomass have been proposed for redfish in this area.

STOCK STATUS: The stock as whole is considered to be inside safe biological limits although status varies among regions. All CPUE indices as well as the production model show a substantial reduction from a high in the late 1980s, but from the mid-1990s the CPUE index from the Icelandic bottom fishery has remained relatively stable, slightly above $\mathbf{U}_{pa}$. Since 1994, total catches have declined by over 70. The catch in 2001 and 2002 were the lowest annual catch since 1979. Some of the decline is due to catch restrictions, which have substantially reduced effort since 1994.

RECENT MANAGEMENT ADVICE: ICES advises that the effort should be kept low and no higher than the recent average. Accordingly, the catch in 2004 from the total stock should be less than 26 000 t. TAC or effort allocated to demersal redfish fishery in Div. Va should be given separately for each of

the redfish stocks. As the fishable stock of *S. mentella* in Subarea XIV is depleted ICES advises that there should be no direct fishery for *S. mentella* in that Subarea.

STECF COMMENTS: STECF agrees with the advice of ICES.

2.83.3. Oceanic redfish (Sebastes mentella) in area Va, XII and XIV

FISHERIES: The pelagic fishery in the Irminger Sea is conducted only on the mature part (approximately 95% mature) of the stock. Russian trawlers started fishing pelagic S. mentella in 1982. Vessels from Bulgaria, the former GDR and Poland joined those from Russia in 1984. Total catches increased from 60 600 t in 1982 to 105 000 t. in 1986. Since 1987, the total landings decreased to a minimum in 1991 of 28 000 t. The main reason for this decrease was a reduction in fishing effort, especially by the Russian fleet. The increase in the catches from 1991–1996 is a direct consequence of increased fishing effort due to new fleets entering the fishery. Total catches reached a historical high of 180 000 t in 1996. However, the catches have been lower during the last 6 years; at the same time the fishery has expanded into deeper waters. In 2001 and 2002, the WG estimate of the catch has been around 130 000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The 2001 trawl-acoustic survey on pelagic redfish (*S. mentella*) in the Irminger Sea and adjacent waters was carried out by Germany, Iceland, Russia and Norway in June/July and the CPUE series for Bulgarian, German, Icelandic, Norwegian, Russian, and Spanish fleets are the source of management.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for redfish in Va, XII and XIV.

STOCK STATUS: The stock structure of deep-sea redfish *S. mentella* in Sub-area XII, Division Va and Sub-area XIV and NAFO Convention Area remains generally uncertain. The state of the stock is not precisely known. There are indications from acoustic surveys that the stock may have been larger in the early 1990s. Although variable, CPUE series from the commercial fisheries on both redfish types indicate no trend in the stocks since 1995. Biomass estimates from a survey in 2001 suggest a biomass in the order of 2 million tonnes, but this estimate is highly uncertain. Therefore it is not known, if the current exploitation rate is above or below the 5% exploitation rate considered sustainable.

RECENT MANAGEMENT ADVICE: The recent exploitation level seems not to have caused stock size reduction. For 2004, ICES advises that TACs do not exceed current catch levels (including the NAFO Convention Area). The average catch in the period 1997-2001 has been approximately 120 000 tonnes. In addition, ICES advises that management action should be taken to prevent a disproportional exploitation rate of any one component.

STECF COMMENTS: STECF agrees with the advice of ICES.

2.84. (*Pollachius virens*) in Div´s IIa (EU zone), IIIa, Sub-areas IV (North Sea) and VI (West of Scotland).

FISHERIES: In the North Sea and sub-area VI, saithe are primarily taken in a directed shelf-edge trawl fishery, and are also taken as part of the mixed roundfish fishery. The stock is exploited by nations including Norway, France, Germany, the UK, Ireland, Spain and Denmark. Over 1989-2001, at a continuous downtrend reported landings have varied between 94,000t and 309,000t. In 2002 landings were 122,000 t.. The stock is managed by TAC. Separate TACs are set for Saithe in IIa, IIIa, North Sea combined (Sub-area IV) and Sub-area VI.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.40, B_{pa} = 200,000t. In 1999, a long-term management plan for saithe in IIa (EU zone, IIIa-d, North Sea and VI has been agreed between the EU and Norway. The plan shall consists of the following elements:

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 106,000 tonnes (B_{lim}).

2. For 2000 and subsequent years the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of 0.40 for appropriate age groups as defined by ICES.

3. Should the SSB fall below a reference point of 200,000 tonnes (B_{pa}), the fishing mortality rate referred to under paragraph 2, shall be adapted in the light of scientific estimates of the conditions then prevailing. Such adaptation shall ensure a safe and rapid recovery of SSB to a level in excess of 200,000 tonnes.

4. The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.

STOCK STATUS: The stock is within safe biological limits. Fishing mortality has declined from 1986 to 2001, and is estimated below F_{pa} in 2002. SSB has remained near or below B_{pa} since 1984, but has increased in the late 1990s and is estimated to be above B_{pa} since 1999.

RECENT MANAGEMENT ADVICE: The ICES advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1. ICES advises that fishing mortality in 2004 should be less than Fpa corresponding to landings in 2004 of less than 232,000 t.

STECF COMMENTS: STECF notes that although saithe is assessed together in area IV and VI, TACs are set separately for areas IV and VI. Saithe in the North Sea are mainly taken in a directed trawl fishery. STECF therefore considers the management advice for saithe in the North Sea to be compatible with the advice for North Sea cod provided the fishery for saithe can be shown to comply with the advice from ICES on fisheries with an incidental catch of cod.

The fishery in Subarea VI consists largely of a directed deep-water fishery operating on the shelf edge but includes a mixed fishery operating on the shelf. Therefore STECF considers the management advice for saithe in area VI must take into account the management adopted for area VI cod.

2.85. Saithe (*Pollachius virens*) in Div´s IVb (EU zone), VI, XI and XIV

Saithe in area VI has previously been assessed as a separate stock. This component has now been combined with saithe in the North Sea (Sub-area IV) and saithe in Skagerrak and Kattegat (Division IIIa). See section 2.84 of this report.

2.86. Saithe (Pollachius virens) in Div´s VII, VIII, IX, X

STECF did not have access to any stock assessment information on saithe in this area.

2.87. Saithe (*Pollacius virens*) in the North East Arctic (Sub-areas I and II)

FISHERIES: Since the early 1960s, the fishery has been dominated by purse seine and trawl fisheries, with a traditional gill net fishery for spawning saithe as the third major component.

Landings of saithe were highest in 1970-1976 with an average of 238,000 t and a maximum of 265,000 t in 1970. This period was followed by a sharp decline to a level of about 160,000 t in the years 1978-1984. Another decline followed and from 1985 to 1991, the landings ranged from 67,000-122,000 t. An increasing trend was seen after 1990 to 171,498 t in 1996. Since then the annual landings have been 134,000-154,000 t. Estimated total landings in 2002 were about 156,000 t. EU landings reached about 4.400 t in 2002.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock.

The advice is based on an analytical assessment using data from catch at age, an acoustic survey and CPUE from two commercial fleets. There are no explicit management objectives for this stock. For management objectives to meet precautionary criteria, their aim should be to reduce or maintain fishing mortality below F_{pa} and to increase or maintain spawning stock biomass above B_{pa}.

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality proposed by ICES are B_{pa} = 150,000 t, F_{pa} = 0.26.

STOCK STATUS: The stock is within safe biological limits. Fishing mortality in 2001 is below F_{pa} and SSB in 2002 is well above B_{pa}. After a long period of low stock size, the stock recovered during the 1990s with the recruitment of several above-average year classes. The exploitation pattern has shifted to the older ages due in part to the increase in minimum landing size (1999).

RECENT MANAGEMENT ADVICE: ICES advises that fishing mortality should be below F_{pa}, corresponding to a catch in 2004 of less than 186 000 t.

Based on the TAC set and estimates of catches for other gears, quotas are set for purse seine and trawl fisheries. In the Norwegian fishery, quotas may be transferred. In addition to quotas, the fisheries are managed by minimum mesh size limitations, minimum landing size, by-catch regulations and area closures. In 1999 the minimum landing size was increased.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.88. Salmon (*Salmo salar*) in the Baltic Sea, Div. IIIb,c,d (Main Basin and Gulf of Bothnia, Sub.div. 22-31)

FISHERIES: The salmon fishery in the Baltic is based both on reared and wild fish. In latest few years, the proportion of wild fish has increased to 30 - 50 % of the catch. These estimates are based on genetic stock composition analysis and scale readings. In the current situation, the proportion of wild salmon is economically important for the fishery. All the Baltic countries participate in the salmon fishery. The total landings have, for the last 10 years, varied between 390,000 and 131,000 specimens with a decreasing trend for the last five years. The nominal catches in 2002 (395,000 specimens) is one of the lowest since 1972, even though the total releases are high and smolt production of wild rivers has increased. Decreased catches since the mid 1990s are largely explained by TAC restrictions, strong regulations in costal fisheries, reduced survival rates of reared salmon, and poor market prices. Non-reported catches and discards are estimated to be about 20% of the reported landings. About 70% of discards are caused by seal damage. These loses are not included in the TAC.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: A provisional value for F_{pa} has been proposed, F_{pa} = 0.30. ICES is still working on developing the PA reference points further.

STOCK STATUS: The status of the wild stock as a whole, although improved, remains uncertain because the survival of smolt to adult is unknown. Based on the most recent estimates of smolt production ICES still classifies the weakest wild stocks as being outside safe biological limits.

MANAGEMENT AGREEMENTS: IBSFC objective is "to increase the natural production of wild Baltic salmon to at least 50% the natural production capacity of each river by 2010, while retaining the catch level as high as possible." In addition, IBSFC states that the genetic diversity should be maintained.

RECENT MANAGEMENT ADVICE: ICES advises that the national and international measures in place in 1997-2001, with the TAC for 2003 of 410 000 salmon, be continued. ICES further advises that the exploitation close to the river mouths and in rivers should be closely monitored and kept sufficiently low to allow the number of spawning fish to increase.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that the management objectives lead to a need of stock specific assessments that can be carried out by models utilising genetic stock identification results and river specific smolt estimates. STECF further notes, that a TAC

of 460 000 fish in numbers for 2004 was agreed by IBSFC at the same level than in 2003 at its meeting in Sept. 2003.

2.89. Salmon (*Salmo salar*) in the Baltic Sea, Gulf of Finland (Sub. div. 32)

FISHERIES: The salmon fishery in the Gulf of Finland is mainly based on reared fish. In recent years reared fish would have constituted 96 and 99% of the catch, if the estimates of smolt production of reared and wild fish are valid indicators of recruitment to the fisheries. Estonia, Finland and Russia are participating in the salmon fishery. Salmon catches in the area are low, and although commercial effort is low there is substantial (but poorly quantified) effort and catches by recreational fishers. Since 1996 the landings decreased continuously. In 1996 the landings still amounted to about 80,000 specimens, but on the other hand in 2002 the landings only amounted to 31,000 specimens.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The IBSFC objective is "to increase the natural production of wild Baltic salmon to at least 50% of the best estimate potential and within safe genetic limits, in order to achieve a better balance between wild and reared salmon

PRECAUTIONARY REFERENCE POINTS: Not established.

STOCK STATUS: The current abundance is poorly quantified, and cannot be evaluated relative to safe biological limits, because reference points have not been established. However, the condition of wild stocks is poor. Parr densities are very low in many rivers carrying wild salmon populations. Therefore ICES considers, that the wild stocks are outside safe biological limits.

MANAGEMENT AGREEMENTS: IBSFC objective is "to increase the natural production of wild Baltic salmon to at least 50% the natural production capacity of each river by 2010, while retaining the catch level as high as possible." In addition, IBSFC states that the genetic diversity should be maintained.

RECENT MANAGEMENT ADVICE: ICES recommends that, in the light of the precarious state of wild stocks in the Gulf of Finland and the very low wild smolt production in 2002, fisheries should only be permitted at sites where there is virtually no chance of taking wild salmon along with reared salmon. It is particularly urgent that national conservation programmes to protect wild salmon be enforced around the Gulf of Finland.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that the management objectives lead to a need of stock specific assessments that can be carried out by models utilising genetic stock identification results and river specific smolt estimates.

2.90. Sandeel (*Ammodytidae*) in the North Sea (IV)

FISHERIES: Sandeel is taken by trawlers using small mesh gear. The fishery is seasonal, taking place mainly in the 2 and 3 quarter. Most of the catch consists of *Ammodytes marinus* and there is little by-

catch of protected species. Sandeels are largely stationary after settlement and the North Sea sandeel must be considered as a complex of local populations.

The stock is exploited predominantly by Denmark and Norway, with minor landings for the UK and the Faroes. Landings fluctuated between 300,000 and 1,100,000 t (1971-1998) and are very dependent on year class strength. The EU fleet landings have been around 550,000t in 1999 and 2000 and have increased in 2001 and 2002 to around 650,000t. However, 2003 has seen a dramatic decline in the fishery, probably due to an extremely weak 2002 year class.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on a seasonal age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary biomass reference point is $\mathbf{B}_{pa}$ = 600,000t. No precautionary fishing mortality reference point has been proposed.

STOCK STATUS: The state of the stock is uncertain. The 2001 year class still appears to be abundant and the 2002 year class is estimated to be extremely weak. Provisional estimates indicate that SSB in 2002 was below **B**lim. However, the stock is believed to have increased to above **B**pa in 2003. No fishing mortality reference points have been set for this stock. The 2002 year class was extremely weak.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1. ICES is unable to provide predictions that can be used for TAC setting for 2004. The fishery should therefore be managed through effort and capacity control.

The 2002 year class is weak which means that SSB in 2004 will be low. The exploitation at the beginning of the 2004 sandeel season should be kept below the exploitation in 2003. This restriction should apply until the strength of the incoming year class has been evaluated, at which time appropriate adjustment in management can be advised.

Local depletion of sandeel aggregations by fisheries should be prevented, particularly in areas where predators congregate.

STECF COMMENTS:STECF agrees in general with the advice from ICES. STECF also recommends that in order to implement appropriate and effective management proposals in 2004, in accordance with the intentions of the ICES advice for 2004, an appropriate ('ad hoc') harvest control rule (decision rule) which takes into account information from the fishery in 2004, must be agreed **before** the start of the fishery in the spring 2004. Such a decision rule should be established in consultation with appropriate fishery experts.

2.91. Rays and Skates in the North Sea

Stock summaries for skates and rays in the North Sea are given in Section 14.1.11

2.92. Sole (Solea solea) in Sub-area IV (North Sea)

FISHERIES: Sole is mainly taken by beam trawl fleets in a mixed fishery for sole and plaice in the southern part of the North Sea. A relatively small part of the catch is taken in a directed fishery by gill-netters in coastal areas, mostly in the 2nd quarter of the year. The stock is exploited predominantly by The Netherlands with smaller landings taken by Belgium, Denmark, France, Germany and the UK. Landings have fluctuated between 14,000 and 31,000 t (1987-2001). The landings in 2002 are around 17,000t, the same level as the TAC.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.40, B_{pa} = 35,000t.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. SSB in 2003 is below Bpa, and fishing mortality in 2002 remains above Fpa. The spawning stock reached an historic low in 1998, below Blim. It increased sharply following recruitment of the strong 1996 year class. The 2001 year class is above average.

ICES notes that the peaks in SSB of this stock are heavily dependent on the occasional occurrence of strong year classes. The SSB and landings in the recent years have been dominated by the 1996 year class. Due to the above average recruitment of the 2001 year class, the stock is expected to increase above B_{pa} in 2004.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1

For the stock specific advice, ICES recommends that fishing mortality on North Sea sole be less than Fpa = 0.4, corresponding to landings of less than 17,900 t in 2004. This implies a reduction in fishing mortality of at least 17%. Management of fisheries taking sole must respect the stringent restrictions on the catch and discard rates advised for cod, with effective monitoring of compliance with those restrictions.

A fishermen survey has been carried out by the North Sea Fiseries Partnership. ICES notes that the results of the fishermen survey could be consistent with the results of the assessment for this stock, although absolute estimates of abundance cannot be derived from the survey, which is comparing this year with last year's catch rates.

The minimum mesh size (80mm) in the mixed beam trawl fishery in the southern North Sea means that large numbers of (undersized) plaice are discarded. Measures to reduce discarding in the mixed beam trawl fishery would greatly benefit the plaice stock and future yields.

STECF COMMENTS: STECF agrees with the advice for North Sea sole. STECF notes that as sole are caught in a mixed fishery, mainly with plaice, the management measures for sole should take into account management measures adopted for other species like plaice and especially North Sea cod for which stringent management is advised.

STECF agrees with ICES that reduction of discards would benefit the plaice stock and future yields from sole and plaice.

STECF notes that although the ICES advice is similar to last year (reduce F to less than F_{pa}) the proposed exploitation has increased due to a relatively strong 2001 yearclass.

2.93. Sole (*Solea solea*) in Division IIIa

FISHERIES: The fishery is mainly conducted by Denmark, with smaller landings taken by Germany and Sweden. Significant amounts of sole are taken as by-catch in the fishery for *Nephrops*. Landings fluctuated between 200 t and 1,400 t (1971-1999). From 1987-2001 the catches did not exceed the TAC except for 1990. In 2002 the catch was around 10% higher than the TAC of 0,500t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.30, B_{pa} = 1,060 t.

STOCK STATUS: Based on the most recent estimate of fishing mortality and SSB ICES classifies the stock as being harvested outside safe biological limits. SSB is estimated well above B_{pa}in 2003. SSB was exceptionally high in the period 1992–1996 due to strong recruitment in the period 1989–1993. The recruitment was above average in 2002, but has mostly been well below average during 1994-2001.

RECENT MANAGEMENT ADVICE: ICES recommends that current fishing mortality should be reduced to below $F_{pa,}$ corresponding to landings in 2004 of less than 475t. The stock supported catches at 250-450t for 35 years, prior to the occurrence of strong recruitments in the period of 1989 to 1993. These recruitments led to large increases in SSB and yield. During 1994-2001, recruitment has been below long-term average, but in 2002 was above average.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that ICES suggests, like last year, that fishing mortality should be reduced to below F_{pa} For 2003 the corresponding landings were 275t, for 2004 the corresponding advice is 475t. This increase is mainly based on the strong 2000 year class which has entered the fishery and is expected to mature in 2004.

2.94. Sole (*Solea solea*) - Vb (EU zone), VI, XII, XIV

STECF did not have access to any stock assessment information on sole in this area.

2.95. Sole (*Solea solea*) in Division VIIa (Irish Sea)

FISHERY: Sole are taken mainly in a beam trawl fishery that commenced in the 1960s and are also taken as a by-catch in the longer established otter trawl fisheries. Effort in the Belgian beam trawl fleet increased in the late 1980s as vessels normally operating in the North Sea were attracted into the Irish Sea by better fishing opportunities. In recent years, however, catch rates of sole have been low in the Irish Sea, and part of the beam trawl fleet has moved to other sole fishing grounds. Over the last 30 years, the total landings have been in the order of 1,000 t to 2,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment which uses commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.30, B_{pa} = 3,800 t.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. The SSB in 2002 was above and SSB in 2003 is now below Bpa and fishing mortality in the last three years has been above or at Fpa. Fishing mortality varied around Flim from 1970 to 1998. SSB has recently increased from the historic low in 1997 to about Bpa. The 2000 year class is estimated to be the lowest on record.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.3.

For the stock specific advice, ICES recommended that fishing mortality in 2004 should be reduced by 10% corresponding to landings of 790t in 2004. This will allow SSB to increase above B_{pa} in the short term.

STECF COMMENTS: STECF agrees with the assessment for VIIa sole. The fisheries targetting sole take a bycatch of cod and other species. Hence the management measures for VIIa sole should take into account the management measures adopted for other species, especially cod and whiting for which stringent management is advised. STECF notes that unlike last year, this stock is harvested outside safe biological limits, mainly due to the 2000 year class which is the lowest on record.

2.96. Sole (*Solea solea*) - VIIbc

FISHERIES: Ireland is the major participant in this fishery with 96% of the international landings between 1993-2001. Sole are normally caught in mixed species otter trawl fisheries in Division VIIb. These vessels mainly target other demersal fish species and *Nephrops*.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: The state of the stock in relation to biological reference points is not known. Catches have been relatively stable in recent years.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES recommends that catches in 2004 be no more than the recent average (2000-2002) of around 65 t, in order to avoid an expansion of the fishery until there is more information to facilitate an adequate assessment.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.97. Sole (*Solea solea*) in Division VIId (Eastern English Channel)

FISHERIES: The main fleets, fishing for sole in Division VIId, are Belgian and English offshore beam trawlers (> 300 HP), which take plaice as a by-catch. These fleets also operate in other management areas. French offshore trawlers targeting roundfish also take sole as a by-catch. Also numerous inshore < 10 m boats on the English and French coasts target sole in the spring and autumn mainly using fixed nets. Between 1986–2002 the total landings have been fluctuating around 4,500t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessments, using catch-at-age and CPUE data from commercial fleets and surveys are considered uncertain due to under-reporting from the inshore fleet and mis-reporting by beam trawlers.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.40, B_{pa} = 8,000t.

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock as being inside safe biological limits. The SSB in 2003 is above Bpa, and the fishing mortality in 2002 was below Fpa. Recent recruitment has been strong. In the past the performance of the assessment has been poor. The fishing mortality for 2001 has been revised upwards by 31% and SSB has been revised downwards by 17%. This is considered to be an expression of the uncertainty of the assessment and may be substantially influenced by under- and mis-reporting. Due to recent large recruitments, SSB is expected to remain above B_{pa} in the short-term, provided that the fishing mortality does not exceed F_{pa}.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.1.

For the stock specific advice, ICES recommends that the fishing mortality be less than Fpa = 0.4, corresponding to landings of less than 5,900 t in 2004.

STECF COMMENTS: STECF agrees with the advice for VIId sole.. As sole are caught in a mixed fishery, the management measures for sole should take into account management measures adopted for other species, especially North Sea cod for which stringent management is advised. Also, the 80mm mesh size in the mixed beam trawl fishery is not matched to the minimum landing size of plaice.

Measures to reduces discarding in the sole fishery would greatly benefit the plaice stock and future yields.

2.98. Sole (*Solea solea*) in Division VIIe (Western English Channel).

FISHERIES: Total landings reached a peak in the early 1980s, initially because of high recruitment in the late 1970s and later because of an increase in exploitation. In recent years, English vessels have accounted for around 60% of the total landings, with France taking approximately a third, and Belgian vessels the remainder. UK landings were low and stable between 1950 and the mid-1970s, but increased rapidly after 1978 due to the replacement of otter trawlers by beam trawlers. The principal gears used are otter-trawls and beam-trawls, and sole tends to be the target species of an offshore beam-trawl fleet, which is concentrated off the south Cornish coast and also catches plaice and anglerfish. The total landings have been stable over 1991-2001 and amounts to around 900 t. The 2002 landings of 1,092t is the highest catch since 1990.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessment based on landings, survey and commercial CPUE data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.20, B_{pa} = 2,800t.

STOCK STATUS: Like last year, the stock is outside safe biological limits. SSB has declined since 1980 and has been estimated to be at its historic lowest level in 2003 (1,917t), well below **B**pa. Fishing mortality has been above $\mathbf{F}_{lim}$ since 1982, reaching the highest F on record in 2002. . Since 1990 most year classes have been below average.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES continues to recommend that a recovery plan which ensures a safe and rapid rebuilding of SSB to levels above Bpa be implemented. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above Blim or other strong evidence of recovery is observed. In 2004 such a recovery plan would imply zero catch.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that immature fish represent around 30% (in numbers) of the landings in this fishery, but possibly a greater proportion of the catch due to high grading. An improved selection pattern, in conjunction with a reduction in effort would considerably improve the status of the stock. STECF notes that the advice for an effective reduction in fishing mortality is consistent with the advice for plaice and cod in division VIIe.

2.99. Sole (*Solea solea*) in Divisions VIIf,g (Celtic Sea)

FISHERIES: Sole are taken mainly in a beam-trawl fishery that commenced in the early 1960s and, to a lesser extent, in the longer established otter-trawl fisheries. In the 1970s, Belgian beam trawlers and Belgian and UK otter trawlers mainly carried out the fishery. The use of beam-trawls (to target sole and plaice) increased during the mid-1970s. The fisheries for sole in the Celtic Sea and Bristol Channel

involve vessels from Belgium, taking around 60%, the UK around 20%, France around 5% and Ireland also around 5% of the total landings. The sole fishery is concentrated on the north Cornish coast off Trevose Head and around Lands End, and reported landings have generally declined since the mid 1980s, up to 1998 and increased since then.The 2002 landings are the highest since 1986.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based analytical assessment using catch-per-unit effort data from two commercial fleets and one survey.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.37, proposed B_{pa} = 2,200 t.

STOCK STATUS: Based on the most recent estimates of fishing mortality and SSB, ICES classifies the stock as being harvested outside safe biological limits. Fishing mortality has increased since the late 1970s, exceeding Fpa since the early 1980s, and in 2002 was above Flim. SSB has declined steadily since the early 1970s. SSB fell below Bpa in 1989, remained around that level until 1995, then fell again to a series low in 1998. SSB remained low until 2001, when the outstanding 1998 year class began to contribute and SSB increased above Bpa. SSB is forecast to remain around the 2002 level in 2003-2004. Recruitment has fluctuated with some peaks: the 1970, 1989 and 1999 year classes were strong, and the 1998 year class the strongest in the series.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES recommends that the fishing mortality should be reduced to below Fpa, in order to maintian SSB above B_{pa} in the short-term. This reduction of current F by 25% from *status quo* F corresponds to landings of less than 1000t in 2004.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes plaice and sole are exploited in the same fishery and the status of plaice is such that a reduction in fishing mortality of 80% in indicated. Therefore tha status of the plaice stock determines the management of Sole.

2.100. Sole (*Solea solea*) – VIIhjk

FISHERIES: Sole are predominantly caught within mixed species otter trawl fisheries in Division VIIj. These vessels target mainly hake, anglerfish, and megrim. Beam trawlers and seiners generally take a lesser catch of sole. Ireland is the major participant in this fishery with around 50% of the international landings between 1993-2001. The catches in 2002 are around 30% higher than the landings in 1999-2001, which were the lowest on a short time serie.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: The state of the stock is not known in relation to biological reference points. Catches increased in 2002 compared to the years 1999-2001.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

For the stock specific advice, ICES recommends that catches in 2004 be no more than the recent average (2000-2002) of around 360 t, in order to avoid an expansion of the fishery until there is more information to facilitate an adequate assessment.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that over the last years the TAC was not fished.

2.101. Sole (*Solea solea*) in Divisions VIIIa,b (Bay of Biscay)

FISHERIES: Since 1984, catches of sole by French small-mesh shrimp trawlers decreased markedly, and the gill-net and trammel-net fishery has expanded and now accounts for 59% of the French landings. Landings by Belgium beam trawlers increased rapidly in the late 1980s and since 1991 have been relatively constant at 8% of the total. For the last 15 years the total landings have varied from 4,000 t to 7,400 t. The catches reach 5,400t in 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based analytical assessment based on landings, available discard information and CPUE data series from 1984-2002.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.36, B_{pa} = 13,000 t.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. At the high fishing mortality that has been maintained since 1992, the SSB has declined continuously. Fishing mortality has generally increased since 1984 and has been above Flim since 1997. SSB has fluctuated around 15 000 t up to 1995, but has decreased since then to around 10 000 t. Since 1992 recruitment has been at a lower, but stable level.

RECENT MANAGEMENT ADVICE: The advice on the exploitation of this stock is presented in the context of mixed fisheries as described in section 16.4

For the stock specific advice, ICES recommends a recovery plan that will ensure a safe and rapid recovery of SSB to a level in excess of Bpa. Rebuilding the stock in the short term requires the fishing mortality should be reduced by at least 65% to below 0.2 in 2004. This corresponds to a catch of less than 2,000t be caught in 2004.

Setting the TAC at a low level may reduce the fishing mortality, but past experience has shown that it is very difficult to control fishin mortality by TAC's alone. ICES recommends that in addition to a TAC, restrictions in effort of fleets exploiting sole should be implemented. Large closed areas and seasons may contribute to stock recovery, but only if accompanied by major reductions in effort. The stock of sole might benefit from the effort measures taken for the rebuilding of the hake stocks.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF agrees that major reductions in effort are necessary to recovery of the stock. STECF notes that although the selection pattern has improved due to the development in the gillnet fishery, fishing mortality is still too high.

2.102. Sole (*Solea* spp.) - VIIIcde, IX, X

STECF did not have access to any stock assessment information on sole in this area.

2.103. Sprat (*Sprattus sprattus*) in IIa and the North Sea.

FISHERIES: Denmark, Norway and UK exploit the sprat in this area. The fishery is carried out using trawlers and purse seiners. There are considerable fluctuations in total landings, from a peak in 1975 of 641,000 t to a low in 1986 of around 20,000 t. Estimated total landings in 2002 were around 144 000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No attempt to produce an assessment has been made since the 1980s.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for sprat in IIa and the North Sea.

STOCK STATUS: Sprat is a short-lived species with natural fluctuations in stock biomass. The 2003 survey index (February) indicates that a good 2002 year class is recruiting to the fishery in 2003. The stock appears to be in good condition, as the biomass has increased in recent years.

RECENT MANAGEMENT ADVICE: In the ACFM report of 2003, advice on catches could only be given for 2003 because sprat is a short lived species. Based on the historic relationship between survey indices and catches, the 2003 survey value indicates that a catch of 257 000 t in 2003 would allow SSB to remain stable or increase.

As the sprat fishery has a by-catch of juvenile herring, the exploitation of sprat will in some periods be limited by the restrictions imposed on fisheries catching juvenile herring, particularly if sprat abundance is low. The percentage of herring by-catch has been around 8%. The by-catch of 0- and 1-ringer herring is expected to occur during the third and fourth quarters, given the strength of the incoming year-classes. It is important that herring by-catch restrictions are maintained, as it is anticipated that large year classes of 0- and 1-ring herring in the North Sea may be included in the fishery. In 2003 a high by-catch of 1 ringer herring is expected to occur.

A two-step management process is suggested for a better utilisation of the stock. A provisional TAC could be set for January-March 2004 and revised in April taking into account the most recent survey data.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.104. Sprat (*Sprattus sprattus*) in IIIbcd, Baltic Sea (Sub-div. 22-32)

FISHERIES: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden exploit sprat in the Baltic. During the 1990s total catches increased considerably, from a level of 85,000 t in the 1990 to 530,000 t in 1997. Since then there has been a decrease again. In 2002 total catches amounted to 343,000 t. Trawlers account for most of the catches. The increase in catches since

1992 is due to the development of an industrial pelagic fishery. Varying amounts of herring are taken in the fisheries for sprat. The catches from this fishery consist mainly of sprat (about 70%) and herring.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on analysis of catch at age data calibrated with acoustic survey data.

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality have been set at $\mathbf{B}_{pa}$ = 275,000 t, $\mathbf{F}_{pa}$ = 0.40.

STOCK STATUS: The stock is within safe biological limits. SSB increased until 1996, but has since 1997 decreased to about 1.2 mill t in 2003, which is above the long-term average. In the most recent years the estimated fishing mortality (around 0.4) have doubled compared to the values of the early 1990s. The estimated F for 2002 was above $\mathbf{F}_{pa}$. The 1999 year class is estimated to be very strong, whereas the 2000 year class is estimated to be below average. The 2001 year class is predicted to be above average.

RECENT MANAGEMENT ADVICE: ICES recommends that the fishing mortality in 2003 should remain below F_{pa} corresponding to catches less than 474 000 t. Most sprat is taken in mixed pelagic fisheries together with herring. ICES classifies the Central Baltic herring stock as being outside safe biological limits and the management of this herring stock is therefore the overriding concern.

STECF COMMENTS: STECF agrees with the advice on the exploitation of Baltic sprat. However, STECF notes that the proposed TAC of 474000 t (recommended TAC 2004 by IBSFC 420 000 t) implies an increase of around 30% in effort on sprat to take the TAC. The fishery directed to sprat are known to have a by catch of young herring which has been estimated at up to 35% by weight. Such a by catch would result in addition mortality on youg herring over and above that required to catch the herring TAC. This is clearly undesirable. STECF, therefore stresses the necessity of more efficient monitoring of the sprat fishery regarding by-catch of herring.

2.105. Sprat (*Sprattus sprattus*) in the Skagerrak and the Kattegat (IIIa).

FISHERIES: The fisheries are carried out by Denmark and Sweden using trawlers and along the Swedish coast by small purse seiners. For the last 15 years the annual landings have been in the order of 10,000 to 20,000 t except for 1994 and 1995 when the landings were 96,000 t and 56,000 t respectively. In 2002 landings were around 20,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. There have been no recent attempts to undertake an assessment in recent years.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for sprat in Division IIIa.

STOCK STATUS: The state of the stock is unknown. Sprat in this area is short-lived with large annual fluctuations in stock biomass.

RECENT MANAGEMENT ADVICE: As sprat is mainly fished together with juvenile herring the exploitation of sprat will be limited by the restrictions imposed on fisheries for juvenile herring. With the current management regime, where there are by-catch ceilings of herring as well as by-catch percentage limits, the sprat fishery is controlled by these factors.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.106. Sprat (*Sprattus sprattus*) in Divisions VIId,e.

FISHERIES: Only UK carries out the sprat fishery in these areas. For the last 10 years the annual landings have been in the order of 1,200 to 5,400 t. Landings have decreased since 1999.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No recent attempts to produce an assessment have been made.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for sprat in Divisions VIId,e.

STOCK STATUS: The state of the stock is unknown. Sprat is a short-lived species with natural fluctuations in stock biomass.

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: No comments

2.107. Turbot (*Psetta maxima*) in the North Sea

STECF did not have access to any stock assessment information on turbot in this area.

2.108. Whiting (*Merlangius merlangus*) IIa(EU zone), North Sea

FISHERIES: Whiting are taken as part of a mixed roundfish fishery, as well as a by-catch in fisheries for *Nephrops* and industrial species. Substantial quantities are discarded. Historically total catches have varied considerably ranging between 43 000 and 218 000 t. The 1998 catch was the lowest since 1960, but catches increased slightly to 60,000 t in 2000. They decreased to 40,000 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using catch-at-age data from landings, discards and industrial by-catch, as well as survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.65, B_{pa} = 315,000t.

STOCK STATUS: The state of the stock is uncertain. A provisional assessment indicates that the SSB may have declined over the last 20 years, reaching a historic low in 1998, that fishing mortality may have decreased and is below $\mathbf{F}_{pa}$, and that recruitment has been relatively low since 1990, with the

exception of the 1998 year class. Survey data suggests that the stock size has increased in recent years. In a survey conducted amongst fishermen comparing catch rates in 2002 and 2003 the perception of whiting abundance appears to have remained the same, with a possible indication that the abundance has increased.

ICES has previously considered this assessment to be very uncertain due to inconsistent trends in the development of the stock as indicated by (i) conflicts between stock indices, and (ii) the high sensitivity of the catch-at-age analysis to annual updates. In recent years ICES has sought to address this problem by presenting the results of a probabilistic assessment whose error bounds were considered to best encapsulate the overall uncertainty of the assessment. However, even this approach has failed to deal adequately with the high sensitivity of the catch-at-age analysis to the addition of a single year's catch data and, consequently, the assessment is not a reliable basis for the stock status.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries of the North Sea (Section 16.1). The stock specific advice for whiting is that fishing mortality in 2004 should be less than $\mathbf{F}_{pa}$, i.e. that catch should not increase in 2004 compared to recent years.

STECF COMMENTS: STECF agrees with the stock specific advice from ICES that fishing in 2004 should be less than $\mathbf{F}_{pa}$. However, in the absence of a reliable catch forecast, STECF is unable to determine whether this will imply catches at or below the level seen in recent years.

2.109. Whiting (*Merlangius merlangus*), Skagerrak & Kattegat (IIIa)

FISHERIES: The majority of whiting landed from the Skagerrak and Kattegat are taken as by-catch in the small-mesh industrial fisheries. Some are also taken as part of a mixed demersal fishery. As in the North Sea stock, landings in 1997-1999 were near the lowest observed historically in all fleets; nominal landings in 2002 were about 250 t

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for whiting in the Skagerrak and Kattegat.

STOCK STATUS: Based on the available information it was not possible to assess the status of the stock or identify safe biological limits. It is likely that this stock is linked to the North Sea stock for which the assessment is very uncertain, but which is likely to be outside safe biological limits.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries in the Kattegat and Skagerrak (Section 16.1). The stock specific advice for whiting is that landings in 2004 should be less than 1 500 t as a precautionary value to restrict the potential for re-expansion of the fishery and misreporting from other regions.

STECF COMMENTS: STECF agrees with the advice from ICES.

2.110. Whiting (Merlangius merlangus) Vb(EU zone), VI, XII & XIV

FISHERIES: The fishery is restricted to Division VIa where whiting are taken as part of a mixed roundfish fishery, as well as a by-catch in fisheries for *Nephrops.* Scottish trawlers take most of the whiting catch in Division VIa. Since 1976, Scottish heavy trawl and seine effort has declined, whilst that of light trawlers has generally increased. Ireland and France take smaller proportions of the catch and all the remaining catch is taken by EU vessels. Approximately 50% of the total catch in weight is discarded. Since 1987 human consumption landings have declined from about 11,500 t to an historic low of 1 709 t in 2002.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using catch-at-age data from landings and discards, as well as survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = 0.6, B_{pa} = 22,000 t.

STOCK STATUS: The stock remains outside safe biological limits. Fishing mortality has exceeded F_{pa} in all years since 1983, but may have declined in recent years. Spawning stock, which has been in decline since 1981, has exceeded B_{pa} in only two years since 1988 and has been below B_{lim} since 1998. Recruitment since 1993 has been below the long-term average.

RECENT MANAGEMENT ADVICE: ICES' advice on the exploitation of this fish stock is now presented in the context of the mixed fisheries of the West of Scotland (Section 16.2). The stock specific advice for whiting, to bring SSB above $\mathbf{B}_{pa}$ in 2005, is that total fishing mortality in 2004 should be below 0.31, corresponding to human consumption landings of less than 2 100 t. The proportion of fish discarded is very high and appears to have increased in recent years. Measures to reduce discards and to improve the exploitation pattern would be beneficial to the stock and to the fishery. The more widespread use of 110 mm mesh nets in 2002 as well as the requirement to fit square mesh panels to certain towed gears since late 2000, may improve the selection pattern for whiting.

STECF COMMENTS: Whilst, in general, agreeing with the ICES advice for this stock STECF also notes the following:

Whereas an evaluation of the benefit of improvements in selectivity resulting from changes in mesh size will always remain difficult STECF considers that recent regulatory changes in mesh size may be of significant benefit for building the SSB. In the case of this stock these changes may contribute an increase up to about 30% SSB in 2005 if implemented in the most optimistic circumstances (WGNSDS Technical Minutes, ICES/ACFM October 2003). STECF considers that such technical measures (including industry-initiated programs) should become a permanent feature of this fishery.

The specific advice for this stock should be considered in light of additional comments in Section 16.2 that considers Regional Mixed fishery advice for the ICES area.

2.111. Whiting (*Merlangius merlangus*) in VIIa (Irish Sea)

FISHERIES: Whiting is taken mainly as a by-catch in mixed-species otter trawl fisheries for Nephrops, cod, and other demersal species, and to a lesser extent in the pelagic fishery for cod and haddock. Between 60 - 70% of the catch is estimated to be discarded, mainly in the trawl fishery targeting *Nephrops*. From 1989 to 2002, landings declined from 11,300 t to about 300 t. Only EU vessels exploit the stock, with the UK and Ireland accounting for the majority of the landings, with smaller quantities taken by Belgium, France and the Netherlands.

SOURCE OF MANAGEMENT ADVICE:. The advice this year is based on a revised assessment using survey data only for the western Irish Sea where the bulk of thewhiting catch has been taken in recent years. The stock trends provided in last year's provisional assessment is similar to this year's assessment, confirming the present estimate of the stock status.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are Fpa = 0.65, Bpa = 7,000 t.

STOCK STATUS: Based on the most recent estimate of the biomass ICES classifies the stock as being outside safe biological limits. The current assessment indicates that fishing mortality has been around or above Flim since 1985. SSB has declined since 1980 to a very low level, and has been below Blim since 1997. Catches have declined progressively since the early 1980s, but the proportion discarded has increased.

RECENT MANAGEMENT ADVICE: In October 2003, ICES recommended that given the very low stock size, the recent poor recruitments and the continued substantial catch, a recovery plan which ensures a safe and rapid rebuilding of SSB to levels above Bpa should be implemented. Such a recovery plan must include a provision for zero catch until the estimate of SSB is above Blim or other strong evidence of rebuilding is observed. In 2004 such a recovery plan would imply zero catch.

STECF COMMENTS: STECF agrees with the advice from ICES. The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.3.

2.112. Whiting (*Merlangius merlangus*) in VIIb-k

The assessment for this management unit only covers VIIe-k, it does not include whiting from VIIb-c.

FISHERIES: Whiting form part of a mixed demersal fishery in this area. Most are caught using trawls, but there is some targeted fishing using seines in VIIg-j, and whiting are also taken as a by-catch in trawl fisheries for *Nephrops*. From 1988-1999 reported landings from the assessment area have varied between 13,600 t and 22,700 t. Since 1999, the landings declined to around 13,000 t in 2002. All landings have been taken by EU vessels, with France, Ireland and the UK being the major exploiters. Smaller landings have been reported by Belgium, the Netherlands, Germany and Denmark.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is Bpa = 21,000t. No precautionary reference point for fishing mortality has been proposed for whiting in VIIb-k.

STOCK STATUS: Based on the most recent estimate of SSB and fishing mortality ICES classifies the stock as being inside safe biological limits. SSB reached high levels in 1995 and 1996, and has decreased until 1999 but remaining well above Bpa. SSB increased in 2001 as the outstanding 1999 year class matured. The 2000 and 2001 year classes are estimated to have been very weak. Fishing mortality was very high during the 1980s, decreased in the early 1990s and is currently estimated to be around 0.7.

RECENT MANAGEMENT ADVICE: In 2003 ICES advised that fishing mortality should not increase, corresponding to landings of at most 14 000 t in 2004.

STECF COMMENTS: STECF agrees with the advice from ICES. The advice on the exploitation of this stock in 2004 is presented in the context of mixed fisheries and is found in Section 16.4.

2.113. Whiting (Merlangius merlangus) - VIII

STECF did not have access to any stock assessment information on whiting in this area.

2.114. Whiting (Merlangius merlangus) - IX, X

STECF did not have access to any stock assessment information on whiting in this area.

2.115. Witch (Glyptocephalus cynoglossus) in the North Sea

STECF did not have access to any stock assessment information on witch in this area.

3. Other stocks of the North East Atlantic of Community interest

3.1. Deepwater fish (several species) in the Northern North Sea (IVA), IIIa, Vb, VI, VII, VIII, IX, X and XII.

FISHERIES: The term 'deep water' is defined by ICES to include waters of depths greater than 400 m. However, some of the species included as deep water species in the management advice by ICES are also distributed into more shallow waters, e.g. ling and tusk. Other species/stocks, which have similar depth distributions, e.g. anglerfish and Greenland halibut, are already assessed by ICES in area specific assessment working groups.

In ICES Division IVa there is a by-catch of Greater silversmelt in the industrial trawl fishery. A longline fishery targets tusk and ling with forkbeard (*Phycis blennoides*) and grenadier as a bycatch. Some deepwater species are landed as a by-catch in the trawl fisheries targeting anglerfish and Greenland halibut. In ICES Division IIIa there is a targeted trawl fishery for roundnose grenadier and greater silversmelt. Several deep-sea species are also by-catch in, for instance, the trawl fisheries for Northern shrimp.

In sub-area V there are trawl fisheries targeting blue ling, redfish, argentine and orange roughy, which have as by-catch a great number of other deep-sea species. There are also traditional longline fisheries for ling and tusk, and trawl and gill net fisheries for Greenland halibut and anglerfish. In sub-areas VI and VII there are directed fisheries for blue ling, roundnose grenadier, orange roughy, black scabbard and deep-water sharks. In sub-area VIII there is a longline fishery which mainly targets greater forkbeard, and trawl fisheries for hake, megrim, anglerfish and Nephrops which have a by-catch of deep-water species. In sub-area IX there is a directed longline fishery for black scabbardfish with a by-catch of the Portuguese dog-fish and also a artisanal longline fishery for red seabream in the Strait of Gibraltar. In ICES sub-area X, there are handline and longline fisheries near Azores and the main species landed are red seabream, wreckfish, conger eel, bluemouth, golden eye perch and alfonsino. In ICES sub-area XII there is a multi-species bottom trawl fishery on the Hatton bank and the main species landed are roundnose grenadier, smoothhead, blue ling and Portuguese dogfish. In addition, in recent years there is exploratory fishing on this sub-area (Mid-Atlantic ridge and Hatton bank).

STEFCF notes, that no new assessments of the deep water species have been presented by ICES in 2003.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have been defined for some stocks.

STOCK STATUS: No new stock assessments have been presented by ICES in 2003, and the most recent stock status review and management advice by ICES is found in the ICES report for 2002. According to the assessments carried out in 2002, the state of the stocks of most exploited deep water species are considered unknown, uncertain or outside safe biological limits.

RECENT MANAGEMENT ADVICE: ICES recommends immediate reduction in these fisheries unless they can be shown to be sustainable. New fisheries should be permitted only when they expand very slowly, and are accompanied by programs to collect data which allow evaluation of the stock status.

STECF COMMENTS: STECF agrees with the ICES recommendation. STECF further notes that several of these fisheries take place in international waters outside national or EU jurisdiction. Hitherto this has rendered it difficult to enforce management measures for these fisheries

STECF notes that in 2002 some of these stocks have been subject to TACs for the 1st time. STECF reiterates its comment of November 2001 that management measures based on effort/fleet regulation would be an appropriate long-term approach for management of these fisheries.

*3.1.1. Alfonsinos/Golden eye perch (*Beryx *spp.)*

FISHERIES: In most cases the landings refer to both species combined (*Beryx splendens* and *B. decadactylus*). Most of the landings of *Beryx* are from hand-lines and long-lines within the Azorean EEZ of Sub-area X and by trawl outside the EEZ on the Mid-Atlantic Ridge.

In various seamounts of the Sub-area X there are some indications that the stocks were intensely exploited during the last decade.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Assessment data are scanty and no reliable assessment is possible at present.

REFERENCE POINTS: No precautionary reference points have been proposed for the stock(s) of Alphonsino in the NE Atlantic.

STOCK STATUS: Very little is known about the stock structure of these species. These species are frequently found in small aggregations, often associated with topographical features. The state of the stock(s) in the various sub-areas where these species occur is unknown.

RECENT MANAGEMENT ADVICE: According to the spatial distribution of the species and their aggregating behaviour alfonsinos are very susceptible to exploitation. ICES repeats its general recommendation that fisheries on such species be permitted only when they are accompanied by programs to collect data and expand very slowly until reliable assessment indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES.

3.1.2. Ling (spp).

FISHERIES: The major fishery in Division IIa is the Norwegian longline fishery. This fishery also operates in other Sub-areas and Divisions, such as IVa, V, and VI. The catches in Division Va are by-catches in longline, gillnet and bottom trawl fisheries. In Division Vb the majority of the catch is taken by longliners rather than trawlers. In Sub-areas VI and VII trawl fisheries are predominant.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessment is available. Stock indicators such as CPUEs from the main fisheries are not available. The view on current stock status is based data from previous years.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of Ling.

STOCK STATUS: The state of the stock is highly uncertain due to the lack of updated information. In previous years it was considered to be outside safe biological limits in at least some parts of its range and there are no reasons to believe that the situation has changed.

RECENT MANAGEMENT ADVICE: ICES recommends that the overall fishing effort be reduced by 30%.

STECF COMMENTS: STECF agrees with the advice of ICES. However STECF notes that the ICES advice for deepwater species for 2004 is unclear, in that it recommends effort reductions but does not specify reference levels. The interpretation of STECF is that, based on the ICES answer to a request for clarification of such reference levels NEAFC (ICES, 2003, Section 3.13.3a), the advised reduction in effort should refer to 1998 levels.

3.1.3. Blue Ling (spp).

FISHERIES: The majority of landings are from the Norwegian coast (II), Iceland (Va), Faroes (Vb), west of Scotland and Rockall Trough (VI) and the Mid-Atlantic Ridge and Hatton Bank (XII). Landings from the west of Ireland and Western Approaches (VII) and further south are very small A major part of this fishery is on spawning aggregations. Landings from Division IIa are mainly catches in a gillnet fishery off mid-Norway, elsewhere this species is taken mainly as by-catch in trawl fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessment is available. The view on current stock status is based on trends in CPUE figures.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: Little is known about the stock structure of these species. Although stock structure is uncertain, it is believed that the stock(s) of blue ling in the North Atlantic are outside safe biological limits. Catches and CPUE series (Figures 3.13.2.1 and 3.13.2.2) show declining trends in Divisions Va and Vb and in Sub-areas VI and VII, where more than 85% of catches of blue ling have been taken over the past five years. Using trawl and survey CPUEs as indices, exploitable biomass at the end of 2001 is considered to be below 20% of the maximum observed biomass.

RECENT MANAGEMENT ADVICE: ICES recommends that there be no directed fisheries for this stock and technical measures such as closed areas on spawning aggregations be implemented to minimise catches of this stock in mixed fisheries.

STECF COMMENTS: STECF agrees with the advice of ICES.

3.1.4. Tusk (spp).

FISHERIES: The majority of landings are from ICES sub-areas IIa, IIIa, IVa along the Norwegian coast, Va (around Iceland), and Vb (around Faroe Islands). This species is taken mainly in long line fisheries, and most of the catches are by-catches in ling fisheries. Tusk is also taken as by-catch in bottom trawl fisheries. The Norwegian fishery accounts for the more than 50% of total catches of tusk.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessment is available. The view on current stock status is based on trends in CPUE figures.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: : The overall state of the stock is highly uncertain due to the lack of relevant CPUE data for major fisheries in the most recent years (IIa and IVa). Given that the fleet and the catches have increased and that the fishing areas and practices are the same, it is unlikely that the exploitation rate has decreased in recent years. The stock is believed to be outside safe biological limits.

RECENT MANAGEMENT ADVICE: ICES recommends that overall fishing effort be reduced by 30%.

STECF COMMENTS: STECF agrees with the advice of ICES. However STECF notes that the ICES advice for deepwater species for 2004 is unclear, in that it recommends effort reductions but does not specify reference levels. The interpretation of STECF is that, based on the ICES answer to a request for clarification of such reference levels NEAFC (ICES, 2003, Section 3.13.3a), the advised reduction in effort should refer to 1998 levels.

*3.1.5. Greater silver smelt or argentine (*Argentina silus*).*

FISHERIES: The majority of landings are from ICES sub-areas IIa, IIIa, IVa along the Norwegian coast, Va (around Iceland), and Vb (around Faroe Islands). This species is taken mainly in long line fisheries, and most of the catches are by-catches in ling fisheries. Tusk is also taken as by-catch in bottom trawl fisheries. The Norwegian fishery accounts for the more than 50% of total catches of tusk.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessment is available. The view on current stock status is based on trends in CPUE figures.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: : The state of the stock(s) is unknown. Landings have increased considerably in recent years, particularly in Sub-areas II, VI and VII.

RECENT MANAGEMENT ADVICE: Greater silvers smelt stocks can only sustain very low rates of exploitation. ICES repeats its general recommendation that fisheries on such species, also as bycatch, be only permitted when they are accompanied by programs to collect data and expand very slowly until reliable assessment indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES.

*3.1.6. Black scabbardfish (*Aphanopus carbo*)*

FISHERIES: : Black scabbardfish is caught in two very different fisheries: (1) in waters off Mainland of Portugal (Division IXa) and (2) to the west of British Isles. In the waters off Mainland of Portugal it is taken in a targeted artisanal longline fishery and CPUE data have been relatively stable over the years. To the west of the British Isles it is taken in a mixed species, mainly French trawl fishery along with roundnose grenadier and sharks.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: : The stock structure of this species is still largely unknown.

RECENT MANAGEMENT ADVICE: ICES recommends a significant reduction in the fishing effort in the northern areas. The contradicting trends of the CPUE series make it difficult to advise on the need for effort reduction in the southern area, but certainly no expansion of the effort should be allowed and fisheries should not be allowed to expand until reliable assessment indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES. However STECF notes that the ICES advice for deepwater species for 2004 is unclear, in that it recommends effort reductions but does not specify reference levels. The interpretation of STECF is that, based on the ICES answer to a request for clarification of such reference levels NEAFC (ICES, 2003, Section 3.13.3a), the advised reduction in effort should refer to 1998 levels.

*3.1.7. Greater forkbeard (*Phycis blennoides*)..*

FISHERIES: The landings of greater forkbeard are mainly by-catch from both trawl and longline fisheries. Sub-areas VI and VII comprises around the 85% of the species total landings in ICES area. Fluctuations in landings are probably the result of changing effort on different target species and/or market prices. The increase in landings in Sub-areas VIII and IX probably represents a directed longline fishery

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: : The state of the stocks in the various ICES Sub-areas where this species occurs is unknown.

RECENT MANAGEMENT ADVICE: Greater forkbeard stocks can probably only sustain very low rates of exploitation. ICES repeats its general recommendation that fisheries on such species, also as bycatch, be permitted only when they are accompanied by programs to collect data and expand very slowly until reliable assessment indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES.

3.1.8. Orange roughy (Hoplostethus atlanticus)

FISHERIES: : There are currently four fisheries for orange roughy in the North East Atlantic. The main fishery up to 2000 was conducted by French trawlers in Sub-areas VI and VII. In 2001, an Irish fishery has rapidly developed in Sub-area VII, taking the bulk of the landings (2400 t). The other fisheries include a Faroese fleet, which mainly operates in Division Vb and international waters (Hatton Bank and mid-Atlantic ridge) and a small Icelandic coastal fleet conducted in Division Va. The French fishery in Sub-area VI started in 1991 and, after an initial peak of 3500 t, landings declined rapidly to less than 200 t per annum. French landings in Sub-area VII peaked in 1992 at around 3100 t and in recent years have stabilised at around 1000 t per annum. The main fishery is on spawning aggregations.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: Recent CPUE data indicate that the stock of orange roughy in VI may be depleted and outside safe biological limits at present. The state of the stock in Sub-area VII is highly uncertain. The state of orange roughy stocks in other areas is unknown.

RECENT MANAGEMENT ADVICE: Orange roughy stocks cannot sustain high rates of exploitation. Newly discovered aggregations are often overexploited before enough information is available to provide timely advice on management. Considering recent observations on the fishery developments, the exploitation of orange roughy should be strictly limited and the stocks/populations closely monitored. Data obtained should be incorporated into appropriate management measures. These recommendations should also apply to areas where there is currently no exploitation on orange roughy. There should be no directed fishery in Sub-area VI.

STECF COMMENTS: STECF agrees with the advice of ICES.

3.1.9. Roundnose grenadier (Coryphaenoides rupestris)

FISHERIES: The majority of international landings are from the Skagerrak (III), Faroes (Vb), west of Scotland and Rockall Trough (VI), west of Ireland and Western Approaches (VII) and the Mid-Atlantic

ridge and western Hatton Bank (XII). In most areas, roundnose grenadier is the target species of mixed trawl fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: The state of the stocks within all ICES areas is unknown. The observed increasing CPUE over recent years in Division Va and Sub-areas VI and VII is believed to reflect a change in the fleet distribution rather than an increase of the stock size.

RECENT MANAGEMENT ADVICE: ICES recommends regulation of the fishery in all areas in order to control fishing effort. For Sub-areas VI and VII and Divisions Vb and IIIa significant reductions on effort are necessary. In all other areas, expansion of fisheries should not be allowed to expand until reliable assessments indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES. However STECF notes that the ICES advice for deepwater species for 2004 is unclear, in that it recommends effort reductions but does not specify reference levels. The interpretation of STECF is that, based on the ICES answer to a request for clarification of such reference levels NEAFC (ICES, 2003, Section 3.13.3a), the advised reduction in effort should refer to 1998 levels.

*3.1.10. Red (=blackspot) seabream (*Pagellus bogaraveo*)*

FISHERIES: There is a directed handline and longline fishery in Sub-areas IX and X. Red seabream appears as by-catch in the longline and trawl fisheries for hake, megrim, angler and *Nephrops* in Sub-areas VI, VII and VIII.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: The state of the stock in Sub-areas X and IX is unknown. When comparing current and historical landings data from other areas (VI, VII, and VIII) this species seems to be severely depleted.

RECENT MANAGEMENT ADVICE: Red seabream stocks can only sustain very low rates of exploitation. ICES repeats its general recommendation that fisheries on such species be permitted only when they are accompanied by programs to collect data and expand very slowly until reliable assessment indicate that increased harvests are sustainable.

STECF COMMENTS: STECF agrees with the advice of ICES.

3.1.11. Deepwater sharks

FISHERIES: Deepwater sharks are taken in mixed species trawl fisheries in Divs. IIIa and IVa and Sub-areas V, VI, VII and XII. For instance, in Divs. IIIa and IVa catches up to 350 tonnes of the Velvet belly (*Etmopterus spinax)* were recorded as by-catch in 1998. It is not possible to target squalids without a by-catch of other species, and fisheries taking other species such as black scabbard, roundnose grenadier, forkbeard and blue ling have a substantial by-catch of sharks. The various longline fisheries taking deepwater sharks also take forkbeards, mora, Greenland halibut and rabbitfish. However the species diversity in such fisheries is lower, and sharks tend to be a more dominant proportion of the catch. The mixed –species character of these trawl and long line fisheries renders it difficult to manage them following single species advice. There is no information on gill-net fisheries for deepwater sharks, though it is known that there are such fisheries. Further data are required on catch and effort in these fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of sharks.

STOCK STATUS: The state of the stocks of these species is unknown. Trends in mixed species CPUE are difficult to evaluate owing to the mixed-species nature of the catches, but the overall trend has been declining.

RECENT MANAGEMENT ADVICE: Deepwater sharks can only sustain very low levels of exploitation. Due to the overall declining trends in CPUE, despite the mixed nature of the catches, ICES recommends that the overall exploitation be reduced. Deepwater sharks are taken in mixed fisheries and this makes it difficult to manage them in a single species context. ICES further advises that species specific landings data be collected for all deepwater sharks.

STECF COMMENTS: STECF agrees with ICES in that deep-water sharks are very vulnerable to exploitation, and that the fishing mortality should be reduced However STECF notes that the ICES advice for deepwater species for 2004 is unclear, in that it recommends effort reductions but does not specify reference levels. The interpretation of STECF is that, based on the ICES answer to a request for clarification of such reference levels NEAFC (ICES, 2003, Section 3.13.3a), the advised reduction in effort should refer to 1998 levels.

3.2. 3.2. Sardine (*Sardina pilchardus*) in VIIIc and IXa

FISHERIES: Sardine in these Divisions are exploited by fleets from Portugal and Spain. Sardine are taken mainly by purse-seiners. This stock is not managed by an international TAC. Historically during the last 50 years landings have fluctuated with periods of high landings during the 40's, 60's, 80's, and low landings during the 50's, 70's and 90's. The total catch in 2002 was 99,700 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on an analysis of catch at age data calibrated with egg surveys and acoustic surveys undertaken in VIIIc and IXa during March (VIIIc + IXa) and November (IXa). The advice for 2004 is based on an assumed reduced fishing mortality in 2003. Fishing mortality in recent years is estimated

to be around the lowest in the time-series. The fishery regulations enforced both by Spain and Portugal since 1997 may have contributed to the decline in fishing mortality.

PRECAUTIONARY REFERENCE POINTS: No precautionary approach reference points have been proposed for sardine stock.

STOCK STATUS: ICES indicated that the state of the stock can not be classified in relation to precautionary approach points. The stock biomass is increasing from one of the lowest observed levels, due to the contribution of the strong 2000 recruitment. The size of this recruitment is estimated to be around the second highest in the time-series. Recruitment in 2002 is estimated as the lowest of the series. Fishing mortality in recent years is estimated to be around the lowest in the time-series.
The overall situation of the stock is good, but different situations are found in different areas. The biomass at the Northern Spanish coast is at a lower level than in the mid-eighties and the age composition is dominated by young individuals unlike what was observed in the earlier period. The uncertainties in the asssessment are mainly related to the definition of the outer limits of the stock unit and to the scarce knowledge on the migrations of fish between areas both within and across the stock boundaries.

RECENT MANAGEMENT ADVICE: ICES recommends that fishing mortality should not increase above the level in 2001-2002 of 0.26, corresponding to a catch of less than 128,000 t in 2004.

STECF COMMENTS: STECF notes that at present no TAC for sardine in VIIIc and IXa is implemented. The stock in this area is referred to as *Sardine in VIIIc and IXa,* but these Divisions may not encompass the entire distribution of the stock.

4. Stocks of the North West Atlantic (NAFO)

4.1. American plaice (*Hippoglossoides platessoides*) in Divisions 3L, 3N and 3O

FISHERIES: Historically, American plaice in Div. 3LNO historically, has comprised the largest flatfish fishery in the Northwest Atlantic.

In most years the majority of the catch has been taken by offshore otter trawlers. Catches decreased sharply from 40,000 tons in 1988 to 600 tons in 1995, but a increasing trend has been observed since then. and remained at these levels until 1999.. Total catch in 1999 was 2,565 tons, above the 1998 level of 1,600 tons. There was no directed fishing in 1994 and a moratorium on fishing from 1995 to 2003. Total catch in 2002 was 4 800 tons, mainly taken in the Regulatory Area, and as by-catch in the Canadian yellowtail flounder fishery

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass and abundance data from several surveys as well as on age sampling from Canadian by-catch and length sampling from by-catch from Russia, EU-Spain and EU-Portugal.. An analytical assessment using the ADAPTive framework tuned to the Canadian spring and autumn surveys was used.

PRECAUTIONARY REFERENCE POINTS: No good recruitment has been estimated for this stock at SSB below 50 000 tons and this is currently the best estimate of B_{lim}.

STOCK STATUS: Biomass and SSB are very low compare to historic levels. There have been no good recruitment to the exploitable biomass since the mid-1980s.

RECENT MANAGEMENT ADVICE: Scientific Council reiterates its recommendation for no directed fishing on American plaice in Div. 3LNO in 2004 and 2005. By-catches be kept to the lowest possible level and restricted to unavoilable by-catch in fisheries directing for other species.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.2. American plaice (*Hippoglossoides platessoides*) in Divisions 3M (Flemish Cap)

FISHERIES: On Flemish Cap, the stock of American plaice mainly occurs at depths shallower than 600 m. Catches of Contracting Parties, in the recent years, are mainly as by-catches in trawl fisheries directed to other species in this Division. Nominal catches increased during the mid-1960s, reaching a peak of about 5 300 tons in 1965, followed by a sharp decline to values less than 1 100 tons till 1973. Since 1974, when this stock became regulated, catches ranged from 600 t (1981) to 5,600 t (1987). Subsequently, catches declined to 275 t in 1993, caused partly by a reduction in directed effort by the Spanish fleet in 1992. The catch for 2002 was estimated to be 128 t. From 1979 to 1993 a TAC of 2,000 t was agreed for this stock. A reduction to 1,000 tons was agreed for 1994 and 1995 and a moratorium has been in place since 1996.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass and abundance data from surveys carried out by USSR/Russia (1972-1993), EU (1988-2000) and Canada (1978-1996). Age-length keys were available from EU (1988-2002). Length compositions were available from the 1988 to 2002 fisheries. In 2003 an update of the assessment was presented..

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock. Based on 12 points only, examination of the stock-recruitment relationship indicates a reduced recruitment below 5 000 tons SSB.

STOCK STATUS: The stock biomass and the SSB are at a very low level and there is no sign of recovery.

RECENT MANAGEMENT ADVICE: In 2002 NAFO advised that there should be no directed fishery on American plaice in Div. 3M in 2004. By-catch should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.3. Cod (*Gadus morhua*) in Division 2J, 3K and 3L.

FISHERIES: Considerable uncertainty exists about the structure of the Div. 2J+3KL stock. The available tagging, genetic, survey and biological data are consistent with the two hypothesis: a) the inshore constitutes a separate inshore subpopulation that is functionally separate from the offshore; and b) inshore and offshore fish together constitute a single functional population.

The only over-wintering aggregation known to exist occurs in a deepwater inlet in northern Div. 3L, Smith Sound. Fish from this aggregation migrate seasonally out of the sound in the spring, mainly northward in Div. 3L and southern Div. 3K, supporting most of the commercial fishery which has taken place in the fall over the last three years. Elsewhere densities are extremely low throughout the stock area, with the exception of the southern portion of Sudiv. 3L where there is a seasonal migration of fish from Subdiv. 3Ps. This migration was much reduced in 2000.

Prior to the 1960s the Div. 2J and 3KL cod stock supported fisheries catching from 200,000 t to 300,000 t annually. During the 1960s, good recruitment, together with high exploitation rates, resulted in catches averaging about 580,000 t. The total catch peaked at 800,000 t in 1968. However the stock was in a period of decline from the 1960s until the mid-1970s. Reduced exploitation and some improved recruitment after that time, allowed the stock to increase until the mid-1980s, when catches were about 230,000 t. The rapid decline in the resource in the early-1990s led to reduced TACs and eventually to a moratorium on commercial fishing in 1992. A recreational fishery was permitted in 1992-94, 1996, 1998 and 1999 but not in 1995 and 1997. Catches also came from sentinel surveys in 1995-99 and a commercial Index fishery in 1998. The commercial fishery was reopened in 1999 with a TAC of 9 000 tons for the inshore only; in 2000 a TAC of 7 000 tons was established for sentinel surveys and a commercial index fishery in the inshore for vessels under 65 feet; and in 2001 and 2002 a TAC of 5 600 tons for commercial fishery. The total landings of 4 200 tons in 2002. The limited Canadian Index and recreational fisheries were again closed beginning on 1 April 2003.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is Canada's FRCC (Fisheries Resource Conservation Committee). NAFO Scientific Council is requested by the Coastal State Canada to provide advice on the status of the stock but does not make management recommendations. The advice is based on data coming from different source: Abundance and biomass indices were available from bottom-trawl survey in autumn and spring (Div. 3L only). Removals-at-age in 2001 were available from the limited by-catch, the sentinel survey, a food/recreational fishery and the commercial fishery. Exploitation rates were derived from inshore tagging studies. Data on growth and maturity were also available.

The last full analytical assessment of this stock was attempted in 2001, and in 2003 the information was updated.

PRECAUTIONARY REFERENCE POINTS: Under the hypothesis of a single functional population (hypothesis a) a tentative spawner biomass limit reference point of 200 000 tons was suggested.

STOCK STATUS: The stock as a whole remains at a very low level. Total and spawning biomass indices are both extremely low relative to historic levels. Year-classes recruiting in the 1990s have been extremely weak.

The new information considered in the stock status update (2003) substantially increases the concerns noted in the 2001 assessment regarding the sustainability of current levels of fishing, and found that there was no evidence of a recovery and considered that any fishery in the inshore would delay recovery.

RECENT MANAGEMENT ADVICE: For the bank sub-stocks to allow a sentinel fishery only with by-catch in fisheries directed to other species. It implies a capture of 1000t-1500t, with local management, which according to the FRCC would not impede stock growth..

STECF COMMENTS: STECF agrees with the advice given by the FRCC. However, STECF notes that the results of the management options evaluated by FRCC are presented in the report of FRCC as qualitative statements. STECF urges that quantitative results of these evaluations should be presented in full to permit scrutiny by non FRCC scientists.

4.4. Cod (*Gadus morhua*) in Division 3M (Flemish Cap)

FISHERIES: The cod fishery on Flemish Cap has traditionally been a directed fishery by Portuguese trawlers and gillnetters, Spanish pair-trawlers and Faeroese longliners. Cod has also been taken as by-catch in the directed redfish fishery by Portuguese trawlers. Small amounts of cod are taken as a by-catch in the shrimp fishery by Canada and Norway, based on observer data from these fleets in 1993-95, and were reported null in the Icelandic fishery in 1995 and 1996. The by-catch of cod in the past Russian pelagic fishery for redfish was also low.

Apart for the period 1995-1998, catches exceeded the agreed TAC from 1988 to 1994. Large numbers of small fish were caught by the trawl fishery in the most recent years. By-catches are estimated to have been low in the shrimp fishery since 1993. The directed fisheries since 1996 were very small compared with previous years. Most of the fleets traditionally targeting Div. 3M cod did not participate after 1996.

In 1999 the fishery was closed and catches were estimated in that year as 353 tons, most of them taken from non-Contracting Parties based on Canadian Surveillance reports. Those fleets were not observed in 2000 2001 and 2002, and catches were reduced to 55 an 37 and 33 Tons respectively, mainly obtained as by-catch of the redfish fishery.

SOURCE OF MANAGEMENT ADVICE:

The main management advisory body is NAFO. Length and age composition of the 2000-02 by-catches were available for Portuguese trawlers. Data were also available from the EU bottom-trawl and the Russian trawl surveys, both covering the whole distribution area of the stock.

An update of the assessment was presented in 2003.

PRECAUTIONARY REFERENCE POINTS: There are uncertainties about the precision of the SSB and recruitment estimates. Nevertheless, the SSB-recruitment plot from the VPA shows that there was reduced recruitment at SSB below 14,000 tons, and this value might be considered as a preliminary estimate of B_{lim}.

STOCK STATUS: The stock has collapsed and remains at a very low level. Given the absence of recruitment to the stock, little improvement in this stock can be expected in the foreseeable future.

RECENT MANAGEMENT ADVICE: In 2002, NAFO advised that there should be no directed fishery for cod in Div. 3M in 2003 and 2004. Also, the by-catch of cod in fisheries directed to other species on Flemish Cap should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.5. Cod (*Gadus morhua*) in Divisions 3N and 3O

FISHERIES: Nominal catches increased during the late-1950s early –1960s, reaching a peak of about 227,000 t in 1967. During the period from 1979 to 1991, catches ranged from 20,000 t to 50,000 t. The continued reduction in recommended TAC levels contributed to reduced catches in recent years which reached a level of 10,000 tons in 1993. There has been no directed fishery for cod in 3NO since february 1994 but the estimated by-catch increased continuously to 2,200 tons in 2002. Since the moratorium was instituted, catches have increased by a factor of over 7.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Length and age composition were available from the 2001 and 2002 fisheries to estimate the total removals at age. Canadian spring and autumn survey data provided abundance, biomass and age structure information. Canadian juvenile research survey data were available up to 1994. An analytical assessment was presented in 2003.

PRECAUTIONARY REFERENCE POINTS: The limit reference point for biomass is B_{lim} = 60,000 t. NAFO Scientific Council also concluded that in the recent period of low productivity, there are indications that recruitment is further reduced when spawning stock biomass is 30,000 t. The NAFO Scientific Council plans to review the biological reference points for this stock in the context of the PA framework. Simulations suggest that recovery time for this stock will largely depend upon which recruitment regime prevails in the future. The yield expected under the current low recruitment regime is about one-tenth of that expected from recruitment levels that existed in the 1960s and 1970s.

STOCK STATUS: The stock remains close to its historical low with weak representation from all year classes.

RECENT MANAGEMENT ADVICE: In 2003 NAFO advised that there should be no directed fishing for cod in Div. 3N and 3O in 2004 and 2005. By-catches of cod in fisheries targeting other species should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.6. Greenland Halibut (*Reinhardtius hippoglossoides*) in Sub-area 2 and Divisions 3KLMNO

FISHERIES Catches increased from low levels in the early-1960s to over 36,000 tons in 1969, and ranged from 24,000 tons to 39,000 tons over the next 15 years. From 1986 to 1989, catches exceeded 20,000 tons only in 1987.

In 1990, an extensive fishery developed in the deep water (down to at least 1 500 m) in the Regulatory Area, around the boundary of Div. 3L and 3M and by 1991 extended into Div. 3N. The total catch estimated by STACFIS for 1990-94 was in the range of 47 000 to 63 000 tons annually, although estimates in some years were as high as 75 000 tons. The catch was only 15,000 t to 20,000 t per year in 1995 to 1998 as a result of lower TACs under management measures introduced by the NAFO Fisheries Commission. Catches were well below the agreed TACs in 1995-99. Catches have been increasing since then and by 2002 had reached 34 000 tons (same as in 2000) while in 2001 reached up to 38,000 tons. The major participants in the fishery in the Regulatory Area in 2002 were EU-Spain (15 900 tons), EU-Portugal (4 200 tons), Russia (3 5 00 tons) and Japan (2 800 tons). Canadian catches peaked in 1980 at just over 31,000 tons, while the largest non-Canadian catches before 1990 occurred in 1969-70. USSR/Russia, Denmark (Faeroe Islands), Poland and EU-Germany (GDR before 1989) have taken catches from this stock in most years, but catches by the latter two countries have been negligible since 1991. Canadian catches ranged from 8 200 to 13 500 tons from 1985-91, then declined to between 2 300 and 6 200 tons per year from 1995 to 1999. Catches increased to 10 600 tons in 2000 but declined again to 8 000 tons in 2001 and 6300 tons in 2002. Most of the Canadian catch in recent years is taken by gillnets.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on CPUE data from otter trawl fisheries throughout the stock and the Portuguese otter trawl fishery in the Regulatory Area of Div. 3LMN. Abundance and biomass indices were available from Canadian (1978-2002) in 2J+3KLMNO, EU in 3M (1988-2002), and EU-Spain (1995-2002) research vessel surveys. The Canadian autumn surveys in 1996 to 1999 covered most of the stock distribution, including Div. 2GH. International commercial catch-at-age data were updated from 1989-99 providing a series from 1975-2002.

An analytical assessment using Extended Survivors Analysis (XSA) tuned to the Canadian spring (Div. 3LNO), and fall (Div. 2J, 3K) and the EU (Div. 3M) surveys for the years 1995-2002 was used as an assessment of the 5+ exploitable biomass, level of exploitation and recruitment to the stock.

PRECAUTIONARY REFERENCE POINTS: The current assessment results are not considered sufficiently reliable to allow estimation of formal reference points in quantitative terms. Until such reference points can be provided, NAFO Scientific Council advises that:

Fishing mortality should be maintained, with high probability, below the average level estimated for the period 1991 to 1994..

STOCK STATUS: The exploitable biomass has been declining in recent years and is presently estimated to be at its lowest level. Recent recruitment has been poor and if catches continue at recent levels, then the stock will decline further.

RECENT MANAGEMENT ADVICE: The present view of the stock is considerably more pessimistic than in recent years. All observed indicators are showing persistent declines over the past several years while catches have generally been increasing. Assuming a catch of 30 000 tons in 2003 and in order to prevent a further decline in exploitable biomass during 2004, the catch in 2004 should not exceed 16 000 tons.

The Council, again, recommends that measures be considered to reduce, as much as possible, the exploitation of juvenile Greenland halibut in all fisheries.

STECF COMMENTS: STECF is aware of the severe decline suffered in this stock and agrees with the advice given by NAFO. However, STECF notes that there is considerable uncertainty regarding the absolute level of this stock and recommends that NAFO makes every effort to reconcile the discrepancies in the stock indicators. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.7. Greenland Halibut (*Reinhardtius hippoglossoides*) in Sub-area 0 + Division 1A Offshore *and Divisions 1B-1F*

FISHERIES: Before 1984, USSR and GDR conducted trawl fisheries in the offshore part of Div. 0B. In the late-1980s catches were low and mainly taken by the Faeroe Islands and Norway. In the beginning of the 1990s catches taken by these two countries increased and Canada, Russia and Japan entered the fishery. In 1995 a Canadian gillnet fishery began. In 1997 and 1998 only Faeroe Island and Canada conducted a fishery in the area. Besides Canadian trawlers, trawlers from four different countries chartered by Canada participated in the trawl fishery in Div. 0A in 2001 and 2002. In 1987 a longline fishery started inshore in Cumberland Sound.

In Div. 1A offshores and Div. 1B-1F almost all catches are taken offshore mainly by trawlers from Japan, Greenlad, Norway, Russia, Faroe Islands and EU (mainly Germany).

The annual catches in Subarea 0 and Div. 1A offshores and Div. 1B-1F were below 2 600 tons from 1984 to 1988. From 1989 to 1990 catches increased from 2 200 tons to 10 500 tons, remained at that level in 1991 and then increased to 18 100 tons in 1992 mainly due to an increase in offshores effort. During 1993-2000 catches fluctuated between 8 300 and 11 400 tons. The catches amounted to 10 700 tons in 2000 and increased to 13 400 tons in 2001 and further to 15 000 in 2002 primarily due to increased effort in Div. 0A.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on catch-at-age data from Sub-area 0 and Div. 1CD. Standardised and unstandardised catch rates were available from Div. 0A and Div. 1CD. Biomass estimates from (1997-2002) surveys were available from DIV. 1CD, only Recruitment data were available from Div. 1A-1F from 1989-2002. No analytical assessment could be performed..

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The age composition in the catches has been stable in recent years. Based on survey indices the stock has been increasing since 1994 and is now at the level of the late-1980s and early-1990s

RECENT MANAGEMENT ADVICE: In 2003, NAFO advised that the TAC for 2004 should not exceed the current level of 11,000 tons for Div. 0B and 1C-1F. It also advices a TAC of 8, 000 tones for Greenland halibut in DIV. 0A+1AB for 2004. Council recommends that Div. 1B be included in the management area with Div. 0A and Div. 1A.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.8. Shrimp (*Pandalus borealis)* in Division 3M (Flemish Cap)

FISHERIES: The shrimp fishery in Div. 3M began in late-April 1993. Initial catch rates were favourable and, shortly thereafter, vessels from several nations joined. Since 1993 the number of vessels ranged from 46-110, and in 2002 there were approximately 40 vessels fishing shrimp in Div. 3M. Vessels from 16 nations have participated in this fishery. Total catches were approximately 27 000 tons in 1993, increased to 48 000 tons in 1996, declined in 1997 and increased steadily through 2000. Catch statistics to 1 October 2002 indicate removals of about 41 000 tons. This will likely result in a total catch of about 50 000 tons by the end of the year.

The fishery was unregulated in 1993. Sorting grates and related by-catch regulations were implemented in 1996 and have continued since.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on catch, effort and biological sampling data from trawlers from several nations. A standardised CPUE index was developed to account for changes in gear (single and double trawl), fishing power and seasonality. Time series of size and sex composition data were available from three countries and survey indices from Faroeses (1997-2002) and EU bottom-trawl (1988-2002) surveys.

No analytical assessment was possible in 2002 and fishing mortality is unknown. The interpretation of stock status is based upon interpretation of commercial fishery and research survey data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: It is not possible to provide any absolute estimate of current or future stock size. Stock size indicators have been fluctuating without a trend since 1988. The 1997 year class was above average in 2002, but its contribution to the fishery will diminish after 2003. The 1999 year-class is above average and will be contributing to the fishery in 2003 and 2004. However the 1998 and 2000 year-classes appear to be weaker.

RECENT MANAGEMENT ADVICE: The stock appears to have sustained an average annual catch of about 45 000 tons since 1998 with no appreciable effect on stock biomass. Considering the strength of the 1997 year and the re-evaluation of the strength of the 1999 year-class in the current assessment

to average or above average and that it is expected to be the main contributor to the catch biomass in 2003 and 2004, the Scientific Council advises a catch of 45 000 tons for 2004.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.9. Redfish (*Sebastes spp.*) in Divisions 3L and 3N

There are two redfish species of commercial importance in Div. 3LN: deep-water redfish (*Sebastes mentella*) and Acadian redfish (*Sebastes fasciatus*). These are very similar in appearance and are reported collectively as redfish in statistics. The relationship to adjacent NAFO Divisions, in particular to Div. 3O, is unclear and further investigations are necessary to clarify the integrity of the Div. 3LN management unit.

FISHERIES: In the early–1980s, the former USSR, Cuba and Canada were the main fleets targeting redfish. The rapid expansion of the fishery in 1986 and continued high catch in 1987 and 1988 was due to new entrants, primarily EU-Portugal and various non-Contracting Parties, most notably South Korea, Panama and the Cayman Islands. These countries accounted for a catch of about 24,000 t in 1988. In the period from 1988 to 1994 they took between 1,000 t and 19,000 tons annually; however, since 1994 they have not fished in the area.

Catches averaged about 22 000 tons from 1959 to 1985, increased sharply to an historical high of 79 000 tons in 1987 then declined steadily to about 500 tons in 1996. Catch increased to 850 tons by 1998 and was about 2 000 tons in 1999-2001 but, again, declines to 1200 tons in 2002. A moratorium on directed fishing was implemented in 1998. Catches since 1998 were taken as by-catch primarily in Greenland halibut fisheries by EU-Portugal, EU-Spain and Russia. A portion of the catches, in some years substantial, have been taken by non-Contracting Parties from 1987 to 1994. These countries have not fished in Div. 3LN since 1994.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on USSR/Russian (1984-94) and Canadian (1978-02) bottom trawl surveys data. The last assessment of this stock was carried out in 2003, and no analytical assessment was possible for this stock this year.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: Based on the available data, the stock appears to be at a very low level. There are indications of some increases in the stock since 1996 due to growth in weight of the relatively strong 1986-87 year-classes and possible through some immigration of fish from Div. 3O to Div. 3N.

RECENT MANAGEMENT ADVICE: In 2003 NAFO advised that there should be no directed fishing for redfish in Div. 3LN in 2004 and 2005, and that by-catches of redfish in fisheries targeting other species should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.10. Redfish (*Sebastes spp.*) in Division 3M

There are 3 species of redfish, which are commercially fished on Flemish Cap: deep-water redfish (*Sebastes mentella*), golden redfish (*Sebastes marinus*) and Acadian redfish (*Sebastes fasciatus*). The present assessment evaluates the status of the Div. 3M beaked redfish stock, regarded as a management unit composed of two populations from two very similar species (*Sebastes mentella* and *Sebastes fasciatus*). The reason for this approach is that evidence indicates this is by far the dominant redfish group on Flemish Cap.

FISHERIES: The majority of the commercial bottom trawl catches are composed of beaked redfish (*Sebastes mentella* and *Sebastes fasciatus*). The Div. 3M redfish stocks have been exploited in the past both by pelagic and bottom trawlers from former the USSR, former GDR and Korean non-Contracting party vessels. The redfish fishery in Div. 3M increased from 20,000 t in 1985 to 81 000 t in 1990, falling continuously since then until 1998-1999, when a minimum catch around 1,100 t was reported, mostly as a by-catch in the Greenland halibut fishery. The decline in the Div. 3M redfish catches from 1990 to 1999 is related with the simultaneous quick decline of the stock biomass and fishing effort. There was an overall increase of the redfish catches to 3 800 tons in 2000. In 2001-02 catch is at a somewhat lower level of 3 000 tons with the directed fishery primarily prosecuted by EU- Portugal and Russia.

The start in 1993 and further development of a shrimp fishery on Flemish Cap lead to high levels of redfish by-catch in 1993-1994. Since 1995 this by-catch in weight fell to apparent low levels but in 2001 redfish by-catch reached 738 tons, the highest level observed since 1994. Translated to numbers this represents an increase from the recent by-catch level of 3.4 million redfish (1999-2000) to 22.1 millions in 2001-02, representing 71% of the total 2001-02 catch in numbers.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on catch-at-age data from 1989-2002 including by-catch information from the shrimp fishery. Catch rate data for 1959-93 is available from the NAFO database. Biomass indices as well as length and age data are provided by Russian (1983-93, 1995-96, and 2001-02), EU (1988-2002) and Canadian (1979-85 and 1996) surveys.

The Russian survey was complemented with an acoustic estimate of the redfish pelagic component for the 1988-1992 period. Survey bottom biomass and female spawning biomass were calculated from 1979-1985 Canadian and 1988-2002 EU surveys. A virtual population analysis (XSA) and a surplus production analysis (ASPIC) were carried out for 1989-2002, providing indicators of stock biomass, female spawning biomass and fishing mortality trends.

PRECAUTIONARY REFERENCE POINTS: No updated information on biological reference points is available in 2003.

STOCK STATUS: While the decline in stock biomass appears to have halted, it is still unclear as to whether there has been any actual increase. The total stock and spawning stock are currently at a low level compared to the earlier period in the time series. At the current relatively low fishing mortality, and with growth of the relatively strong 90 year-classes followed by the growth in the 1998 year-class, stock and spawning biomass should gradually increase.

RECENT MANAGEMENT ADVICE: The Council was unable to advise on a specific TAC for year 2004 and 2005, however, in order to maintain relatively low fishing mortalities so as to promote stock recovery, Scientific Council recommends that catch for Div. 3M redfish in 2004 and 2005 be in the range of 3,000 t – 5,000 t. The by-catch of juvenile redfish in the shrimp fishery should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.11. Redfish (*Sebastes* spp.) in Sub-area 1

There are two redfish species of commercial importance in Sub-area 1: golden redfish (*Sebastes marinus*) and deep-sea redfish (*Sebastes mentella*). These are very similar in appearance and are reported collectively as redfish in statistics. Relationship to other north Atlantic redfish stocks are unclear.

FISHERIES: Historically, redfish were taken mainly as a by-catch in the trawl fisheries for cod and shrimp. However, occasionally during 1984-86, a directed fishery on redfish was observed for German and Japanese trawlers. With the collapse of the Greenland cod stock during the early-1990s, resulting in a termination of that fishery, catches of commercial sized redfish were taken inshore by long lining or jigging and offshore in shrimp fisheries only. Recent catch figures do not include the weight of substantial numbers of small redfish discarded by the trawl fisheries directed to shrimp.

In 1977, total reported catches peaked at 31,000 t. During the period 1978-83, reported catches of redfish varied between 6,000 t and 9,000 t. From 1984 to 1986, catches declined to an average level of 5,000 t due to a reduction of effort directed to cod by trawlers from EU-Germany. With the closure of the offshore fishery in 1987, catches decreased further to 1,200 t, and have remained at that low level. The estimated catch figures for 2001 and 2002 are 300 and 500 tons, respectively, representing the lowest on record.. Recent catch figures do not include the weight of substantial numbers of small redfish discarded by the trawl fisheries directed to shrimp.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on EU-German groundfish survey (1982-2000), Greenland-Japan and Greenland deep-sea surveys (1987-95 and 2000), and Greenland bottom trawl survey (1988-2002) data. The last assessment of these stocks were carried out in 2003 and no analytical assessments were possible this year

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS Golden redfish (*Sebastes marinus*): The stock of golden redfish in Sub-area 1 remains severely depleted. There are indications that the probability of future recruitment is reduced at the current low SSB. Short-term recovery is very unlikely.

STOCK STATUS Deep-sea redfish (*Sebastes mentella*): The spawning stock of deep-sea redfish in Sub-area 1 remains severely depleted, and an increase is unlikely in a short term.

RECENT MANAGEMENT ADVICE: In 2003, NAFO advised that no directed fishery should occur on redfish in Sub-area 1 in years 2004 and 2005. By-catches of redfish in the shrimp fishery should be at the lowest possible level. The probability of recovery of the redfish stocks in Sub-area 1 would be enhanced if the by-catch of redfish taken in the shrimp fishery were significantly reduced.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.12. Roughhead grenadier (*Macrourus berglax*) in Sub-areas 2 and 3

FISHERIES: It has been recognised that a substantial part of the recent grenadier catches in Subarea 3, previously reported as roundnose grenadier correspond to roughhead grenadier. The misreporting has not yet been resolved in the official statistics before 1996, but the species are reported correctly since 1997. Roughhead grenadier is taken as by-catch in the Greenland halibut fishery, mainly in Div. 3LMN Regulatory Area.

The level of roughhead grenadier catches in Sub-areas 2 and 3 before the start of the Div. 3LMN Greenland halibut fishery remains uncertain. The average catch since 1990 has been about 4,000 t taken primarily by EU-Portugal and EU-Spain, around 90 % of total landings, as by-catch in the fishery directed to Greenland halibut. Catches of roughhead grenadier in 1998 and 1999 increased to 7,200 t, and decreased thereafter to 3,100 tons in 2001 In 2002 they raised again up to 3,700 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on various bottom trawl surveys, which partially cover the distributional area of the roughhead grenadier population. Additionally, data on depth distribution and biological parameters are available. Because of limited time series, limited coverage and various vessel/gears conducting these surveys, the information is of limited value in determining resource status. It is not possible to provide an estimate of the absolute size of the stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for roughhead grenadier in Sub-areas 2 and 3.

STOCK STATUS: The state of the stock is not known.

RECENT MANAGEMENT ADVICE: In 2003, NAFO advised that it is not possible to provide any advice for roughhead grenadier in Sub-areas 2 and 3.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.13. Roundnose Grenadier (*Coryphaenoides rupestris*) in Sub-areas 0+1

The roundnose grenadier (*Coryphaenoides rupestris*) stock in Davis Strait is probably connected to other stocks in the North Atlantic. The stock component found in Sub-areas 0+1 is at the margin of the

distribution area for this species. Canadian and Russian surveys that covered both Subareas 0 and 1 showed that most of the biomass generally was found in Subarea 1.

FISHERIES: Recommended TACs were at 8,000 t over the period 1977-95. The advice since 1996 has been that the catches should be restricted to by-catches in fisheries targeting other species. There has been no directed fishery for this stock since 1978. An unknown proportion of the reported catches of roundnose grenadier are roughhead grenadier (*Macrourus beglax*).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass estimates of roundnose grenadier from surveys in Div. 0B during the period 1986-92, from Div. 1CD during the period 1987-95, from 1CD in 1997-2002 and Div. 0B in 2000-2001. No analytical assessment could be performed in 2001.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for roundnose grenadier in Sub-areas 0+1.

STOCK STATUS: The stock of roundnose grenadier is still at the very low level observed since 1993.

RECENT MANAGEMENT ADVICE: In 2002, NAFO advised that there should be no directed fishing for roundnose grenadier in Sub-areas 0 and 1 in 2003-2005. Catches should be restricted to by-catches in fisheries targeting other species. In 2003 the status of this stock was reviewed and found no significant changes.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.14. Short-finned Squid (*Illex illecebrosus*) in Sub-areas 3 and 4

The northern short-finned squid (*Illex illecebrosus*) is an annual species (1-year life cycle) and is considered to comprise a unit stock throughout its range in the Northwest Atlantic Ocean, from Newfoundland to Florida including NAFO Sub-areas 3-6.

FISHERIES: Catches in Sub-areas 3+4 increased during the late-1970s, averaging 81,000 t during 1976-81, and peaking at 162,000 t in 1979. Catches in Sub-areas 3+4 declined to 100 t in 1986, ranged between 600 and 11,000 t during 1987-95, increased to 15 800 t in 1997. After 1997, catches declined sharply, from 1 100 tons in 1998 to 2480 t in 2002. A TAC for Sub-areas 3+4 was first established in 1975 at 25,000 t, but was increased in 1978, 1979 and 1980. The Sub-area 3+4 TAC remained at 150,000 tons during 1980-1998 and was set at 75,000 tons for 1999 and 34,000 tons for 2000-2003.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for short finned quid in Sub-areas 3+4.

STOCK STATUS: Based on survey biomass indices nad mean body weights, in Division 4VWZ, the Northern shortfin squid resource in SA 3-4 remained at a low level in 2002.

RECENT MANAGEMENT ADVICE: In 2003, NAFO was unable to advise on a specific level of catch for 2003 or 2004. However, based on available information, including an analysis of the upper range of yields that might be expected under the present low productivity regime, the NAFO Scientific Council advised that the TAC for year 2004, for short-finned squid in Sub-areas 3+4, be set between 19,000 tons and 34,000 tons.

The advised TAC range is applicable only in periods of low productivity. In periods of high productivity, much higher catches and TAC levels are appropriate.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.15. Witch Flounder (*Glyptocephalus cynoglossus*) in Divisions 2J and 3KL

FISHERIES: During the late-1970s and early-1980s witch flounder were widely distributed around the fishing banks, primarily in Division 3K. During the mid-1980s however, they were rapidly disappearing and by the early-1990s, had virtually disappeared from this area entirely, except from some very small catches along the continental slope in southern part of Division 3K. They now appear to be located only along the deep continental slope area, especially in Division 3L both inside and outside the Canadian 200-mile fishery zone

In recent years, catches have been reported from the Flemish Pass area of Div. 3M. This is likely to represent an extension of the Div. 3L component of the stock. In the past, the stock had been fished mainly in winter and springtime on spawning concentrations but is now only a by-catch of other fisheries.

The fishery for witch in this area began in the early 1960's and increased steadily from about 1,000 t in 1963 to a peak of over 24,000 t in 1973. Catches declined rapidly to 2,800 t by 1980 and subsequently fluctuated between 3,000 and 4,500 t to 1991. The catch in 1992 declined to about 2,700 t, the lowest since 1964, and further declined to around 400 t by 1993-1994.

The stock has been under moratorium in the Canadian zone since 1995 but fishing on this stock has been unregulated in the NAFO Regulatory Area. The annual by-catch has ranged between 300 to 1,400 tons during 1995-1999. The 2002 catch was about 450 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is Canada. NAFO Scientific Council has recently been asked to evaluate the status of the resource.. The advice is based on abundance and biomass data from Canadian autums survey (1978-2002). Age based data have not been available since 1993, and none are anticipated in the near future Last assessment of this stock was carried out in 2001 and no analytical assessment was possible.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for witch flounder in Divisions 2J and 3KL.

STOCK STATUS: The stock remains at a very low level The relationship between witch flounder in Div. 3M and the Div. 2J, 3K and 3L stock warrants investigation.

RECENT MANAGEMENT ADVICE: In 2003, NAFO advised that there should be no directed fishing on witch flounder in Divisions 2J and 3KL in 2004 and 2005 to allow the stock torebuild. By-catches in fisheries targeting other species should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.16. Witch Flounder (*Glyptocephalus cynoglossus*) in Divisions 3N and 3O

The stock mainly occurs in Div. 3O along the deeper slopes of the Grand Bank. Traditionally, the fishery took place on spawning concentrations in the winter and spring.

FISHERIES: Catches significantly exceeded the TAC during the mid-1980s. In 1987 and 1988, the total catch was about 7,500 tons, declining to between 3,700 and 4,900 tons from 1989 to 1992 with a catch of 4,400 tons estimated for 1993. The best estimates of catch for 1994-96 were 1,100, 300 and 300 tons, respectively, with the 1997-2002 catch estimates ranging from 500-900 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on converted abundance and biomass data from Canadian spring surveys during 1984-2003 and autumn surveys during 1990-2002 as well as Spanish surveys during spring 1995-2002. No analytical assessment was possible with current data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for witch flounder in Divisions 3NO.

STOCK STATUS: Stock remains at a low level.

RECENT MANAGEMENT ADVICE: In 2002, NAFO Scientific Council advised that there should be no directed fishing on witch flounder in Div. 3N and 3O in 2003 and 2004, to allow for stock rebuilding. By-catches should be kept at the lowest possible level.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

4.17. Yellowtail Flounder (*Limanda ferruginea*) in Divisions 3L, 3N and 3O

FISHERIES: The stock is mainly concentrated on the southern Grand Bank and is recruited from the Southeast Shoal area nursery ground, where the juvenile and adult components overlap in their distribution.

Catches exceeded the TACs in each year from 1985 to 1993. During the moratorium (1994-97), catches decreased from around 2 000 tons in 1994 to about 280 tons in 1996 and increased to 800 tons in 1997, as by-catch in other fisheries . Since the fishery re-opened in 1998, catches have increased from 4 400 tons to 10 800 tons in 2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on CPUE from Canadian trawlers data from 1965 to 2002. For 2002, length frequency data from the Canadian fishery, and from by-catches of Russian, Portuguese and Spanish trawlers were available.. Abundance and biomass indices from annual Canadian spring (1971-82; 1984-2003) and autumn (1990-2002) bottom trawl surveys; annual USSR/Russian spring surveys (1972-91); co-operative Canadian Dept. Fisheries and Oceans/Canadian fishing industry surveys (1996-2002); and, Spanish surveys in the NAFO Regulatory Area of Div. 3NO (1995-2002) are also used. An analytical assessment using a stock production model was presented to estimate stock status in 2002.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for fishing mortality is 2/3 F_{MSY} as a target fishing mortality.

STOCK STATUS: Stock size has increased over the past year and is perceived to be at a level well above that of the mid -1980s.

RECENT MANAGEMENT ADVICE: In 2002, NAFO Scientific council recommended the total catches should not exceed 14 500 tons in 2004. This corresponds to catch projections based on F = 2/3 Fmsy and an assumed catch of 14 300 tons in the year 2002. Scientific Council noted that catches have been about 10% higher than TACs during 1998-2001. In providing its advice, Scientific Council notes that the advice applies to all removals (directed plus by-catch). Scientific Council recommends that measures be put in place to ensure that total catches do not exceed the recommended levels. In 2003 the status of this stock was reviewed and found no significant changes.

STECF COMMENTS: STECF endorses the advice from NAFO. STECF notes that management decisions have already been taken during NAFO's 25th Annual Meeting, 15-19 September 2003.

5. Resources in the area of CECAF

The latest assessment and advice is based on the report of the CECAF meeting held in Tenerife, Spain from 22-24 October 2002. For some stocks, there is no updated advice and the text of the stock sections remains unchanged.

5.1. Sardine (*Sardina pilchardus*) off Morocco and Western Sahara (under Moroccan administration)

FISHERIES: Sardine is exploited along the Moroccan and the Western Sahara shelves in four different fishing grounds referred to as north stock (between 33ºN and 36ºN), central stock including zone A (between 29ºN and 32ºN) and zone B (between 26ºN and 29ºN), and southern stock or zone C (between 22ºN and 26ºN). Currently, zone north is exploited by a reduced number of small purse seiners from the north of Morocco. . Fisheries for sardine in zones A and B are exclusively carried out by Moroccan boats. Those in zone C were fished by 10 Spanish purse seiners, based in Arrecife de Lanzarote (Canary Islands), during the last fishing agreement currently elapsed, and by an unknown number of Moroccan purse seiners and long distance trawlers from Russia, Ukraine, Norway, Netherlands, and other countries. The non-Moroccan vessels operate under bilateral or private fishing agreements.

Catches in zones North and A have been exclusively Moroccan and have ranged from 4,300 t to 25,000 t and 3,500 t to 200,000 t respectively in the period 1976-2001. In zone B a substitution process, imposed by the EU-Morocco fishing agreement, has resulted in Spanish boats being completely replaced by Moroccan boats after 1996. Total catches in this area have varied between 85,000 t and 700,000 t. The situation in zone C is more complex due to the variety of fleets fishing in this area. For many of these fleets, only very limited information is available. Reported catches in this particular zone have ranged between 36,000 t and 766,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). Assessment Working Groups meet on an *ad hoc* basis and have traditionally considered that the sardine from zones A and B belong to a single stock named the central stock, and that those from zone C constituted a separate unit stock called the southern stock. The FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Banjul, The Gambia from 5 to 12 April 2002 to assess pelagic resources and to analyse fisheries management and exploitation options that would ensure optimal and sustainable use of the pelagic resources in the area.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: The small pelagics working group could not determine the current state of these stocks. However, acoustic surveys on the southern stock (zone C) indicate that the stock has been increasing in recent years.

RECENT MANAGEMENT ADVICE:

Central stock: The Working Group of 2002 was unable to comment on the state of the central stock and issued no advice.

Southern stock: No specific advice for the management of this stock was isseed in the 2002 report of CECAF. Note however, that management of these fisheries is regulated by Morocco, by fishing effort regulations and in some cases by the allocation of quotas to specific fleets. In the most recent years, the Moroccan authorities have also declared closed seasons and closed areas that are not equally applied to the different fleets involved in the fishery.

STECF COMMENTS: .STECF has no comments

5.2. Anchovy (*Engraulis encrasicolus*) off Morocco

FISHERIES: Anchovy is exploited in the northern region of the Moroccan coast by purse seiners from Morocco and Spain. Information on the fishery is very scarce. Spanish boats fish both in Moroccan and Spanish zones and it is very difficult to deduce the origin of their catches. Catches in this region by purse seiners are mainly composed of anchovy, sardine (*Sardina pilchardus*) and mackerel (*Scomber japonicus*). The activity of Moroccan boats is unknown. It is possible that the anchovy existing in this zone belongs to the same stock occurring in the ICES division IX a (Gulf of Cádiz). The management of the fishery is by fishing effort regulation.

SOURCE OF MANAGEMENT ADVICE: There has never been an assessment of this stock.

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed for this stock.

STOCK STATUS: Unknown. There only data are from acoustic surveys conducted by IMR, Bergen (Norway). The results of these surveys were not available to STECF

RECENT MANAGEMENT ADVICE: There is no advice issued by CECAF specifically for Anchovy but CECAF advises that the combined catch of small pelagics in Northwest Africa should not be increased above the average level attained during the last 5 years of about 830,000 tonnes, excluding Sardine (*Sardina pilchardus*).

STECF COMMENTS: STECF has no comments

5.3. Octopus (*Octopus vulgaris*) off Western Sahara (under Moroccan administration)

FISHERIES: The cephalopod fishery of the Western Sahara started at the end of the sixties. It has been exploited by trawlers from Morocco (292 boats in 1996) and Spain (79 boats in 1998) operating on the shelf from 6 and 12 nautical miles from the coast respectively. The main target species in the fishery is octopus (*Octopus vulgaris*) followed, in order of importance, by cuttlefish (mainly *Sepia hierredda*), squid (*Loligo vulgaris*) and a miscellaneous group of finfish (flatfishes, seabreams, etc.).

Total catches of all species combined have varied between 80,000 t and 156,000 t in the period 1975-1996. The species composition of the catch differs between the fleets with sampling indicated that on average, Spanish catches comprises 62% octopus, 16% cuttlefish, 7% squid and 15% mixed finfish. Moroccan catches comprised 52% octopus, 15% cuttlefish, 7% squid and 26% mixed finfish. Recently two other Moroccan fleets made up of small coastal trawlers and canoes fishing with pots for octopus (poulpiers) have entered the fishery. According to the most recent information, the poulpiers caught a total of 3,000 t, 4,500 t & 8,000 t of octopus in 1993, 1994 & 1995, respectively. Catches of all species by coastal trawlers were estimated as 4,229 t in 1994, 3,190 t in 1995 and 2,512 t in 1996, although their specific composition is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF and Octopus is now assessed by the Demersal Species Working Group. A Working Group was held at the Spanish Institute of Oceanography (IEO) in Santa Cruz de Tenerife, Spain from 17 to 20 September 2002 (unpublished report).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: The Moroccan authorities regulate this fishery by effort and gear regulations, combined with different closed areas and for national and foreign fleets. The last evaluations carried out using the BIODYN model give biomass levels comparable to those established by the 1997 Working Group on cephalopods. As octopus abundance is very fluctuating, it is recommended that yearly stock evaluations be carried out to decide annual catch levels.

STECF COMMENTS: STECF has no comments on the assessment or advice.

5.4. Cuttlefish (*Sepia* spp.) off Western Sahara (under Moroccan administration)

FISHERIES: Cuttlefish species are exploited in the same cephalopod fishery as octopus, where they are taken as a by-catch species (see Section 5.3 above for more details). The cuttlefish catch can be composed up to five different species among which only three (*Sepia hierredda*, *S. officcinalis* and *S. bertheloti*) are landed commercially.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. Several attempts have been made in 1978, 1982, 1985, 1991 and 1997 to assess the state of these stocks using surplus production models. The results were considered unreliable due to the uncertainties in the catch and effort data available to the Working Groups. A Working Group was held at the Spanish Institute of Oceanography (IEO) in Santa Cruz de Tenerife, Spain from 17 to 20 September 2002 (unpublished report).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: The status of these stocks is unknown.

RECENT MANAGEMENT ADVICE: Moroccan authorities manage these fisheries in the general framework of the cephalopod fishery by means of effort and gear regulations combined with closed areas and seasons applied differently to national and foreign fleets.

STECF COMMENTS: STECF has no comments.

5.5. Sole (*Solea vulgaris*) off Western Sahara (under Moroccan administration)

FISHERIES: The sole forms part of the miscellaneous finfish by-catch in the cephalopod fishery (see Section 5.3 above for more details). Catches are unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. No attempt has ever been made to assess this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Moroccan authorities manage this fishery in the general framework of the cephalopod fishery by means of effort and gear regulations combined with closed areas and seasons applied differently to national and foreign fleets**STECF COMMENTS:** STECF notes that the wedge sole (*Dicologoglossa cuneata*) is another flatfish species caught in the same fishery as *S. solea*. This species may form an important component of the catch.

STECF COMMENTS: STECF has no comments.

5.6. Seabreams (*Sparidae*) off Morocco and the Western Sahara (under Moroccan administration)

FISHERIES: Seabreams species occurring on fishing grounds along the Moroccan and the Western Sahara coasts are mainly composed of species belonging to the genera *Dentex, Pagellus, Pagrus, Diplodus* and *Spondyliosoma*. These species are caught in artisanal fisheries specifically targeting breams, as well as in other fisheries targeting other demersal species, (see 5.8 below for additional information) and also as a by-catch in almost every other fishery in the region. The total annual catches of breams are impossible to estimate.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. An assessment of the state of these stocks in the whole CECAF region was attempted in 1984. A second assessment, taking into account only the stocks off Morocco and the Western Sahara was attempted in 1991. The results from both assessments were considered unreliable and inconclusive. Further assessments were attempted at the meeting of the Demersal species Working Group from 17-20 September 2002 (unpublished report).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: The status of the stocks is unknown.

RECENT MANAGEMENT ADVICE: Moroccan authorities manage these fisheries in the general framework of the different fisheries in which they occur, generally by means of effort regulations and gear restrictions. CECAF has advised a precautionary approach to management in order that effort on demersal stocks in the north of the CECAF region is not allowed to increase.

STECF COMMENTS: STECF has no comments

5.7. Deepwater shrimps (*Parapenaeus longirostris*) off Morocco

FISHERIES: Deepwater shrimps, particularly *Parapenaeus longirostris*, are the objective of ice and freezer trawlers from Morocco and Spain fishing (until 1999) in Moroccan waters north of Cape Juby (28ºN). Ice trawlers (104 from Spain and 464 from Morocco in 1996) simultaneously exploited the European hake (*Merluccius merluccius*) and the shrimps, as well as other deepwater crustaceans such as *Plesiopenaeus edwarsianus*, *Aristeomorpha foliacea* and *Aristeus antennatus*. Catches of *P. longirostris* by ice trawlers ranged between 3,183 t and 8,996 t in the period 1981-1996. Freezer trawlers (34 from Spain and 43 from Morocco in 1996) target only crustaceans with *P. longirostris* the major component in their catches. The total catch of *P. longirostris* in these fleets varied between 489 t and 6310 t in the period 1985-1996.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. The most recent assessment of the Moroccan *P. longirostris* stock was attempted at the meeting of the Demersal species Working Group from 17-20 September 2002 (unpublished report).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Results from the 1997 assessment showed that the stock was fully exploited with a MSY at the level of 9000 t. The recent stock status is unknown.

RECENT MANAGEMENT ADVICE: The fishery is managed by Morocco by means of gear restrictions and effort regulation combined with closed seasons and areas applied differently to national and foreign fleets. CECAF has advised a precautionary approach to management in order that effort on demersal stocks in the north of the CECAF region is not allowed to increase.

STECF COMMENTS: STECF has no comments.

5.8. Other finfish off Morocco and the Western Sahara (under Moroccan administration)

FISHERIES: As mentioned in Section 5.6, demersal finfish in Moroccan and Western Sahara waters are exploited by a variety of fleets that catch them either as by-catch or as target species. At least 100

different species could be involved. They belong mainly to the families *Sparidae, Sciaenidae, Serranidae* and *Haemulidae*. The available estimates indicate that the amount of finfish caught as by-catch and discarded in fisheries directed at other species may represent a high proportion of the total catch. Fleets specifically targeting these finfish, were based in villages along the Moroccan and the Western Sahara coasts, and in several ports of the Canary Islands.

The Spanish fleet was composed of around 40 wooden boats fishing in the Western Sahara zone south of Cape Bojador (26ºN) using hand lines and traps. Their catches ranged from 1,000 t and 5,000 t in the period 1975-1997. Information on the Moroccan fleet is very scarce. Apparently there are two different types of vessels; longliners and boats using so called small-scale gears (petit métiers). There are between 52 and 98 longline vessels based in Tan-Tan. Those using small-scale gears comprise over 1200 units that operate from different places in the Western Sahara. Catches of longliners in 1988 were 169 t, 117 t of which were seabreams. There is no information on the production of boats using small-scale gears.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for finfish stocks in waters off Morocco and the Western Sahara.

STOCK STATUS: The status of these stocks is unknown.

RECENT MANAGEMENT ADVICE: Moroccan authorities manage these fisheries in the general framework of the different fisheries in which they occur, generally by means of effort regulations and gear restrictions. CECAF has advised a precautionary approach to management in order that effort on demersal stocks in the north of the CECAF region is not allowed to increase.

STECF COMMENTS: STECF has no comments.

5.9. Hake (*Merluccius merluccius*) off Morocco and the Western Sahara (under Moroccan administration)

FISHERIES: The fleets exploiting hake off Morocco until 1996 were: Moroccan ice trawlers, Spanish trawlers (composed of ice trawlers and "trios"), Spanish longliners, Spanish gillnetters and Portuguese polyvalent boats fishing with longlines and gill nets. Moroccan and Spanish ice trawlers were the same fleets that target deepwater shrimps (see section 5.7). Spanish "trios" used to fish in the Western Sahara between 24ºN and 28ºN but withdrew in 1990. Spanish longliners operated along the whole region (Morocco and Western Sahara) fishing both hake and Senegalese hake (*Merluccius senegalensis*), while the gillnetters, having the same target species, restrict their activities to the Moroccan shelf. Little information is available on the Portuguese polyvalent fleet but it is known that boats target European hake, with Senegalese hake as a by-catch (no more than 7% of the total catch). The overall total catch of hake varied from 7,400 t to 13,400 t in the period 1982-1996, with most of the catch taken by the Moroccan and Spanish fleets.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. An assessment of the hake stock has been carried out in four different years using surplus production models and length based cohort analysis (Jones' method).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for European hake off Morocco and Western Sahara.

STOCK STATUS: The most recent assessment made in 1997 showed that the stock is fully exploited with a MSY of around 9,500 t. Length cohort analysis indicated that the Moroccan ice trawler fleet concentrates on juveniles while all other fleets exploit mainly the adult fraction of the stock.

RECENT MANAGEMENT ADVICE: The fishery is managed by Morocco by means of gear restrictions and effort regulations, together with closed seasons and areas, that apply differently to national and foreign fleets. CECAF has advised that the regulation concerning the minimum mesh size of 70 mm hake should be enforced in order to reduce fishing pressure on young fish and that effort on hake should be monitored.

STECF COMMENTS: STECF has no further comments.

5.10. Black hake (*Merluccius senegalensis* and *Merluccius polli*) off Western Sahara (under Moroccan administration), Mauritania and Senegal

FISHERIES: The so called black hake is a commercial category made of Senegalese hake (*Merluccius senegalensis*) and Benguela hake (*Merluccius polli*). These species tend to occur in waters south of Morocco, off Western Sahara, Mauritania and Senegal where the Spanish longline and gillnett fleets (see section 5.9, Fisheries) mainly exploit Senegalese hake. Hake are also exploited by a specialized fleet of Spanish trawlers that targets both species. This fleet operates on the shelf of all three countries, depending on the seasonal abundance of hake in the different areas. The combined catch of black hake by all the Spanish fleets varied between 10586 t and 20622 t over the period 1983-1995.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. There has never been an assessment of the black hake stocks due to the difficulty of obtaining information on the species composition of the catches (morphological similarities make it very difficult to distinguish them at landing sites).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for black hakes in this stock.

STOCK STATUS: No information is available on the status of these stocks

RECENT MANAGEMENT ADVICE: The fisheries are managed by Morocco, Mauritania and Senegal by means of legal sizes, and gear and effort regulations, combined with closed seasons and areas, that are applied differently to national and foreign fleets and which may change from country to country. CECAF has advised that the use of a minimum mesh size of 70 mm for black hake and that fishing effort should be maintained at the current level.

STECF COMMENTS: STECF has no further comments.

5.11. Octopus (*Octopus vulgaris*) in Mauritania

FISHERIES: The cephalopod fishery in Mauritania started in 1965. Since then Japanese, Korean, Libyan, Spanish, Portuguese, Chinese and Mauritanian fleets have all exploited these resources. Currently, some 200 Mauritanian freezer trawlers, most of them re-flagged from the other nationalities, and a substantial artisanal fleet of around 900 canoes fishing with pots (poulpiers), continue to fish the cephalopods in Mauritania. Since 1995 Spanish vessels have returned to the fishery after several decades absence, with around 30 freezer trawlers currently involved in the fishery. Octopus is the target species in this fishery followed in importance by cuttlefish (mainly *Sepia hierredda*), squid (*Loligo vulgaris*) and a miscellaneous group of many different finfish species. Catches have ranged from 15,000 t to 46,000 t in the period 1984-1997.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. Last assessments of the octopus stock from Mauritania have been conducted in 1997 in the frame of a CECAF *ad hoc* Working Group and in a special meeting held in 1998 to deal with the resources of the Mauritanian EEZ. Dynamic production models applied to standardized CPUE series were used in both evaluations.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for these stocks in these areas.

STOCK STATUS: The assessment conducted in 1998 indicated that the stock was over-exploited with MSY at the level of 35,000 t.

RECENT MANAGEMENT ADVICE: The fishery is managed by Mauritania by means of minimum landing sizes (with a minimum size of 500 g), gear restrictions and effort regulations, combined with closed seasons and areas, that apply equally to national and foreign fleets. The assessment 1997 CECAF Working Group stated its concern on the state of the stock and requested the introduction of adequate management measures in the fishery (without any other specification); the 1998 Working group in Nouadhibou recommended a reduction of 25% of the fishing effort exerted by the cephalopod fishery. The results of evaluations carried out at the 2002 meeting of the demersal species WG using the BIODYN model, gave biomass levels comparable with those found at the time of the Working Party of 1997 on cephalopods. The octopus resources fluctuate widely, and CECAF has recommended that annual assessments are carried out.

STECF COMMENTS: STECF has no further comments..

5.12. Cuttlefish (*Sepia hierredda*) off Mauritania

FISHERIES: Cuttlefish species are taken as a bycatch in the same cephalopod fishery as octopus (see Section 5.11 above for more details). The cuttlefish catch can be composed of several different species among which only *Sepia hierredda* is known to be of commercial value. Production of that species varied between 4,000 t and 11,000 t over the period 1984-1996.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. Several attempts have been made in 1978, 1982, 1985, 1991, 1997 and 1998 to assess the state of these stocks

using surplus production models. The results were considered unreliable due to problems with stock identity and the uncertainties in catch and effort data available to the Working Groups.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: The fishery is managed by Mauritania in the general framework of the cephalopod fishery by means of minimum landing sizes, gear restrictions and effort regulations, combined with closed seasons and areas, that are applied equally to national and foreign fleets. The 1998 Working Group in Nouadhibou recommended a reduction of 25% of the fishing effort exerted by the cephalopod fishery. There is no additional advice from CECAF on the cuttlefish stocks off Mauritania.

STECF COMMENTS: STECF has no comments.

5.13. Penaeus shrimps (*Penaeus* spp.) off Mauritania

FISHERIES: The Crustaceans of commercial importance in Mauritanian waters are exploited by a specialized fleet from Spain that targets different species among which are, in order of importance, the shrimp (*Parapenaeus longirostris*), the prawns (*Penaeus notialis and Penaeus kerathurus*), the crab (*Chaceon maritae*) and the deep water shrimp (*Aristeus varidens*). Catches of *Penaeus notialis* made by these boats have varied between 405 t and 1,082 t over the period 1987-1996. There seems to be another fleet component composed of boats apparently chartered by Mauritania, that has been landing crustaceans in Mauritanian ports during recent years. The average overall landings of all species combined by the chartered fleet in recent years is about 400 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. The last attempt to evaluate the *Penaeus notialis* stock was made in the Working Group held in 1998, by applying dynamic production models to standardized CPUE series. Results from the 1998 assessment were considered invalid as no correlation was found between fishing effort and CPUE. This stock assessment was hampered by the difficulty to identify the effort exerted upon coastal and deep shrimps.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS:. The actual status of the stock remains unknown.

RECENT MANAGEMENT ADVICE: The fishery is managed by Mauritania in the general framework of the crustacean fishery by means of gear restrictions and effort regulations. The CECAF Working Group in 1998, recommended to maintain the level of fishing effort. The CECAF Working Group has also recommended licensing schemes for both coastal and deep shrimps, in order to provide good assessments for these stocks, At its 2002 meeting CECAF re-iterated its advice that fishing effort should be maintained at its current level.

STECF COMMENTS: STECF has no comments.

5.14. Deepwater shrimps (*Parapenaeus longirostris* and *Aristeus varidens*) off Mauritania

FISHERIES: These species are fished in the same fishery described in section 5.13. *Parapenaeus longirostris* is the main target species in the fishery accounting more than 50% to the total catch. Catches of this species has ranged from 488 t to 2,382 t over 1987-1996, while that of *Aristeus varidens* has varied between 43 t and 314 t during the same period.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. The most recent attempt to evaluate the *Parapenaeus longirostris* stock was made in a Working Group held in 1998, which applied dynamic production models to standardized CPUE series. The *Aristeus varidens* stock has never been assessed. Results from the 1998 assessment of *Parapenaeus longirostris* were considered invalid as no correlation was found between fishing effort and CPUE. This stock assessment was hampered by the difficulty to identify the effort exerted upon coastal and deep shrimps.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: The actual status of both stocks remains unknown.

RECENT MANAGEMENT ADVICE: The fisheries are managed by Mauritania in the general framework of the crustaceans fishery by means of gear restrictions and effort regulations. The CECAF Working Group in 1998, recommended to maintain the level of fishing effort. The CECAF Working Group has also recommended licensing schemes for both coastal and deep shrimps, in order to provide good assessments for these stocks, At its 2002 meeting CECAF re-iterated its advice that fishing effort should be maintained at its current level.

STECF COMMENTS: STECF has no comments.

5.15. Atlantic horse mackerel (*Trachurus trachurus*) and Cunene horse mackerel (*Trachurus trecae*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: The Atlantic horse mackerel is distributed off Western Sahara (under Moroccan administration) and Mauritania, while the cunene horse mackerel is mainly found in Mauritania and Senegal waters. The limit of the distribution of these stocks is subject to long-term variations. This greatly influences the catch of these species in Mauritania. Off both Western Sahara and Mauritania, the catch of Atlantic horse mackerel is taken by foreign pelagic trawlers, mostly of East-European origin. The main part of this catch is taken in Western Sahara waters.

Catches in the northern CECAF region have ranged from 22,000 t to 85,000 t in the period 1990-2001.. In Senegal, the cunene horse mackerel is taken by artisanal fishermen, local industrial boats, and foreign trawlers. In Mauritania and Western Sahara, the catch is taken by foreign pelagic trawlers, mostly of East-European origin. These vessels target horse mackerel in preference to sardinella, because of the higher value of the horse mackerel. Catches of cunene horse mackerel in the northern

CECAF region during 1991-2001 have fluctuated around 70,000 t –198,000 t showing an increasing trend in the two last years.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment working group on small pelagics was held in Banjul (Gambia) in 2002. . For exploratory purpose, a Separable VPA was run for the two species (*Trachurus trachurus* and *Trachurus trecae).* Thereafter, an Integrated Catch Analysis (ICA) was run for each of the species separately. The results of the ICA for *T. trachurus* indicate that the stock has been through fluctuations during the last twenty years, and that the stock has been in a declining phase in recent years. For *T. trecae*, the ICA did not find a reasonable solution. The acoustic time-series for that species shows the opposite trend with an increasing trend in stock biomass.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks

STOCK STATUS: The actual status of the stock remains unknown.

RECENT MANAGEMENT ADVICE: The present assessments must therefore be looked upon as preliminary and the stock and F-levels must not be used for management purpose. However, the trends in stock and F's seem to be well estimated. Considering the many uncertainties in the assessment of these stocks, a precautionary approach should be taken in management of the stocks. And the WG recommends a restriction of fishing effort to the current level.

STECF COMMENTS: STECF has no comments.

5.16. Mackerel (*Scomber japonicus*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: . Catches of mackerel in the northern and southern CECAF region during 1990-2001 have fluctuated from 20,000 t to 214,000 t. In the Moroccan zone north, A and B, mackerel is a by-catch in the fishery for sardine. The total catch during 2001 reached about 25,600 t. In Southern stock, for the vessels working under joint ventures (from Ukraine and other countries), the catch was 90,500 t and 65,00 t in 2000 and 2001 respectively. In Mauritania, the total catch of the trawlers was 65,000 t and 60,000 t in the years 2000 and 2001 respectively. In Senegal and Gambia, mackerel is exploited by the artisanal and industrial fleets. The total catch in this area in 2000 and 2001 was around 2,000 – 2,500 t.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment working group on small pelagics was held in Banjul (Gambia) in 2002. . An Integrated Catch Analysis (ICA) was used for this species. The results showed that the total biomass reached a maximum in 1995 (1,1 million tonnes) and decreased from 1996 to 2001. Generally, the estimations by ICA were in good agreement with the results of Russian acoustic surveys.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The actual status of the stock is unknown.

RECENT MANAGEMENT ADVICE: . The results of the ICA indicate a decreasing trend in biomass. Although the results are uncertain, due to inconsistencies in the input data, the 2002 Working Group considered that there is reason for a precautionary approach, avoiding an increase in fishing effort.

STECF COMMENTS: STECF has no comment.

5.17. Sardinella (*Sardinella aurita* and *S. maderensis*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: The two species of sardinella, *Sardinella aurita* and *S. maderensis*, have been lumped together because most of the commercial catches consist of a mixture of both species, and the species composition of these catches is either suspect or unknown. *Sardinella* is caught off Western Sahara (under Moroccan administration), Mauritania, Senegal and The Gambia. The sardinellas are not target species in The Gambia. The landings in the artisanal fishery are very low and no major variations in landings have been observed. There are no industrial pelagic fishing vessels. In Senegal, the resources of coastal small pelagics are exploited by an artisanal fishery and an industrial one. The artisanal fishery uses motorised canoes and a variety of fishing gears. The industrial fleet consists mainly of trawlers and seiners, some of which are of foreing origin, which work under commercial contracts. In Mauritania and Western Sahara, an artisanal fishery for sardinella is virtually non-existent. The goverments of these contries utilize the *Sardinella* resource by selling licenses to foreign pelagic trawlers. The *Sardinella* stock of Mauritania and Western Sahara has been exploited since the late 1960s by pelagic trawlers from Eastern Europe, and also by combinations of purse seiners and factory vessels from South Africa and Norway. The factory vessels and purse seiners terminated their operations in 1991, when they ran into economic problems due to the withdrawal of state support. After a decline in East-European effort, the Mauritania government invited EU ship owners to come to Mauritania and compensate for the decline of the East-European fishing effort. Starting from 1996, a fleet of 6-8 mainly Dutch vessels has been working in Mauritanian waters. In 2000, three large units have been added to the fleet. In 2001 a new regulation was introduced in Mauritania, which resulted in an extension of the fishing limits for pelagics trawlers from 12 miles to 13-25 miles off the coast. The exploitation of sardinellas in the Moroccan southern zone gained importance in the early 1990s. In the 1990s, this fishery was conducted mainly by pelagic trawlers that worked for Moroccan joint ventures, and trawlers operating under the fishery agreement between Morocco and the Russian Federation. The total catches in the region have varied between 219,000 t and 588,000 t from 1990 to 2001.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessments Working Group on small pelagics was held in Banjul (Gambia) in 2002. A special meeting held in 1998 dealing with the resources of the Mauritanian EEZ. A workshop to review information on small pelagics off northwest Africa was held in Casablanca (22-26 February 2000). Using information on length and age distribution, The 2000 Working Group has tried to apply a VPA on the sardinellas, but the results were considered not satisfactory. The indices from acoustic surveys by the Institute of Marine Research of Bergen (Norway) show the same trend for both species of sardinella, i.e. a decline from 1995 to 1997 and a recovery in 1999 (1,828,000 t in 1998 and 3,627,000 t in 1999). Biomass estimates in 2001 was 3,200,000 t but these estimates should be regarded as abundance indices, and not as absolute estimates.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Provisional information from the workshop indicates that the stock declined from 3.5 million tonnes in 1992 to 1.8 million tonnes in 1998. The survey undertaken in 1999 has apparently shown a recovery of the stock to the level of 1992. The status of sardinellas was reviewed at the meeting of the pelagic species Working Group held in 2002. But the results were considered not satisfactory.

RECENT MANAGEMENT ADVICE: In its 2002 report CECAF advised that a precautionary catch level of 500,000 tonnes should be maintained for the Sardinellas (both species) in the Northwest area of the CECAF region.

STECF COMMENTS: SRECF has no comments.

5.18. Other finfish in Mauritanian waters

FISHERIES: The situation of other finfish stocks in Mauritania is very similar to that in Western Sahara (see section 5.8). This group is composed of around 100 different species that can be taken either in directed fisheries or as by-catch in other fisheries. The directed fishery is conducted by an unknown number of small canoes that operate from many different places in the coast using a variety of artisanal gears. Other fisheries take these species as a by-catch and only retain onboard those that have any commercial interest, the remainder being discarded. The magnitude of the catches of these species is unknown.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment Working Group on demersal finfish was held in 1984. . A special meeting held in 1998 dealing with the resources of the Mauritanian EEZ.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks

STOCK STATUS: The Working Groups in 1984 and 1998 were unable to assess the status of these stocks.

RECENT MANAGEMENT ADVICE: Not available.

STECF COMMENTS: STECF has no comments.

5.19. Deepwater shrimps off Senegal

FISHERIES: Crustaceans resources in Senegal are mainly made of shrimps (*Parapenaeus longirostris* and *Aristeus varidens*) and crab (*Chaceon maritae*). These species are exploited in a fishery mainly conducted by Spanish trawlers. Total catches of crustaceans in the period 1987-1996 have fluctuated between 1,174 t and 2,330 t.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment working group on crustaceans was held in 1997. No attempt has been made to assess the state of these stocks.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: CECAF has advised that fishing effort on shrimp should be maintained at its currrent level.

STECF COMMENTS: STECF has no comments.

5.20. Deepwater shrimps off Guinea Bissau

FISHERIES: Crustaceans resources in Guinea Bissau are mainly made of shrimps (*Parapenaeus longirostris* and *Aristeus varidens*), prawns (*Penaeus notialis*) and crab (*Chaceon maritae*). These species are exploited in a fishery mainly conducted by Spanish trawlers. Total catches of crustaceans in the period 1987-1996 have fluctuated between 378 t and 1,943 t.

SOURCE OF MANAGEMENT ADVICE: : CECAF is the advisory body for this area. The last CECAF assessment working group on crustaceans was held in 1997. No attempt has ever been made to assess the state of these stocks. In 1989, 1990, 1991 and 1995 IPIMAR conducted trawl surveys in a rectangle close to the Bijagó s archipelago. Biomass estimates for the prospected area in 1989, 1990, 1991 and 1995 are respectively 12.9t, 18t, 42.5t, 29.7t for *P. longirostris*, and 7.2, 9.7, 55.3, 14.8 for *P. notialis*..

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: Not available.

STECF COMMENTS: STECF has no comments.

5.21. Cuttlefish (*Sepia hierredda*) off Guinea Conakry

FISHERIES: The cephalopod fishery off Guinea Conakry is conducted by Spanish freezer trawlers that started their activities in the area in 1986. In 1990 there were 24 units fishing for cephalopods but the number has decreased in successive years with only two vessels involved in 1994. The target species in this fishery is the cuttlefish (*Sepia hierredda*), with a by-catch of octopus (approximately 8% of the total catch). Reported catches of octopus have varied between less than a ton and 576 t during 1986-1996. Catches of the cuttlefish (*Sepia hierredda*) have ranged between 118 t and 4,510 t in the period 1986-1996.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment working group on cephalopods was held in 1997. No attempt was made to assess the state of this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for cuttlefish in Guinea Conakry.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: Not available.

STECF COMMENTS: STECF has no comments.

5.22. Octopus (*Octopus vulgaris*), Senegal

FISHERIES: This octopus stock has been exploited actively in Senegal since 1986, when this species became abundant in the area. It is commonly hypothesized by scientists, that the development of this stock was a consequence of the sparid over-fishing in the area (as in Morocco and in Mauritania). This highly valuable stock is targeted seasonally by large-scale fisheries (bottom trawling, national and foreign fleets, including EU fleets) and artisanal fisheries (canoes fishing with hand line and jigs, all this catch being exported). Pots are not used in Senegal by the artisanal fishery. In recent years, the two gears used by the artisanal fishery have each accounted for about 50% of the artisanal catch.

The artisanal and large-scale fisheries tend to operate in different fishing zones, the artisanal ones being more coastal, and there is probably little interaction between the them. Catches from this stock are highly variable from year to year, because the fishery exploits only one year class (the life span of octopus is less than one year) and because the levels of recruitment are quite variable. This variability of recruitment is probably related to the upwelling strength: a strong upwelling producing high recruitment, followed by high catches during the subsequent year. Over 50,000 t of octopus was removed from this region in 1999 for example.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is CECAF. However, in practice, the stock is localised and permanently resident in the Senegalese EEZ and its assessment and management is undertaken entirely by Senegal.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The assessment of this stock is inconclusive, but it appears that the fishing capacity in the area, combining artisanal and industrial vessels, is already excessive. The stock appears to subject to growth over-fishing.

RECENT MANAGEMENT ADVICE: Recently, various management measures, such as size limits and seasonal closures of variable duration have been introduced. The scientific analyses undertaken indicate that these measures may have had little or no positive effects on the yield-per-recruit, but that they may have had a positive effect on the market. The results of evaluations carried out at the 2002 meeting of the demersal species WG using the BIODYN model, gave biomass levels comparable with

those found at the time of the Working Party of 1997 on cephalopods. The octopus resources fluctuate widely, and CECAF has recommended that annual assessments are carried out.

STECF COMMENTS: STECF has no comments.

6. Resources in the area of WECAF

STECF was unable to update the stock status and advice for most stocks in the area of WECAF. Consequently, the text of section 6 reflects the stock status as described in the 2002 stock review.

6.1. Shrimp (*Penaeus subtilis*), French Guyana

FISHERIES: Shrimp in the French Guyana EEZ, are now exclusively taken by French shrimp trawlers. Over the historical time period of the fishery (1968-1999), catches have fluctuated between 1 500 t and 5 600 t. The high variations in catches are mainly the result of changes in fleet composition and activity (USA and Japanese fleets in the early period, and the French fleet latterly), and economical and social problems (strikes). Over recent years, landings have been stable (about 3 800 t). The assessment area includes the French Guyana EEZ.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the IFREMER Centre in Cayenne. The assessment is based on LPUE (Landings per Unit Effort), production model, and catch-at-length analysis (cohort analysis).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The LPUE's series of the shrimp fleet shows seasonal trends, fluctuating around 200 kg/day. Over the period 1990-1999 there was a strong increase in average yield per day, probably due to a change fishing strategy as the fleet re-directed effort towards smallest individuals in shallower waters. Production modelling indicates an increase in the stock biomass over the last few years, coincident with a decrease in fishing effort since the early 1980's. The average biomass over 1996-1999 has been estimated at about 10 000 t, close to 2/3 of the estimated virgin biomass of 15 000 t - 16,000 t. The estimated catch at 90% of MSY is close to 4 000 t, which is consistent with the present TAC of 4 108 metric tons established for the fishery.

Estimated LPUE at 90% of MSY is around 250 kg per fishing day, close to the actual catch rates in the fishery. LPUE is directly affected by the level of recruitment. Cohort analysis shows that statistically, there is no relationship between effort and fishing mortality.

RECENT MANAGEMENT ADVICE: The stock is considered to be fully exploited. A precautionary mutli-annual (5 years period) TAC of 4 108 metric tons was decided by the European Community.

STECF COMMENTS: STECF agrees with the advice given by IFREMER

6.2. Red Snapper (*Lutjanus purpureus*), French Guyana

FISHERIES: Red snappers in French Guyana EEZ are exclusively taken by Venezuelan handliners. Over the historical time period of the fishery (1986-1999), catches have increased from 680 t in 1986 to 1 960 t in 1996..

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the IFREMER Centre in Cayenne. The assessment is based on CPUE (Catches Per Unit Effort), production model, and catch-at-length analysis (cohort analysis).

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: The catch rates of red snapper in the fishery in the French Guyana EEZ, shows slight seasonal variation, fluctuating around 28 kg/hour. Catch rates are usually highest during the dry season (quarter 3 and 4) and lowest during the rainy season (quarters 1 and 2). After 1991, the mean length of red snapper landed, declined from 45 cm to 37 cm. No changes have been observed in hook selectivity. There is a good relationship between effort, F and landings. Then trend in recruitment is upward, despite an increase in fishing effort over the same period. Y/R and SSB/R analyses indicate that current F is above F_{max}.

RECENT MANAGEMENT ADVICE: The stock is considered to be overexploited. Fishing effort should be reduced. Considering the vulnerability of the snappers, only handlines should be authorised to catch this species.

STECF COMMENTS: STECF agrees with the advice given by IFREMER

7. Resources in the South-East Atlantic

STECF was unable to update the stock status and advice for all stocks in the SE Atlantic. Consequently, the text of section 7 reflects the stock status as described in the 2002 stock review.

7.1. Deepwater shrimp (*Aristeus varidens*), Angola

FISHERIES: The Deepwater shrimp resources in Angola waters are exploited by nationals or under private fishing agreements (24 vessels) and Spanish (22 vessels) trawl fleets that target two different species which are, the rose shrimp (*Parapenaeus longirostris*) and the striped shrimp (*Aristeus varidens*). The depth distribution of each species is different, as well as, the nets used to harvest each one. Thus, the effort applied is independent for each resource. The crab *Chaceon maritae* is caught as by-catch in this fishery. Catches of *A. varidens* ranged between 1,323 t and 1,578 t over the periode 1993-1997.

SOURCE OF MANAGEMENT ADVICE: There is not an international management advisory body for this region. Angola manages the fishery in the general framework of the crustacean fishery. Several surveys based on swept-area method were carried out to obtain biomass indices, within the Angolan-Spanish cooperation program and Fridtjof Nansen program. In 1999, FAO promoted a Workshop in Luanda (Angola) to attempt the assessment of shrimp and crab stocks in the southern part of the CECAF region, Angola and Namibia. The assessment of *A. varidens* was based on CPUE data by applying simple surplus models. However, the uncertainties about the data available did not allow to obtain a very reliable or precise results.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The CPUE's series of the shrimp fleet shows a decreasing trend mainly during the last years, although with a weak slope. According 1999 assesment the stock seems to be fully exploited.

RECENT MANAGEMENT ADVICE: Angola manages the fishery by means of mesh size restrictions, closing seasons, TAC and effort regulations. The 1999 Workshop recommended a reduction in the overall fishing effort.

STECF COMMENTS: none

7.2. Deepwater shrimp (*Parapenaeus longirostris*), Angola

FISHERIES: The rose shrimp (*Parapenaeus longirostris*) is the most abundant spacies of the deepwater shrimp off Angola (see Section 7.1 above for more datails about the fishery). Over the periode 1993-1997, catches of *P, longirostris* ranged between 3,223 t and 4,529 t.

SOURCE OF MANAGEMENT ADVICE: There is not an international management advisory body for this region. Angola manages the fishery in the general framework of the crustacean fishery. Several surveys based on swept-area method were carried out to obtain biomass indices, within the Angolan-Spanish cooperation program and Fridtjof Nansen program. In 1999, FAO promoted a Workshop in Luanda (Angola) to attempt the assessment of shrimp and crab stocks in

the southern part of the CECAF region, Angola and Namibia. The assessment of *P. longirostris* was based on CPUE data by applying simple surplus models and length based model (LCA). However, the uncertainties about the data available did not allow to obtain a very reliable or precise results for all approaches, although results could show some indication on the stock status.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The CPUE's series of the shrimp fleet shows cyclical fluctuations without any overall trend. The fishery is highly dependent of year class strength and catches consist mainly of only 2 age groups. Results from LCA show that the mean fishing mortality is close to F_{max} and greater than $F_{0.1}$. According the different approaches the stock seems to be heavily exploited.

RECENT MANAGEMENT ADVICE: Angola manages the fishery by means of mesh size restrictions, closing seasons, TAC's and effort regulations. The 1999 Workshop recommended a reduction in the overall fishing effort.

STECF COMMENTS: none

7.3. Benguela hake (*Merluccius polli*), Angola

FISHERIES: The Benguela hake (*Merluccius polli*) has its southern distribution limit in Angola waters, overlaping with Cape hake (*Merluccius capensis*) to the south of the country. This species is discarded by trawlers in the deepwater shrimp fishery with other finfish species. Two or three Spanish vessels caught this species together *M. capensis* in Angola waters, close to the border of Namibia. The catches of this fleet was around 1,200 t over 1989-1999.

SOURCE OF MANAGEMENT ADVICE: There has never been an assessment of this stock in this region.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: None.

7.4. Cape hakes (Merluccius capensis and Merluccius paradoxus), South Africa

FISHERIES: The two species of Cape hake are found throughout South African and Namibian waters. *Merluccius paradoxus* occurs in deeper water than *Merluccius capensis.* The former is mainly located in South Africa waters, although have been reported in the last years a significant longshore movement of this species to the North. The resource is mainly exploided by South African flagged vessels. From 1977 hake catches in South African waters have remainded stable at just over 140,000 t per year

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the Marine and Coastal Management (South Africa). Hakes are assessed as one for management purposes, using commercial data in a localy-developed dynamic Shaefer.form production model, and is tuned by data from research swept-area surveys.

PRECAUTIONARY REFERENCE POINTS: No information about precautionary reference points proposed for this stock.

STOCK STATUS: Estimations from a age-structured production model indicates that the stock has been stable over the past two decades, with signs of gradual increase in recent years at a level of 1,000,000 t of biomass.

RECENT MANAGEMENT ADVICE: The Demersal Working Group makes annual TAC recomendations.

STECF COMMENTS: None.

8. Resources in the South-west Atlantic

STECF was unable to update the stock status and advice for most stocks in the SW Atlantic. Consequently, the text for some stocks in section 8 reflects the stock status as described in the 2002 stock review.

8.1. Patagonian grenadier-Hoki (*Macruronus magellanicus*), Falkland Islands

FISHERIES: Hoki is mainly caught in the western part of the Falkland Islands Interim Conservation and Management Zone (FICZ). This fish is targeted mainly by various European and Falkland Islands registered finfish trawlers. The catches of hoki increased from ~10,000 t in early 1990s to ~20,000 t in 1998-2000. Hoki is targeted in two seasons, in February-May and in July-October. The fish is taken also as a by-catch in Southern Blue Whiting fishery by surimi vessels, and in *Loligo* fishery.

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College, together with input from the South Atlantic Fisheries Commission (SAFC).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The stock is considered to be in good condition, likely to be due to good recruitment of two or three recent large cohorts into the fishery. However, from historical point of view the catches of hoki were quite variable, and there is a concern that current high catches could not be sustainable in the long term.

RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones is being held constant or reduced.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.2. Southern blue-whiting (*Micromesistius australis*), Falkland Islands

FISHERIES: Southern blue whiting (SBW) is mainly caught in the south-western and north-eastern parts of the FICZ. It is targeted mainly by two large (Japanese and Chilean) surimi vessels, and also taken as a by catch during the finfish fishery in the western part of the FICZ. Spawning fish migrate into the FICZ in dense schools in August-September, and remain there until March. The catches of southern blue whiting were the highest in early 1990s (up to 72,000 t), then decreased to 25,000-30,000 t in 1999-2000.

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College, together with input from the South Atlantic Fisheries Commission (SAFC).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The stock has declined to about one third of initial level (observed in early 1990s), and recruitment was also declined to lower levels.

RECENT MANAGEMENT ADVICE: It was recommended that the total catch of SBW should be limited to 50,000 t in the Southwest Atlantic in order to halt the decline in biomass. It was agreed to restrict the total catch of SBW in Falkland Conservation Zones to 25,000 t.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.3. Red cod (*Salilota australis)*, Falkland Islands

FISHERIES: Red cod is fished in the western part of the FICZ mainly as a by catch during hoki and hake fisheries. Additionally, red cod is targeted by Spanish trawlers in spring (September-November) in its spawning grounds to the south-west of the Islands. Catches of red cod are quite variable during the last decade (3,000-9,000 t), with quite high catches in 1998-2000 (6,500-9,000 t).

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The status of the stock is unknown, but an increase in the total catch in recent years arise concerns to the appropriate management of the red cod stock in FICZ.

RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones is being held constant or reduced.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.4. Argentine hake, Austral hake (*Merluccius hubbsi, Merluccius australis*), Falkland Islands

FISHERIES: Hakes are mainly caught in the western part of the FICZ (Austral hake is almost exclusively caught to the SW of the Islands). They are targeted by Spanish and Falkland Islands registered trawlers having a special license for unrestricted finfish. The total catch of hakes in FICZ/FOCZ (Falkland Islands Outer Conservation Zone) decreased from 12,000 t in 1990 to 1,500 t in 1994-1997, and then started to increase again, attaining levels observed in 1992-1993 (3,500-4,200 t). Hakes are targeted mainly in winter during their migrations to the Falkland waters from the Patagonian shelf. The fish is taken also as a by catch during the specialized *Loligo* fishery in the eastern part of the FICZ.

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The stock of common hake in the FICZ is a 'shared' stock with Argentina. It is currently in quite poor condition, and only a small proportion of the stock occurs in Falkland Zones.

RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones is being held constant.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.5. Argentine short-finned squid (*Illex argentinus*), Falkland Islands

FISHERIES: The major fishery resource of the Falkland Islands in terms of total catch and licensing revenue. *Illex* is targeted by Asian jigging fleet (mainly from Korea, Taiwan and Japan), and also by some trawlers in February-June. The main fishing area lies in the northern and north-western parts of the FICZ/FOCZ (north of 52°S). The total catch varied in the last decade, being 100,000-175,000 t in early 1990s, then decreasing to 65,000-80,000 in the middle of the decade and increasing again at the end, attaining the record values in 1999 (~266,000 t). The fishing effort is quite stable during the last five years (80-120 jigging vessels).

SOURCE OF MANAGEMENT ADVICE: Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College, together with input from the South Atlantic Fisheries Commission (SAFC). Each year a pre-recruit survey of the *Illex* stock is undertaken. This is a joint Argentinean/British research cruise involving scientists from Argentina, Britain and the Falklands.

PRECAUTIONARY REFERENCE POINTS: Fishing effort has been held constant in Falkland Zones in recent years. In the event that the spawning stock biomass is likely to decline below the Precautionary Reference Point of a minimum of 40,000 t, there is an agreement that both Argentina and the UK will take an appropriate action. In such a case the *Illex* fisheries in both Argentina and the Falklands may be closed early.

STOCK STATUS: The status of the stock is changing every year due to the short life cycle of the squid (1 year). After a collapse of the Illex argentinus fishery in 2002 due to unfourable environmental conditions, recruitment in 2003 was abundant and almost at the level of those observed in 2000-2001. The total catch in Falkland Zones in 2003 was just over 100,000 mt, but it was taken mainly in the beginning of the fishery season (March - first half of April). Later in the season, the catches dropped significantly, and the fishery was closed earlier, at the end of May.
RECENT MANAGEMENT ADVICE: The distribution of *Illex* is such that it would benefit from a multilateral approach to extend conservation measures to the High Seas (international waters of 45-47°S)**.** This could grow into a regional fisheries organisation.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.6. Patagonian squid (*Loligo gahi*), Falkland Islands

FISHERIES: The second of the major fishery resources in the FICZ, and a domestic resource for the Falkland Islands. *Loligo* is targeted mainly by European and Falkland Islands registered trawlers at depth range of 120-250 m in the region located to the south-east of the Falkland Islands (the so-called '*Loligo* box'). There are two fishing seasons in each year. The first season is in February-May, and the second season lasts from August to October. The total catch is variable during the last decade. The highest catches were observed in 1990, 1992 and 1995 (80,000-98,000 t). In the last several years, catches decreased down to 26,000 t in 1997, showing some recovery in 2000 (65,000 t). The fishing effort is stable, being 15 trawlers in the first season and 16 trawlers in the second season. **SOURCE OF MANAGEMENT ADVICE:** Falkland Islands Government using advice from the Renewable Resources Assessment Group (RRAG), Imperial College.

PRECAUTIONARY REFERENCE POINTS: A minimum spawning stock biomass of 10,000 t at the end of the second season. The fishery is halted once the minimum stock biomass has been achieved.

STOCK STATUS: The stock status is changing every year due to the short life cycle of the squid (1 year). Abundance of the first cohort of Loligo is still at the low level, whilst the abundance of the second cohort of squid is at the medium level. Warmer water temperatures in winter 2003 than in winter 2002 induced higher growth rates of the second cohort of squid.

RECENT MANAGEMENT ADVICE: Poor recruitment and stock status of the first cohort of Loligo induced some drastic restriction of the fishing effort during the first season, which was effectively cut by half. The total duration of the first season was 1.5 months (instead of common four months), and fishery of small squid of the second cohort in May was also forbidden.

The second season was closed two weeks earlier (on the 15 October) for conservative reasons in order to prevent catches of migrating mature females to their spawning grounds. Despite all these restrictions, the total annual catch of Loligo achieved 47,400 mt, which was quite close to the average catch of Loligo in the last decade (53,000 mt). **STECF COMMENTS** STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization.

8.7. Patagonian grenadier-Hoki (*Macruronus magellanicus*), Argentina

FISHERIES: Hoki is caught inside argentinean waters by bottom trawlers and probably by artisanal fleets.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed or are unknown.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands and/or International waters stocks, so effort should be made to improve stock identification.

8.8. Southern blue-whiting (*Micromesistius australis*), Argentina

FISHERIES: Southern blue-whiting is caught inside argentinean waters by bottom trawlers and probably by artisanal fleets

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed or are unknown.

STOCK STATUS: STECF did not have access to any stock assessment in this area .

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands and/or International waters stocks, so effort should be made to improve stock identification.

8.9. Red cod (*Salilota australis)*, Argentina

FISHERIES: Red cod is caught inside argentinean waters by bottom trawlers and probably by artisanal fleets

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed or are unknown..

STOCK STATUS: STECF did not have access to any stock assessment in this area..

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands and/or International waters stocks, so effort should be made to improve stock identification.

8.10. Argentine hake (Merluccius hubbsi), Argentina

FISHERIES: Argentine hake is targeted inside argentinean waters by bottom trawlers and by artisanal vessels using different fishing gears. Importat amounts of juveniles are discarded in the shrimp fisheries carried out by trawlers around San Matias Gulf.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed for this stock or are unknown.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: Several closed areas and/or seasons have been implemented in recent years by Argentinean authorities. Some of the protected areas are the nursery grounds around Isla Escondida and the shrimp fishing area around San Matias Gulf. Different Conservation measures are in force to the north and south of parallel 41º S respectively.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands and/or International waters stocks, so effort should be made to improve stock identification.

8.11. Argentine short-finned squid (*Illex argentinus*), Argentina

FISHERIES: *Illex argentinus* is caught inside argentinean waters by bottom trawlers, jiggers and perhaps by artisanal vessels.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: In the event that the spawning stock biomass is likely to decline below the Precautionary Reference Point of a minimum of 40,000 t, there is an agreement that both Argentina and the UK will take an appropriate action. In such a case the *Illex* fisheries in both Argentina and the Falklands may be closed early.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: Different Conservation measures are in force to the north and south of parallel 41º S respectively.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands or International Waters stocks, so effort should be made to improve stock identification.

8.12. Patagonian squid (*Loligo gahi*), Argentina

FISHERIES: Even *Loligo gahi* abundance is lower inside the Argentine EEZ than in other areas, some quantities arecaught as a by-catch by bottom trawlers in the finfish fisheries and perhaps by artisanal fleets

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed or are unknown.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic into a regional fisheries organization. It is not clear if this is a separate stock from Falklands or International waters stocks, so effort should be made to improve stock identification.

8.13. Patagonian grenadier-Hoki (*Macruronus magellanicus*), International waters

FISHERIES: Hoki is fished as a by catch during Illex and hake fisheries by bottom trawlers from several countries -namely Spain-.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown.. .

RECENT MANAGEMENT ADVICE: no management advice has been made so far for this stock.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

8.14. Southern blue-whiting (*Micromesistius australis*), International waters

FISHERIES: Southern blue-whiting is fished as a by catch during Illex and hake fisheries by bottom trawlers from several countries, mainly from Spain.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown..

RECENT MANAGEMENT ADVICE: no management advice has been given for this stock.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stok into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

8.15. Red cod (*Salilota australis)*, International waters

FISHERIES: Red cod is caught as a by catch during hake and Illex squid fisheries by bottom trawlers from several countries, mainly from Spain.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown. .

RECENT MANAGEMENT ADVICE: no management advice has been given for this stock.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

8.16. Argentine hake, Austral hake (*Merluccius hubbsi, Merluccius australis*), International waters

FISHERIES: Argentine hake is targeted by bottom trawlers from several countries, mainly from Spain. International waters are the most important area for Spanish trawlers targetting for hake in the SW Atlantic. The highest catches for this fleet in the Patagonian Shelf were observed in 1990 with more than 100,000 tons, corresponding most of them to the High Seas. The main fishing grounds are located between parallels 44-47º S. Very reduced catches of Austral hake have been reported in this area.

The maximum effort in International waters and Falkland Islands by Spanish vessels (nº of boats) was also reported in 1990, decreasing since then, mainly due to the development of new fisheries in other areas

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown. .

RECENT MANAGEMENT ADVICE: No management advice has been given for this stock.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock. into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

8.17. Argentine short-finned squid (*Illex argentinus*), International waters

FISHERIES: *Illex argentinus* is targeted by bottom trawlers and jiggers durig the first half of the year. The main fishing area is between parallels 44-47º S. Bottom trawlers are mainly from Spain, whereas jiggers belong to several Asian countries such as Japan, Korea and Taiwan.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown. .

RECENT MANAGEMENT ADVICE: No management advice has been given for this stock, even recomendations to extend conservation measures to the High Seas such as shelf restriction in catches have been proposed to vessels.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock. into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

8.18. Patagonian squid (*Loligo gahi*), International waters

FISHERIES: *Loligo gahi* is caught in relativey small quantities as a by catch by bottom trawlers during hake and Illex fisheries. The main fishing area is around parallel 42º S, where big catches of mainly juvenile patagonian squid have been reported in different years by observers on board of Spanish vessels.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: No assessment has been made so far for this stock, so that stock status is unknown.

RECENT MANAGEMENT ADVICE: No management advice has been given for this stock.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock. into a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

9. Mediterranean resources (GFCM)

The Management advisory body is the Scientific Advisory Committee (SAC) of the General Fisheries Commission for the Mediterranean (GFCM). The SAC is organised in Sub-committees. The Stock Assessment Sub-committee gives advices on stock status and was held in Nicosia (Cyprus) in June 2003.

The state of the Mediterranean stocks is not regularly updated and assessments are only carried out locally and irregularly. For example, red mullet and hake are very important species throughout the Mediterranean, but in the report of the 2003 SAC, assessments for these species in two areas were carried out, even though data on these species in other areas are available in national databases. A stronger commitment to SAC-GFCM goals from EU member states would improve the present situation. Time series assessment for all the stocks are needed to give appropriate and rational management advice. The framework of the National programs for data collection is expected to at least partially solve this problem.

STCEF recommends that member states should present assessments for all the stocks mentioned in the regulation 1639/2001 for each GFCM sub-area under European Community jurisdiction.

9.1. European anchovy (*Engraulis encrasicolus)* in Geographical Sub Area 1. Northern Alboran Sea.

FISHERIES: Anchovy and Sardine are the main target species of the purse seine fleet in the Northern Alboran Sea. Other accompanying species with lower economical importance are also caught such as: Horse mackerel *(Trachurus* spp), mackerel *(Scomber spp),* Atlantic saury *(Scomberesox saurus)* and gilt sardine *(Sardinella aurita).* In the South-Mediterranean Region (from Gibraltar Strait to Cape of Gata) the fleet has continuously decreased in size over the last two decades, from more 230 vessels in 1980 to 120 in 2001. The present fleet has a mean GRT of 17.2 t. Only Malaga Bay fishing area, which represents 85% of total landings, has been considered by the WG. After a minimum in 1993, landings increased slightly up to 1996, but declined again in subsequent years, reaching a minimum in 2000. Landings increased strongly in 2001, together with an increase in CPUE to the highest level since 1995. This was despite the fact that landings were purposefully restricted by the catching sector in order to maintain market prices.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM and its Sub-committee for Stock Assessment (Nicosia, June 2003). Information from fishery: Landings and CPUE trends. Acoustic survey carried out 2000 to 2001.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: This stock has been assessed in 2002. The estimated biomass for Malaga Bay (GS 1) in 2001 (13,210 tonnes) represented a significant increase on the 2000 estimate (1,716 tonnes). Since most of the stock is concentrated in Malaga Bay, the increase can be considered as representative of the whole northern Alboran area.

RECENT MANAGEMENT ADVICE: The reduction in fishing effort since 1985 coupled with the good 2001 recruitment means that in the short-term, the stock can probably support the recent

exploitation rate. However, since the catches are mainly comprised of age groups 0 and 1, the stock and fishery is highly dependent on recruitment, which is highly variable. Continued monitoring of the stock and catches should be maintained.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.2. European anchovy (*Engraulis encrasicolus)* in Geographical Sub area 6 Northern Spain.

FISHERIES: Anchovy and sardine are the main target species of the Spanish purse seine fleet in Sub-area 6. Sardine is the species with the highest amount of catch and the highest value. The fleet presently consists of 191 purse seiners, 12% fewer than in 2001 and a mean GRT of 32.60. Landings peaked at around 22,000 tonnes in 1994, but then decreased to about 6,000 tonnes in 2000; the lowest for the last fifteen years. The anchovy landings represent 80% of the total catch of anchovy from the Spanish Mediterranean.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Stock status in largely based on acoustic surveys, which have been carried out from 1990 to 1993, and from 1995 to 2001, between La Nao Cape and Creus Cape (Tramontana Region). The period in which the surveys were carried out corresponds to the recruitment season of the species. The most important recruitment area is located between Barcelona and the south of the Ebro River Delta. For this area, the surveys suggested that the recruitment was very low from 1996 to 2000, but the population appeared to have recovered in 2001 to amounts close to the half of those found in 1992, when the highest value was estimated. According to the assessment carried out in 2002, the estimated biomass for the whole area in 2001 (27,000 tonnes) was two times higher than that in 2000.

RECENT MANAGEMENT ADVICE: The minimum legal landing size of small pelagic should be set to the length of first maturity. Taking into account the important fluctuations observed in the recruitment, which have a direct effect on the total biomass of the stock, it is recommended that current levels of fishing effort should be maintained.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.3. European anchovy *(Engraulis encrasicolus)* in Geographical Sub Area 7 and 6. Gulf of Lions and North Catalonia

FISHERIES: The anchovy in the Gulf of Lions and North Catalonian is exploited by Spanish and French fleets. Spanish purse seiners fish at night with lights in the Gulf of Lions. The French trawlers operate only during daytime. The annual catch of between 5,000 and 6,000 tonnes is largely regulated by market demand. When market prices are low, the pelagic trawlers shift their activities toward other demersal resources, which in the main, are overexploited. Since 1993 the status of anchovy and other commercially important pelagic resources has been assessed using

annual acoustic surveys in the Gulf of Lions. The acoustic biomass estimate of the anchovy population in the Gulf of Lions has increased over the period 1999-2001 (48,000, 70,000 and 112,000 t. respectively).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Biomass and abundance indices obtained by direct methods from French and Spanish surveys (from 1990 to 1993 and from 1995 to 2001) are analysed and combined, as well as catches and fishing effort series for 1993-2001

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: High level of biomass and relatively low catches, according to the assessment carried out in 2003.

RECENT MANAGEMENT ADVICE: Given the important influence that recruitment variation can have on stock abundance, recent management advice is to maintain current levels of fishing effort and to continue annual evaluations of the status of this stock.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.4. European anchovy (*Engraulis encrasicolus)* in Geographical Sub Area 16. Sicily channel

FISHERIES: no data available

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Biomass evaluations from six echosurveys carried out from June 1998 to July 2002 in the Strait of Sicily.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points

STOCK STATUS:

Based on the 2003 stock assessment recent anchovy population biomass has shown large inter-annual fluctuations, from about 7,000 t in 1998 to 23,000 t in 2001. In addition variation in the age structure of the reported catches suggests that environmental factors may have a strong bearing on recruitment.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM.

STECF COMMENTS: STECF underlines the importance of obtaining more detailed data on the stock and the fisheries exploiting it.

9.5. European anchovy *(Engraulis encrasicolus)* in Geographical Sub Area 17. Northern Adriatic

FISHERIES: Anchovy is one the most important commercial species of the Adriatic Sea. The small pelagic fishery is widely dispersed in the Northern and Central Adriatic Sea and sardine is exploited by the fleets of Italy, Slovenia and Croatia. The Italian fleet in the Northern and Central Adriatic is composed of about 132 (66 pairs) pelagic trawlers *(volante)* mainly operating from Trieste to Ancona and about 36 *lampara* vessels (purse seiners with light) which operate mainly in the Central Adriatic Sea. Italian regulations prohibit fishing with trawls and mid-water pair trawls for about 45 days between July and September. This closed season does not apply for to purse seiners. Fishing activity is suspended during the weekend.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the assessment carried out in 2003, the VPA estimate of stock biomass showed a strong fluctuation during the observed period (1975-2002). Following a collapse in 1987 stock biomass has, thereafter, displayed a positive trend. Nevertheless, the biomass level has not reached the previous high values. Present catches amount to 22% of estimated biomass.

RECENT MANAGEMENT ADVICE: The current level of fishing effort should not be increased.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.6. European anchovy *(Engraulis encrasicolus)* in Geographical Sub Area 22. Aegean Sea

FISHERIES: A purse sein fleet based in the ports of Alexandroupolis, Kavala and Thessaloniki (Greece) operates in the area. No available data on fishing effort, trends in catches, landings and discards.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The DEPM was applied for estimating the anchovy spawning biomass at an area indicated between the Thraki mainland in the north and the isles of Samothraki and Thasos in the south.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the 1999 assessment (submitted to SAC in 2002), the estimated spawning biomass for 1999 is 13,180 tonnes

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: No comments

9.7. Sardine (*Sardina pilchardus)* in Geographical Sub Area 1. Northern Alboran Sea

FISHERIES: Anchovy and Sardine are the main target species of the purse seine fleet in the Northern Alboran Sea. Other accompanying species with lower economical importance are also caught such as: Horse mackerel *(Trachurus* spp), mackerel *(Scomber spp),* Atlantic saury *(Scomberesox saurus)* and gilt sardine *(Sardinella aurita).* In the South-Mediterranean Region (from Gibraltar Strait to Cape of Gata) the fleet continuously decreased in size over the last two decades, from more 230 vessels in 1980 to 120 in 2001. The present fleet has a mean GRT of 17.2. Only Malaga Bay fishing area, which represents 85% of total landings, has been considered by the WG. A peak of landings of around 6,000 tonnes was found in 1991-1992, but then decreased to an overall mean value of 1,000-2,000 tonnes during 19941998. From 1998 onwards, landings and CPUE have an increased to values higher than those observed in previous years.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: No comments

9.8. Sardine (*Sardina pilchardus)* in Geographical Sub Area 6. Northern Spain

FISHERIES: Anchovy and sardine are the main target species for the purse seine fleet in the Northern Spain. Sardine accounts for the major proportion of the catch by weight, but anchovy is the most sought after species, due to its higher economical value. The present fleet has 191 purse seiners, a reduction of 12 compared to 2001, with a mean GRT of 32.60. Sardine landings have increased since the 1970s, reaching a maximun of 53,000 tonnes in 1994 and declining to 38,000 tonnes in 2000.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. ECOMED acoustic surveys carried out from 1990 to 1993, and from 1995 to 2001, between La Nao Cape and Creus Cape (Tramontana Region).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: From 1990 to 2001, the estimated biomass fluctuated from 200,000 tonnes in 1992 to 50,000 tonnes in 2000. The estimation for 2001 was 97,000 tomes, according to the stock assessment carried out in 2002. The highest estimates of recruitment were for 1991 and 1992, whereas the lowest estimates were for 2000 and 2001.

RECENT MANAGEMENT ADVICE: Taking into account the present level of biomass and catches, together with the low level of recruitment detected in the two last years, it is recommended that the current level of fishing effort should not increase.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.9. Sardine (*Sardina pilchardus)* in Geographical Sub Area 7. Gulf of Lions

FISHERIES: Sardine is exploited in the Gulf of Lions by 120 mid water trawlers that target demersal resources when the market prices for sardine are low and by 8 purse seiners operating in the zone. The number of trawlers participating in the fishery for sardine changes monthly according to market demand. The average catch for the period 1999-2001 was 9,000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Since 1993, acoustic surveys have been carried out annually in the Gulf of Lion, to estimate the size of the sardine stock and other commercially important pelagic species.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Sardine stock biomass has remained relatively stable about an average for the period 1999-2001of 76,000 t, according to the stock assessment carried out in 2003. The resource is estimated to be moderately exploited.

RECENT MANAGEMENT ADVICE: No recent advice for management.

STECF COMMENTS: No comments

9.10. Sardine (*Sardina pilchardus)* in Geographical Sub Area 16. Strait of Sicily

FISHERIES: no data available

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Biomass estimation is from six acoustic surveys carried out annually between June 1998 and July 2002 in the Strait of Sicily.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the stock assessment carried out in 2003, sardine biomass has shown large inter-annual fluctuations, from about 36,000 t in July 2000 to 6,000 t in 2002.

RECENT MANAGEMENT ADVICE: The recent decline in sardine biomass may be a result of the winter fishery (January-March) on sardine larvae.. The impact of local fisheries directed to larval or juvenile sardine should be evaluated.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.11. Sardine (*Sardina pilchardus)* in Geographical Sub Area 17. Northern Adriatic

FISHERIES: Sardine *(Sardina pilchardus,* Walb.) is one of the most important commercial species of the Adriatic Sea. The small pelagic fishery is widely dispersed in the Northern and Central Adriatic Sea and sardine is exploited by the fleets of Italy, Slovenia, and Croatia. The Italian fleet in the Northern and Central Adriatic is composed of about 132 (66 couples) pelagic trawlers *(volante)* mainly operating from Trieste to Ancona and about 36 *lampara* vessels (purse seiners with light) which operate mainly in the Central Adriatic Sea. Since 1988, Italian trawlers and pair trawlers have been subject to a closed season to fishing for 45 days between July and September. The closed season is not applicable to purse seine vessels. Italian vessels do not fish during weekends. Sardine landings declined from 1997-2001. No information on discards for 2000 and 2001 is available. Between 1987 and 1999, discard estimates averaged about 2000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. VPA tuned by commercial CPUE (Laurec-Shepherd method) on a 1975-2002 time series.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points

STOCK STATUS: The estimated stock biomass of sardine by VPA showed a peak between 1983 and 1985, then a gradual decline to its lowest value in 1999. In 2000 and 2001, the estimated biomass of sardine increased. According to the stock assessment carried out in 2003, the present level of catches is about the 18% of the estimated biomass.

RECENT MANAGEMENT ADVICE: Fishing effort should not increase and because of the continuous decline in biomass over the last 20 years, effort should be reduced to reverse this trend. Sardine is exploited by Italian, Slovenian, Albanian and Croatian fleets and the SAC of the GFCM recommends that a joint management regime for small pelagics be implemented in Sub-area 17 as soon as possible.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.12. Sardine (*Sardina pilchardus)* in Geographical Sub Area 20+22 Eastern Ionian Sea and Aegean Sea

FISHERIES: A purse seining fleet based in the ports of Volos, Chalkis, Corinthos and Patras (Greece) operates in the area. No available data on fishing effort, trends in catches, landings and discards.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Biomass estimation of sardine stocks in central Aegean and eastern Ionian Seas based on DEPM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the stock assessment carried out in 2003, total spawning biomass was estimated in 2000 to be 19,826 tonnes

RECENT MANAGEMENT ADVICE: No advice on management is available for this stock.

STECF COMMENTS: No comments

9.13. Striped mullet (*Mullus surmuletus)* in Mediterranean

FISHERIES: Fleets, catching this species, are widely dispersed over the entire Mediterranean Basin. This species is mainly caught with set gears, in particular trammel-nets and gillnets, besides it appears in the mixed catches of bottom trawlers operating close to rocky areas. Catch data are incomplete. Striped mullet is a very valuable resource for artisanal fisheries.

The stocks in management units under the control of EU member states, are managed by technical measures such as minimum landing size, minimum mesh size, bottom trawler no take zones within littoral areas, and by maximum set gear dimensions. Over 1996 to 1998, reported landings, excluding the Black Sea, for the two species, *Mullus surmuletus* and *Mullus barbatus* combined, have averaged 15,000 t. The majority of the catch is taken by vessels from EU Member States, 72 % of the total caught.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. No new information was available..

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown, but several stocks are suspected to exists. Stock structure is currently being investigated.

RECENT MANAGEMENT ADVICE: No management advice is available for this stock.

STECF COMMENTS: No

9.14. Red mullet (*Mullus barbatus)* in Geographical Sub Area 9 Ligurian and northern Tyrrhenian

FISHERIES: Mullus *barbatus is* among the most commercial valuable species in the area and forms part of a species assemblage that is the target of the bottom trawling fleets that operate near shore and a specifictarget in some particular periods when the species is densely concentrated near the coast. It is caught mainly with three different variants of the bottom trawl net. The fishing pressure on this species varies between the different zones within sub-area 9 as the composition of the various fleets and their individual target species varies between sub-areas. *Mullus barbatus* catches are higher during the post-recruitment period (from September to November). About 150 vessels exploit the species. Annual landings are around 350 tonnes. Discard of undersized individuals is in general negligible, due to the fact that immediately after recruitment, small sized individuals are still concentrated inside the 3 miles trawl exclusion zone. However, some illegal captures do occur.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Data proceed from trawl-surveys (national and MEDITS programmes) as well as from Catch Assessment Surveys that includes data collection of size structure of the catches. Length Cohort Analysis, Composite Production Models and Yield-per-Recruit analysis were used for assess the status of the stocks in the area.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the stock assessment carried out in 2002, the species is considered fully exploited and in some areas overexploited, depending on the fishing grounds where the different fishing fleets operate with different levels of fishing effort. The current level of the Spawning Stock Biomass if compared with the pristine SSB is considered too low, suggesting a risk of recruitment overfishing. Catch rates and total catches do not show any trend during the last ten years. However, standing stock size estimated through trawl-surveys suggests an increase in biomass of the species in most of the sub-areas.

RECENT MANAGEMENT ADVICE: Fishing effort especially on the areas and season where and when recently recruited juveniles are concentrated should be reduced. This can be obtained through the enforcement of a seasonal fishing ban of a period during the late summer and early autumn. This management measure should also produce a shift in the size of first capture.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.15. Red mullet (*Mullus barbatus*) in Geographical Sub Area 10. Southern and central Tyrrhenian

FISHERIES: Mullus *barbatus is* among the most commercial valuable species in the area and make part of a species assemblage that is the target of the bottom trawling fleets, which operate near shore. No commercial catch data and no information on the fleets were reported to the SAC.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Trawl survey data from MEDITS and SAMED EU projects. The indices of abundance (weight and number per square km by swept area method), size composition at sea by sex, sex ratio, maturity growth, natural and total mortality. The Length frequency analysis, Chen & Watanabe vector, Alagaraja formula, length converted catch curve, simulation of different scenarios using a pool dynamic model.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Full exploitation and growth overfishing can be assumed for the species. No significant trend in biomass abundance estimates.

RECENT MANAGEMENT ADVICE: A reduced (total) mortality of 10% – 15% could be achieved by enforcing area and temporal closures currently applicable, which, in turn, could lead to a more desirable ratio between average Spawning Stock Biomass and average virgin Spawning Stock Biomass (SSB/SSBo). Notwithstanding the stable trend of the relative abundance index indicated by the Stock Assessment Subcommittee, that committee does not say anything on the sustainability of the stock.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.16. Norway lobster (*Nephrops norvegicus)* Geographical Sub Area 9. Ligurian and northern Tyrrhenian

FISHERIES: *Nephrops norvegicus is* a very important species with a very high commercial value. It is the target of a variable fraction of all the fleets operating in the Geographical Sub Area 9 during the whole year. Annual landings in the area are less than 100 tonnes. The species is caught with the traditional Italian bottom trawl net at depths between 250-500 m. About 40 vessels exploit the species in the area. There are no discards since almost all individuals caught are around or beyond the legal minimum size.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Data were collected during trawl-surveys (national and MEDITS programmes) as well as from Catch Assessment Surveys that includes data collection of size structure of the catches, 1985-2001. Length Cohort Analysis and Yield-per-Recruit analysis were used to assess the status of the stocks in the area.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The species is considered to be fully or underexploited, depending on the fishing grounds exploited by the different fishing fleets with different rates. Catch rates have generally increased during the last ten years, according to the stock assessment in 2002.

RECENT MANAGEMENT ADVICE: The resource can probably sustain the current level of effort and fishing pattern

STECF COMMENTS: No comments.

9.17. Blue and Red Shrimp (*Aristeus antennatus)* in Geographical Sub Area 1. Northern Alboran Sea .

FISHERIES: The red shrimp *(Aristeus antennatus)* is one of the most important resources of bottom trawling in Alboran Sea. It is fished on the slope between depths of 400 to 800 m. Landings in the period 1976-2001 were around 300 with a maximum of 517 t in 1991 and a minimum in 2001 115 t. Mean size in the landings was 27 mm CL and the catches in the last three years have decreased since the most recent peaks by about 50%.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The state of the fishery of the Red shrimp considering the average 2000-2002 years and the whole population (females and males together) was analysed. Assessment of the exploited resource was carried out using length and age based methods (LCA and VPA) and yield per recruit analysis (Y/R). Size length catches were transformed into age data and a pseudo-cohort analysis was performed.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for red shrimp in the Mediterranean.

STOCK STATUS: The VPA carried out in 2003 revealed that the mean age of the catch was greater than the mean age of the stock, however, the Y/R curves in all areas pointed to an overfishing scenario. Moreover, a very high fishing effort on the spawning stock biomass

was detected. The SAC Subcommittee on Stock Assessment notes the state of full exploitation and that the current Biomass is about 13% of the Virgin Biomass.

RECENT MANAGEMENT ADVICE: A 25% reduction of the effort could bring the biomass of the stock up to 35% higher than the current value in 3 years.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.18. Blue and Red Shrimps (*Aristeus antennatus)* in Geographical Sub Area 5. Balearic Islands.

FISHERIES: The red shrimp is one of the most important resources of bottom trawling in the Balearic Islands. It is fished on the slope between depths of 400 to 800 m. In biomass, it represents an average of 5% of the overall catches, but its economic value is 30% of the total earnings of the fishery. The trawl yields varied between 3 and 14 kg/h. The highest yields occurred in winter and spring. The decline of the sizes at first capture in 1997 and the increase of juveniles in the catches can be interpreted as a change in the fishery strategy, which has increased the exploitation effort on the small sizes. The average landings in the last three years has been 170 t Mean CPUE varied from 25 to 45 kg per vessel and day. Mean size in landings was 29 mm CL.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The state of the fishery of the Red shrimp (*A. antennatus*) considering the average 2000-2002 years and the whole population (females and males together) was analysed. Assessment of the exploited resource was carried out using length and age based methods (LCA and VPA) and yield per recruit analysis (Y/R). Size length catches were transformed into age data and a Pseudochort Analysis was performed.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for red shrimp in the Mediterranean.

STOCK STATUS: The VPA carried out in 2003 revealed that the mean age of the catch was greater than the mean age of the stock, however, the Y/R curves in all areas pointed to an overfishing scenario. Moreover, a very high fishing effort on the spawning stock biomass was detected. The SAC Subcommittee on Stock Assessment notes the state of full exploitation and that the current Biomass is about 16% of the Virgin Biomass.

RECENT MANAGEMENT ADVICE: A 25% reduction of the effort could bring the biomass of the stock up to 32% higher than the current value in 3 years. Accordingly the GFCM Working Group recommends no increase (and if possible, a decrease in line with the working group analysis) in the current level of fishing effort.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.19. Blue and Red Shrimp (*Aristeus antennatus)* in Geographical Sub Area 6. Northern of Spain.

FISHERIES: The red shrimp is one of the most important resources of bottom trawling in this sub area It is fished on the slope between depths of 400 to 800 m Recent average annual landings were 114 t. Mean size in the landings was 26 mm CL.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The state of the fishery of the Red shrimp (A. *antennatus)* considering the average 2000-2002 years and the whole population (females and males together) was analysed. Assessment of the exploited resource was carried out using length and age based methods (LCA and VPA) and yield per recruit analysis (Y/R). Size length catches were transformed into age data and a Pseudochort Analysis was performed.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for red shrimps in the Mediterranean.

STOCK STATUS: The VPA carried out in 2003 revealed that the mean age of the catch was greater than the mean age of the stock, however, the Y/R curves in all areas pointed to an overfishing scenario. Moreover, a very high fishing effort on the spawning stock biomass was detected. The SAC Subcommittee on Stock Assessment notes the state of full exploitation and that the current Biomass is about 12% of the Virgin Biomass.

RECENT MANAGEMENT ADVICE: A 25% reduction of the effort could bring the biomass of the stock up to 36% higher than the current value in 3 years. Accordingly the GFCM Working Group recommends no increase (and if possible, a decrease in line with the working group analysis) in the current level of fishing effort.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.20. Red Shrimp (*Aristaeomorpha foliacea)* Geographical Sub Area 11. Sardinia .

FISHERIES: Red shrimp is only caught by deep water trawling. In the last twelve years an increase from 59 to 70 trawlers fishing on red shrimps was observed in the geographical sub-area.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for red shrimps in the Mediterranean.

STOCK STATUS: The assessment was carried out in 2002 by Relative Y/R analysis using exploitation rate (E) as indicator of fishing effort. Data were collected during trawl survey programs. The current level of E was derived from Z (total) and M (natural) estimates. The current value of E appears to be very close to E max.

RECENT MANAGEMENT ADVICE: Effort should not increase.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.21. Hake (*Merluccius merluccius)* in Geographical Sub Area 7. Gulf of Lions

FISHERIES: Hake (Merluccius merluccius) is one of the most important demersal species of commercial fisheries in the Gulf of Lions. In 2001 it was exploited by 113 French trawlers, 95 French gillnetters, 26 Spanish trawlers and 20 Spanish longliners. The catches of the trawlers are mainly composed of juveniles living on the continental shelf, while gillnetters and longliners are exploiting the adult part of the stock (spawners) living on the slope and in non-trawlable areas. 80% of the landings are accounted for by trawlers. Total landings remained quite stable during the period 1988 (2941 tonnes) to 2001 (2693 tonnes). During the same period, the total number of trawlers decreased from 196 to 139, while the number of gillnetters increased from 20 to 95 and the longliners fleet increased from 13 to 20 boats. During some periods, discards can represent a significant part of the total European hake catch from Sub-area 7, both in weight and in number.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Length cohort analysis (LCA) and yield per recruit analysis (Y/R) were developed on a mean pseudocohort (1998-2001).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The general status of resource, according to the stock assessment in 2002 shows a growth overexploitation. The biomass values showed a decreasing trend from 1988-91 to 1998-01 periods, but remained stable from 1998-00 to 1998-01. Current biomass is 2.37% of virgin biomass; for females, if F current is reduced by 82%, yield would be 3.3 times higher the current value. For males, if F current is reduced by 68%, yield would be 1.6 times higher the current value. There is a risk of recruitment overexploitation. Spawning females in the current stock have been estimated around one million of individuals, in comparison to 20 millions of individuals in the virgin stock It seems that the spawning stock is decreasing in comparison to previous analysis (1988-91).

RECENT MANAGEMENT ADVICE:

a) To avoid recruitment overfishing: reduce the effort of longline and gillnets in order to increase (or at least maintain) the SSB. A reduction of at least 20% of fishing effort is recommended. Reduction of fishing effort could be achieved by establishing temporal closures for longline and gillnet during the period of maximum spawning, or by reducing time at sea, and/or fishing boats or/and engine power.

b) To reduce growth overfishing: an improvement of trawl selectivity is the most appropriate management measure (length at first capture fixed at 20 cm TL, not compatible with legal mesh size of 40 mm stretched).

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.22. Hake (*Merluccius merluccius)* in Geographical Sub Area 9. Ligurian and northern Tyrrhenian

FISHERIES: *Merluccius merluccius* is one of the most important species in the Geographical Sub Area 9, considering both the amount of catch and commercial value. It is fished with different strategies and gears (bottom trawling, gill nets, hooks). Annual landings in the area are around 500 tonnes. Within the area, several fleets operating from the different ports exploit the species. The fishing pressure varies between fishing grounds. About 150 trawlers and a small number of artisanal vessels current exploit this species.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC- GFCM. Data sources were trawl-surveys (national and MEDITS programmes) as well as Catch Assessment Surveys that include data collection of size structure of the catches. Length Cohort Analysis and Yield-per-Recruit analysis were used to assess the status of the stocks in the area as well as simulations of changes of mesh size. All the analyses were carried out under different assumptions of natural mortality.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: According to the assessment carried out in 2003, this species is considered to be overexploited. Commercial catch rates and total landings have shown downward trends during the last ten years. The current level of the Spawning Stock Biomass if compared with the pristine S.S. Biomass is considered in general too low, suggesting a risk of recruitment overfishing. However, standing stock size estimated through trawl-surveys suggests an increase in biomass of the species in most of the sub-areas of Geographical Sub Area 9.

RECENT MANAGEMENT ADVICE: SAC Subcommittee on stock assessment recommends a reduction of 60% of fishing mortality and an improvement of the exploitation pattern. The reduction of fishing effort, either through a drastic reduction of fleet capacity or in fishing activity, is in this case more effective for a management goal of a spawning stock biomass enhancement. The enlargement of the legal mesh size, up to 60mm, if not combined with fishing effort reduction, determine a modest improvement of the Spawning Stock Biomass while producing a substantial improvement in Yields per recruit.

STECF COMMENTS: STECF agrees with the advice of the GFCM Scientific Advisory Committee.

9.23. European Eel (*Anguilla anguilla*), Mediterranean

The fisheries description and stock status for the European Eel in the Mediterranean is given in section 15.1

9.24. Dolphin fish (*Coryphaena hippurus*), Mediterranean

FISHERIES: Dolphin fish is an epipelagic species, appearing seasonally in the Mediterranean sea, where it is the target of important small-scale fisheries in Malta, Italy (Sicily), Tunisia and Spain (Balearic Islands) Recently, the GFCM is considering the Dolphin fish within the large pelagic species and, as a consequence, it was examined also during the last GFCM-ICCAT joint Expert

Meeting in 2002. According to the genetic evidence, there is a single unit stock in the Mediterranean.

Fish aggregating devices (FADs) are used in the exploitation of dolphin fish with fish caught by surrounding nets with or without purse line. FADs are usually set in lines and generally comprise a float with some palm or bush branches to create a shadow close to the surface (but vary from place to place). They are generally anchored using large limestone boulders. . In two Countries (Spain and Malta), each vessel is provided with a detailed permit for the location of FADs. The net used in Majorca is a special surrounding net, called *"lampugher*a"; this net is without a purse line and has a cod end in the form of a spoon and two wings that are hauled by the vessel at the same time. The net in average has a length of 180 m and a height of 16 m. The mesh size is usually 50 mm and 30 mm in the cod end. The FADs used in Sicily are more or less similar to those used in Spain, with some differences in the floats. The Sicilian net has a length of 180 m and 45 m in height. Several thousands of FADs are set every year on the Mediterranean sea floor and the limestones are left on the sea-bottom. This fact is creating some problems and conflicts with the trawl fishery. The fishing season occurs from August to December in Sicily and in the Balearic area.

According to the EC Study Projects 94/031 and 95/73, during 1995 and 1996 the number of vessels involved in Dolphin fish fishery decreased in Minorca (Balearic Islands-Spain) and in Sicily, almost by 20%.

In Majorca (Balearic Islands-Spain), the catches range from 8.4 tons in 1981 to 127.8 tons in 1995 but decreased in 1996, when the catch was 52.1 tons. The total catch in Sicily was 377.4 tons in 1996, but no other catch data are available for this area. (STECF, 2002).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The EC Study Projects 94/031 and 95/73 provide the only available information about the fishing fleets operating in some regions of Spain (Minorca) and Italy (Sicily). Other data have been provided during the last GFCM-ICCAT joint Expert Meeting in 2002, by document SCRS/02/049. COPEMED collected data in Italy, Malta, Spain and Tunisia since 2000, but this information is still not available. Catch statistics are provided by the above mentioned documents.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: No data available

RECENT MANAGEMENT ADVICE: No assessment has been carried out and no recent management advice has been given

STECF COMMENTS: No comments.

9.25. Blackspot seabream (*Pagellus bogaraveo*), Mediterranean

FISHERIES: Blackspot sea bream is a widely spread species in the Mediterranean. The Spanish South Mediterranean is a very important place for the rearing of this species. Juveniles gradually joint the area of the Strait of Gibraltar namely the eastern fishing grounds, where the fleet of Algeciras fish. The fishing ground in Gibraltar Strait are the most important habitats for adults, the continental shelf north of Alboran sea and Gulf of Cadiz are important fish habitats for juveniles.

The fishing gear used in the Strait of Gibraltar consist on a bottom long-line with special features that make it different and more species-selective from the ones used in other fishing areas. Bottom trawl, other fixed gears and recreational fisheries in the surrounding areas also exploit the species. (STECF, 2002). Other fisheries are developed in the Mediterranean, but no information was available to the SG

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: The evaluation of the resource by different methods leads to the conclusion that there has been a continuous fall in the biomass of this species in the Strait of Gibraltar since 1992. The situation seems to be the result of an increase in fishing activity in the area. Total catches and catch per unit effort show sharp decreasing trends since the second half of the 1990s. Total annual catches have change from more than 870 t in 1994 to 270 t recorded in the latest 3 years. (STECF, 2002).

RECENT MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. A study on the Blackspot Seabream (*Pagellus bogaraveo*) was carried out in the Strait of Gibraltar. A recovery plan for this stock in 1999-2000 was submitted by the Andalucia Government (STECF, 2002) and accepted in 2003. No new data and advice were available.

STECF COMMENTS: No comments.

10. Highly migratory fish (Atlantic and Mediterranean)

The ICCAT Convention, states that the stocks should be managed at MSY. F_{MSY} is thus probably the most appropriate fishing mortality-based target reference point, whereas the corresponding B_{MSY} is only appropriate as a target in an average or equilibrium sense. For this reason, ICCAT like most of the tuna commissions, have not defined any precautionary reference points, for these stocks.

10.1. Bluefin (*Thunnus thynnus*), Eastern Atlantic and Mediterranean

FISHERIES: Bluefin fisheries have been very active in the Mediterranean Sea since ancient times. Eastern bluefin stock is taken by a variety of vessels and types of fishing gears, with many landing sites located in many countries. The main gears are longline, trap and baitboat for the east Atlantic and purse seine, longline and traps for the Mediterranean. The driftnet fishery for tuna has been banned since January 1st 2002 in EU countries. Catches reached an average of 30,000 tonnes in the 1950-65 period and then decreased to an average of 14,000 tonnes during the period 1965-1980. Since then, there has been a continuous increase in bluefin catches, mostly due to purse seiner and longliner in the Mediterranean Sea. Reported landings exceeded 50,000 tonnes in 1996 and were about 39,000 tonnes in 1998 and 33,000 tons in 1999 and 2000 and over 34,500 tons in 2001; the current yield for 2002 is over 30,000 tons, but several countries did not reported their catches. The scientific committee of ICCAT/SCRS has a strong and serious concern about the quality of catch, effort and catch-at-size data and suspects over-reporting between 1993 and 1997 and under-reporting since 1998 (date of the reinforcement of the quota). Unless this situation improves, the quality of the advice that the Committee can provide will continue to deteriorate. This deterioring situation of the data largely occurred since the quick development of farming in the Mediterranean Sea, which induces further pressure on this stock.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. A new stock assessment took place in 2002 with the same technical analysis as that of 1998, i.e., a virtual population analysis tuned with standardised catch rates of several commercial fleets assumed as abundance indices.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The SCRS recognised that the poor quality of the catch, effort and catch-at-size data has seriously impaired the advice in 2002 and the quality of the advice will continue to deteriorate if this situation does not improve in the future. The SCRS evaluated various scenarios, including an alternative catch table. The results of the 2002 assessment are similar to the results obtained in 1998 in terms of trends (the SSB has declined since 1970), but are more optimistic in terms of current depletion (SSB in 2000 is about 86% of the 1970 value). The 2000 level of fishing mortality was almost 2.5 times that which maximizes yield per recruit. The assessment indicated two peaks in the spawning stock (the last being in 1993) and an increase in fishing mortality rates, especially for older fish after 1993. The recruitment was relatively high and did not display any trend since the early 1980s. Projections indicate that the current yields are not sustainable in the

long-term under the current selectivity pattern and current fishing mortality rate. For all the scenarios, long-term sustainable yields are at around 25,000 tonnes. However, if the fishing mortality of small fish (juveniles) or both small and big fish could be reduced, projections indicated that current or even higher yields could be sustained.

RECENT MANAGEMENT ADVICE: ICCAT recommended in 1998 that yields should be reduced to 32,000 tonnes in 1999 and 29,500 tonnes in 2000 and 2001. In 2002, ICCAT fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006, subject to revision on scientific advice after the 2005 stock assessment. The 2002 assessment, as that of 1998, indicate that under current level of recruitment and current fishing selectivity and current mortality rate, yields higher than 26,000 tons are not sustainable over the long-term. Because of the lack of confidence in the input data and in the assessment results, the SCRS is not in a position to give or suggest any strong management recommendations for the short or medium term. The SCRS can only offer advice about long-term consequences of maintaining current catches. The SCRS thinks that long-term sustainable yield is probably lower than current catches because of high fishing mortality rates. Furthermore, bluefin tuna is a long living species (over 20 year classes exploited) with a late age-at-maturity and a low biological productivity in comparison to other tuna species. These biological characteristics mean that the SCRS continues to be concerned with the strong fishing pressure on small fish and recommended that every effort be made to ensure the application of current measures on size limits. A complex package of measures has been adopted by ICCAT in 2002. This includes:

- A prohibition on the catching, retaining on board or selling of tuna less than 4.8 kg in the Mediterranean; this limit will remain at 3.2 kg in the Eastern Atlantic.

- In addition no more than 10% of the total catch, by number of fish, may consist of fish between the minimum landing size and 6.4 kg.

- A closed fishing season in the Mediterranean from 16th July to 15th August for purse seiners.

- A closed fishing season in the Mediterranean during June-July for long-line vessels greater than 24 meters.

- A prohibition on the use of aircraft support during June in the Mediterranean.

- Specific recommendations in respect of data requirements from tuna farms.

- Improvements to data collection.

STECF COMMENTS: STECF agrees with ICCAT advice. STECF further stresses the importance of reinforcing controls on current regulations and improving rapidly the quality of the catch data. In the meantime, measures on size limits and limitation of fishing effort appear to be the most efficient management tools, as well as a better enforcement of the controls. The development of farming in the Mediterranean Sea has generated several problems that make the assessment and management of the bluefin tuna stock more difficult. STECF recommends that regulation of farming be considered and implemented as soon as possible (some potential solutions have been provided in the 2002 GFCM/ICCAT report).

10.2. Bluefin (*Thunnus thynnus*), Western Atlantic

FISHERIES: Western bluefin fisheries have been managed since the early eighties and catches have not varied much since 1983 (the range over this period is 2,106 to 3,215 tonnes). Mostly three countries, USA, Canada and Japan, report catches from this stock using various gears, but some other coastal countries of the West Atlantic (Brazil, Mexico and Bermuda) also catch bluefin tuna. Since 1998, a substantial amount of additional catch that was not in accordance with the Commission's recommended allocation of catch, was recorded through the Bluefin Tuna Statistical Document system.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. A new stock assessment took place in 2002 with the same technical analysis as that of 1998 and 2000, i.e., a virtual population analysis tuned with standardised catch rates of several commercial fleets assumed as abundance indices.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The assessment results are similar to those from previous assessments. They indicate that the spawning stock biomass declined steadily from 1970 through the late 1980s and then remains roughly stable. The potential for rebuilding remains, however, unclear and the key issue are the reasons for relatively poor recruitment since 1976 and the outlook for recruitment in the future. The SCRS considered two recruitment scenarios and for both, the assessment indicated that the fishing mortality exceeded Fmsy and the SSB is below Bmsy. To comply with the rebuilding plan (i.e., rebuilding to the stock size that will produce MSY by 2018), the projections indicated that the TAC could be increased to at least 3000 tonnes if the low recruitment scenario is valid, whereas it should be decreased to less than 1500 tonnes if the high recruitment scenario is valid. The SCRS cautioned that these conclusions do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Despite new information coming from tagging, more is needed to solve this question.

RECENT MANAGEMENT ADVICE: A combination of TAC and size limits have been recommended and apparently applied quite strictly on this stock for about 20 years. A TAC of 2,700 tonnes has been adopted by ICCAT for 2003. As emphasized in previous assessments, mixing across management unit boundaries of fish of western and eastern origin could be important for management of the resource in both areas. In particular, the condition of the eastern Atlantic stock and fishery could adversely affect recovery in the West Atlantic, which was also noted in the SCRS's 1998, 2000, and 2001 reports.

STECF COMMENTS: STECF agrees with the advice from ICCAT. A meeting to discuss the mixing problem is schedual for November 2003.

10.3. Albacore (*Thunnus alalunga*), North Atlantic Ocean

FISHERIES: The Northern Albacore stock is exploited by both surface and longline fleets. Traditional surface fleets include Spainsh troll and baitboats, used mainly in the Bay of Biscay and adjacent waters, and some Spanish and Portugese baitboats around the Azorian Islands. France introduced other surface gears including driftnets and pair-pelagic/midwater trawling in 1987 in the Bay of Biscay and adjacent waters. Ireland and the United Kingdom joined the driftnet fishery at the beginning of the 1990's and in 1998 Ireland initiated experimental fishing trials using pelagic

trawling and trolling. The surface fleets mainly target juveniles and sub-adults (< 90cm FL). A longline fleet from Chinese Taipei was targeting sub-adult and adult albacore (60-120cm) in the central and western North Atlantic, however this fleet is now mostly targeting intertropical bigeye. Other fleets make minor catches and in most cases albacore constitute a component of the by-catch.

In 2002, with the full implementation of the European Unions ban on the use of driftnets, major changes occurred in both the French and Irish albacore fisheries. The number of vessels licensed to fish albacore using pair-pelagic/midwater trawling increased in both countries.

Total catches of albacore in the north Atlantic have shown a downward trend since their peak over 60,000 tonnes in the mid-1960's. This is in part due to a global reduction of fishing effort by the traditional surface and longline fleets, and possibly also to natural fluctuations that may correspond to environmental cycles. During the last decade landings had remained relatively stable around 30,000 tonnes/year. Catches in 2002 were the lowest recorded in the time series (22,465 t). In the absence of driftnetters, pair-pelagic/midwater trawling commenced earlier than in previous years, however catches, in general, were poor at the outset improving somewhat later in the season.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, which in 2003 carried out an initial analysis of the state of the northern stock using a model (VPA) essentially the same as that used in previous assessments. However revisions to catch-at-size data altered the historical data series. The impacts of these revisions are such that ICCAT/SCRS concluded that it was not appropriate to proceed with an assessment based on the 2003 catch-at-age. Consequently, the current state of the northern albacore stock is based primarily on the last assessment conducted in 2000 together with observations of CPUE and catch data provided since then. The 2000 assessment was based on an analysis of catch at age data (ADAPT VPA) tuned with standardised catch rates obtained from commercial fleets assumed as abundance indices (by-catch for the adult fraction and target fishery for the juvenile fraction from some fleets). The CPUE trends have varied since the 2000 assessment, and in particular differed between those representative of the surface fleets and those of the longline fleets. The variability associated with all of these catch rate estimates prevents definitive conclusions about recent trends of albacore catch rates.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The abundance and biomass of adult fish (ages 5+) appears to have declined from the mid-1970s to the late 1980s, followed by a slight increase between 1988 and 1990. However there has been no clear trend since 1990. Abundance of recruits (age 1) and juveniles (ages 2-4) varied from year to year with, perhaps, a similar declining trend from 1975 to 1985. The levels since then have been variable. Global environmental factors might explain some proportion of the recruitment variability during the last two decades and impact the local availability of fish and consequently affect estimated catch rates.

In 2000 ICCAT/SCRS noted that in terms of yield per recruit, the fishing intensity is at, or below, the fully exploited level. Concerning MSY-related quantities however, the SCRS noted that using a particular form of stock-recruitment relationship that allows recruitment to increase with spawning stock indicates that the spawning stock biomass (B_{99}) for the northern stock (29,000MT) is about 30% below the biomass associated with MSY (42,300MT) and that current F is about 10% above F_{MSY}. An alternative model allowing for more stable recruitment values in the range of observed SSB values would provide a lower estimate of SSB at MSY, below the current value.

RECENT MANAGEMENT ADVICE: In 2000 ICCAT/SCRS recommended that in order to maintain a stable Spawning Stock Biomass in the period 2001-2002 the catch should not exceed

34,500 tonnes (the 1999 catch level). It further noted that should the Commission wish the Spawning Stock Biomass to begin increasing towards the level estimated to support the MSY, then catches in 2001 and 2002 should not exceed 31,000 tonnes. The 2003 Committee reiterates its previous advice and extends it until the next assessment.

STECF COMMENTS: STECF agrees with the advice from ICCAT. STECF additionally recommends that during the next assessment further attempts be made to explain the uncertainty in the assessment; this should, where possible, include the use of historic data and the effect of environmental variability on this stock.

10.4. Albacore (*Thunnus alalunga*), South Atlantic Ocean

FISHERIES:

The major fleets exploiting the southern albacore stock are the surface baitboat fleets of Namibia and South Africa, and the longline fleets of Brazil and Chinese Taipei. There are also some minor catches by the purse seine fleet in the tropical area. Since the mid 1970s, the Chinese Taipei fleet have targeted albacore at a fairly high level of effort. Catches by the baitboat fleets of South Africa and, to a lesser extent, Namibia are strongly influenced by the availability of albacore in nearshore waters which is, in turn, influenced by environmentally induced changes in fish distribution. Both Namibia and South Africa have initiated tuna-directed longline fisheries that take a small bycatch of albacore.

Surface and longline catches had remained relatively constant at around 7500 and 20,500 tonnes respectively during the period 1995-2000. Such catches were generally below the replacement yield of 29,200 tonnes estimated by the ICCAT in 2000. However, annual albacore catches exceeded the South Atlantic catch limit in 2000, 2001 and 2002.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, which in 2003 used an age-structured production model (ASPM), using the same specifications as in 2000, to provide a Base Case assessment for South Atlantic albacore. Results were similar to those obtained in 2000, but the confidence intervals were substantially narrower in 2003 than in 2000.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: In 2003, ICCAT/SCRS estimates of MSY and replacement yield from the 2003 Base Case (30,915 t and 29,256 t, respectively) were similar to those estimated in 2000 (30,274 t and 29,165 t). In both 2003 and 2000 the fishing mortality rate was estimated to be about 60% of FMSY. Spawning stock biomass has declined substantially relative to the late 1980s, but the decline appears to have leveled off in recent years and the estimate for 2002 remains well above the spawning stock biomass corresponding to MSY. Both the 2000 and 2003 albacore assessments estimated that the stock status is somewhat above BMSY and catch of 31,000 t, on average, would be expected to reduce the stock further towards BMSY. Recent estimates of high recruitment could allow for some temporary increase in adult stock abundance under a catch of the current level, but this result is uncertain.

RECENT MANAGEMENT ADVICE: In the SCRS report of October -2003, ICCAT recommends that in order to maintain SSB in the near future the catch should not exceed 31,000 t for the next 3 to 5 years.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

10.5. Albacore (*Thunnus alalunga*), Mediterranean Sea

FISHERIES: Albacore fishing is a traditional activity for a number of fleets in the Mediterranean including those of Cyprus, Greece, Italy, Spain, and Malta. ICCAT statistics, however, are considered quite incomplete due to unreported catches from several countries and the lack of data in some years from other countries.

Since 1985, the Spanish baitboat and troll fleets based in the Atlantic have also made some albacore catches in the western Mediterranean and the Alboran Sea in autumn.

Reported albacore catches in the Mediterranean have fluctuated between 1,350 tonnes and 5,577 tonnes since 1984: the reported catch in 2002 was 5,605 tonnes.

The albacore fishery in the Mediterranean appears to have had some important changes in the last five to six years including the availability of albacore in areas where it was not present in the past. This is particularly evident in the Straits of Sicily and in the central-southern Mediterranean, where catches have been reported since 1997 but increased in the last three years, particularly during spring. The opposite case has been reported for the Ligurian Sea and sometimes in the western Mediterranean. The unusual climate and oceanographic situation reported for the last two years may have a bearing on this. The driftnet fishery for albacore has been banned since January 1st 2002 in the EC countries.

SOURCE OF MANAGEMENT ADVICE: The advisory body are ICCAT and FAO/GFCM, through the ICCAT/GFCM expert consultation.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Due to the lack of adequate data, an assessment of the Mediterranean stock has never been carried out by the ICCAT. However according to available information, the Mediterranean stock does not appear to show any particular trend. In addition the mixing rate with the Atlantic stock appears to be insignificant.

RECENT MANAGEMENT ADVICE: ICCAT currently does not provide management recommendations for the Mediterranean stock. ICCAT recommends that reliable data be provided on catch, effort and size for Mediterranean albacore and that efforts be made to recover historic data.

STECF COMMENTS: STECF agrees with the advice from ICCAT, and notes that data collection is now mandatory within the EC data collection programme. STECF additionally strongly supports the recommendation of the ICCAT/SCRS concerning the timely provision of catch and effort data and the collection of historical data.

10.6. Yellowfin *(Thunnus albacares)*, Atlantic Ocean

FISHERIES: Yellowfin tuna are caught between 45ºN and 40ºS by surface (purse seine, baitboat, troll and handline) and sub-surface gears (longline) Almost 75% of catches are taken in the eastern Atlantic using purse seine (76% of the eastern Atlantic catch in 2001) and baitboat (17% of the

eastern Atlantic catch in 2001). In the western Atlantic the fishery is prosecuted by a number of gears including purse seiners (36% of the western Atlantic catch in 2001), longliners (31%) and baitboats and other surface gears (32%). EU purse seiners take some 60% of the total catch. Since 1991, the purse seine fleets have developed a fishery that targets schools associated with artificial floating objects or FADs. This translates into an important increase in catches of juvenile bigeye and, to a lesser extent, increased catches of young yellowfin and other by-catch. Yellowfin catches in the Atlantic as a whole, reached an historical high in 1990 (192,500 tonnes), but otherwise have averaged around 150,000 tonnes over the last 20 years. The total catch in 2002 amounted 137,500 tonnes.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. A full assessment was conducted of yellowfin tuna in 2003 applying various age-structured and production models to the available catch data through 2001.An age-structured virtual population analysis (VPA) was made using eight indices of abundance. The VPA estimates that the levels of fishing mortality and spawning biomass in recent years have been very close to MSY levels.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Since reported yellowfin landings in 2001 appear to be somewhat above the MSY level estimated during the 2003 assessment and fishing effort and fishing mortality may be in excess of the levels associated with MSY, it is important to ensure that effective effort does not increase beyond the current level. Projections indicate that stock biomass is likely to decrease if fishing mortality increases to the level estimated for 1992, which is currently being approached or exceeded. Thus the possibility that the fishing power of the purse seiners and other fleets may further increase, even if the total capacity of the fleet were to remain constant, is also cause for concern. It should be noted that the current estimate of total yellowfin landings in 2002, which was not available at the time of the assessment, is 137,500 t.

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS reaffirmed its support for the 1993 recommendation that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992. ICCAT also continues to recommend that effective measures be found to reduce fishing mortality of small yellowfin. An evaluation of the effects on yellowfin tuna of the moratorium on fishing on floating objects (and other measures to reduce catches of small fish) was not fully achieved due to insufficient data. In general, the approach was intended to benefit bigeye tuna and is not expected to reduce the mortality of juvenile yellowfin tuna. In fact, the fishing mortality on juvenile yellowfin tuna appears to have increased substantially during the moratorium years, although it is unclear that this is related to the moratorium.

STECF COMMENTS: STECF agrees with the advice from ICCAT. Additionally STECF stresses the importance of an effective evaluation of the effect of the moratorium on FADs recommended by ICCAT in 2000.

10.7. Bigeye (*Thunnus obesus*), Atlantic Ocean

FISHERIES: The stock is exploited by three major gears: baitboat, longline and purse seine with corresponding catches in 2001 of 17,733 tonnes (18%), 55,159 tonnes (57%) and 22,060 (23%). The main baitboat fisheries are located in Ghana, Senegal, the Canary Islands, Madeira and the Azores. Japan and Chinese Taipei deploy the two major longline fleets whose catch accounted for about 40 % of total catch in 2001. Tropical purse seine fleets operate in the Gulf of Guinea and off Senegal in the East Atlantic comprising French, Spanish, Ghanaian and other flag vessels managed

by EU countries and off Venezuela in the West Atlantic. Since 1991 the use of FAD's by the purse seine and Ghanaian baitboat fleets and the use of baitboats as FADs by the baitboat fleets in Senegal and the Canary Islands has produced an increase in the catch of small bigeye. These new techniques have apparently improved fishing efficiency and contributed to the increase of the bigeye catch.

Total annual catch exhibited an increase up to the mid-1970s (reaching 60,000) and reached an historic high of about 132,000 tonnes in 1994. It has declined since then with some fluctuation. The provisional total catch in 2002 was about 73,000 tonnes.

Although a full evaluation of the moratorium on the use of FADs was not possible, this regulation appears effective in reducing fishing mortality for juvenile bigeye, at least for the purse seine fishery that complied with this regulation. The full compliance with this regulation by all the fisheries, including baitboats, will greatly increase the effectiveness in reducing fishing mortality for juvenile.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: While a complete assessment of this stock was carried out in 2002 it was hampered by the lack of detailed information from some of the major fisheries. The 2002 assessment used various production models and several types of VPAs. In some cases, the models were unable to produce parameter estimates within a biologically meaningful range, and therefore strong assumptions had to be made in these cases about stock productivity.

The estimates of MSY ranged from 91,000 to 112,000 tonnes. The catch was larger than the upper limit of MSY estimates for the years between 1993 and 1999, causing the stock to decline considerably, followed by a leveling off of the biomass in recent years as total catches decreased. Current biomass is about 10-20% below the biomass corresponding to MSY while F is about 15% higher than F_{MSY}.

Although all results indicate a sharp increase in fishing mortality and an opposite decline in biomass in recent years, the results were unstable and thus the analyses were considered to be inconclusive. However current F appears to exceed F0.1 and is also likely to be higher than Fmax, adding support to the production model's conclusion that the bigeye stock is being over-exploited. Spawning stock biomass-per-recruit is lower than its FSPR30% by about 20%, which corresponds to a threshold at which recruitment over-fishing may occur for other fish species.

The results of stock projections assuming a catch of 100,000 tonnes in 2002 and varying levels of constant catch thereafter suggest that the biomass of the stock will not decline further with constant catches of 100,000 tonnes, which is very close to the reported catch for 2001. Increases in biomass are expected with catches of 95,000 tonnes or less; conversely further declines in biomass are expected with catches of 105,000 tonnes or more.

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS reports that while a minimum size regulation of 3.2 kg was adopted in 1980 it is clear that a large quantity of juvenile bigeye tuna (smaller than 3.2 kg) continues to be taken and mostly from the equatorial baitboat and purse seine fleets. The percentage of these fish has increased since 1990 and was more than 50% of the total fish caught thereafter except in 2000. According to the yield-per-recruit analysis, a full implementation of minimum size regulation regulation could result in an increase in yield-per-

recruit by almost 20% at Fmax. The SCRS consequently recommended the full implementation of the moratorium on fishing FADs by all surface fisheries in the Gulf of Guinea.

For the major fishing countries (whose 1999 catch exceeded 2,100 tonnes) catches in 2001 were limited to the average catches taken in 1991 – 1992. The SCRS concluded that if the current decline in the stock size is to be halted consideration should be given to limiting the total catches made by all countries fishing in the Atlantic to 100,000 tonnes or less.

STECF COMMENTS: STECF agrees with the advice from ICCAT. Additionally STECF stresses the importance of effective enforcement of the moratorium on FADs recommended in November 2000 by ICCAT.

10.8. Swordfish (*Xiphias gladius*), North Atlantic

FISHERIES: For the past decade, the North Atlantic estimated catch (landings plus discards) has averaged about 14,200 tonnes, although the 2001 catch was reduced to 9,797 tonnes. In 2002, there was a 53% decrease in estimated catches since the 1987 peak in North Atlantic landings of 20,236 tonnes. This is in line with current ICCAT recommendations but may be partly attributed to shifts in fleet distributions. Most of the swordfish catches in the North Atlantic are taken by directed longline fisheries, mostly by Spain (3,957 tonnes in 2002), United States (2,400), Canada (959), and Portugal (765).

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined for this stock.

STOCK STATUS: In 2002, the status of the North Atlantic swordfish resource was assessed using both non-equilibrium stock production models and sequential population analyses (SPA). The current base case assessment indicates that the North Atlantic swordfish biomass has improved due to strong recruitment since 1997 (1996 year-class), combined with recent reductions in reported catch. The strong recruitments of the late 1990's have already promoted improvement in spawning stock biomass and should result in further improvement, if these year classes are not heavily harvested.

An updated estimate of maximum sustainable yield from production model analyses is 14,340 tonnes (with estimates ranging from 11,500 to 15,500 tonnes). Since 1997, North Atlantic swordfish catches have been below 14,340 tonnes. The biomass at the beginning of 2002 was estimated to be 94% (range: 75 to 124%) of the biomass needed to produce MSY. The 2001 fishing mortality rate was estimated to be 0.75 times the fishing mortality rate at MSY (range: 0.54 to 1.06). The replacement yield for the year 2003 was estimated to be about the MSY level. As the TAC for North Atlantic swordfish for 2002 is 10,400 tonnes, it is likely that biomass will increase further under current catch levels.

RECENT MANAGEMENT ADVICE: SCRS recommend that if the North Atlantic swordfish stock is to be rebuilt to biomass levels that would support MSY levels within 10 years (through 2009) with a probability of slightly greater than 50%, then the catch (including discards) could be maintained at 14,000 tonnes for 2003-2009. At 15,000 tonnes the stock trajectory declines.

STECF COMMENTS: STECF agrees with the advice from ICCAT. Due to the low size-selectivity of the longlines, the minimum landing size regulation of 125 cm may have resulted in

under-reporting of juvenile catches and appeared not to be practical in most situations. Alternative methods for reducing juvenile catches, such as time and(or) area closures, are probably more efficient and their applicability should be further investigated.

10.9. Swordfish (*Xiphias gladius*), South Atlantic

FISHERIES: Almost all the reported swordfish catches from the South Atlantic (13,569 in 2002) are taken by directed longline fisheries, and mostly by Spain (42% of the reportes catches in 2001), and Brasil (21%), along withby-catch fleets from Japan, Chinese Taipei, Namibia, Uruguay and Portugal.

The South Atlantic estimated catch was relatively low (generally less than 5,000 tonnes) before 1980. Since then, landings have increased continuously through the 1980s and the early 1990s to a peak of 21,884 tonnes in 1995 (levels that match the peak of North Atlantic harvest). The increase of landings was in part due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Then the estimated landings decreased to 13,835 tonnes by 1998 (37% reduction). The reduction in catch following the peak in 1995 was in response to the regulations, and partly due to a shift to other oceans and to a shift in target species. The ICCAT/SCRS noted that chartering arrangements have increased in the South Atlantic with a concurrent increase in reported catch.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: A new assessment of the South Atlantic swordfish stock was conducted in 2002. The ICCAT/SCRS noted that total catches have been reduced since 1995. Previously ICCAT expressed serious concern about the trends in stock biomass of South Atlantic swordfish based on the pattern of rapid increases in catch that could result in rapid stock depletion, and in declining CPUE trends of some by-catch fisheries. Due to some inconsistencies in the available CPUE trends reliable stock assessment results could not be obtained.

RECENT MANAGEMENT ADVICE: Given the recent expansion of the fishery, and the apparent stability in at least one target fishery, the ICCAT Standing Committee on Research and Statistics (SCRS) recommends that to maintain the stock at about the current abundance, catches should remain at about the same level of the past few years.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

10.10. Swordfish (*Xiphias gladius*), Mediterranean Sea

FISHERIES: Swordfish fishing has been carried out in the Mediterranean using harpoons and driftnets since ancient times. Mediterranean swordfish fisheries are characterized by high catch levels. It should be noted that average annual reported catches (on average about 14,500 t from 1984 to 2001) are similar to those of the North Atlantic, even if the Mediterranean is a much smaller body of water compared to the North Atlantic. However, the potential reproductive area in the Mediterranean is probably relatively larger than that in the Atlantic. Further, the productivity of the Mediterranean Sea is thought to be very high. Landings showed an upward trend from 1965-72, stabilised between 1973-1977, and then resumed an upward trend reaching a peak of 20,000 tonnes

in 1988. Since then, the reported landings have declined and since 1990 they fluctuate from about 12,000 tonnes to 16,000 tonnes. The biggest producers of swordfish in the Mediterranean Sea in 2001 were Italy (44%), Morocco (21%), Greece (12%), Spain (13%), Algeria (7%) and Tunisia (4%). In 2002 preliminary catch data indicates a level of about 11,000 tonnes, but several catches have not been reported (i.e. Tunisia and Libya). Prior to 2002 longlines and driftnets were the main gears used, but minor catches were also reported by harpoon and traps. The driftnet fishery for swordfish has been banned since January 1st 2002 in the EU countries.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are GFCM and ICCAT through the joint GFCM/ICCAT working groups. In 2002 the joint ICCAT/GFCM working group carried out a preliminary assessment of the Mediterranean stock based on fisheries data from the central and eastern Mediterranean. In 2003 ICCAT carried out the first assessment of the Mediterranean swordfish stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock, the high exploitation rate (taking into account the very large reported catch of nearly 15,000 tonnes taken in a small area), the extremely large and uncertain catch of very small fish, and warning signs from the fishery are causes for serious concern. The 2003 assessment shows that both production model and age-based VPA indicated the presence of a stable situation in terms of recruitment, total and spawning biomass. These findings suggest that the current exploitation pattern and level of exploitation are sustainable, in the short-term, as long as the stock does not decline. However, the lack of sufficient historical data did not allow the determination of stock status relative to MSY benchmarks. The VPA analysis suggested that recent F estimates were higher than the calculated Y/R and SPR benchmarks. The SCRS noted the large catches of small size swordfish, i.e. less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches. Fish less than 3 years old represent 50-70% of the total yearly catches.

RECENT MANAGEMENT ADVICE:

The joint GCM/ICCAT working group noted that the quality of available data has greatly improved since 1995. Given the uncertainties in the MSY benchmarks, the SCRS recommends that the current levels of exploitation not be exceeded, under the current exploitation patterns. The percentage of juveniles in the catches is relatively high and a reduction of their catches would improve the yield and spawning biomass per recruit. In the past, adoption of a minimum landing size regulation of 120 cm may have resulted in under-reporting of juvenile catches and appeared not to be practical in all situations, considering the low size-selectivity of the fishing gears used. Alternative methods for reducing juvenile catches, such as time and(or) area closures, are mentioned in the 2001 SCRS Report (Section 15.4) and their applicability should be further investigated. In addition, given the uncertainty of the location of the boundary between the Mediterranean and North Atlantic stocks, it is important to identify the biological origin of those catches reported at or near the boundary so that the resulting knowledge can be considered in the management of the North Atlantic and/or Mediterranean stocks. The SCRS continues to recommend that the ICCAT ensure that reliable data be provided on catch effort and size for Mediterranean swordfish. Improvements to these basic inputs to the stock assessment are essential to improve future estimates.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

10.11. Skipjack (*Katsuwonus pelamis*), Eastern Atlantic

FISHERIES: Over the past decade average catches in the eastern Atlantic (125,000 tonnes) account for some 80% of the total and in 2002 amounted to 93,000 tonnes, which represents a 21% decrease as compared to 2001. The catches are taken mostly by surface gears particularly purse seiners (69,000 tonnes) and, to a lesser extent by baitboats (24,000 tonnes). Reported catches are considered to be somewhat under-estimated, due to discarding of small tunas, including skipjack, by the purse seine fleets fishing FAD's (introduced in 1991) and by some baitboat fleets in the equatorial area of the East Atlantic. The most important fisheries are those of Ghana (the largest reported catch in 2002), Spain, France and, to a lesser extent Portugal. In addition various flags of convenience vessels, often belonging to EU companies, operate in the fishery. .

Skipjack fisheries underwent important changes in 1991, a year of exceptional catches (170,000 tonnes), with the introduction of fishing with artificial floating objects (FADs) and the offshore expansion of the purse seine fishery. However, since that year the level of skipjack catches has decreased despite a massive use of FADs. In 2000 and 2001, skipjack catches in the eastern Atlantic amounted to only 108,000 tonnes and 100,000 tonnes respectively.

In 2002 ICCAT reviewed the current stock structure hypothesis of two separate management units, East and West Atlantic, separated at 30°W. In recent years the East Atlantic fisheries have extended to the West of 30°, following the drift of FADs. This would imply the possibility of a certain degree of mixing.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: A detailed stock assessment was conducted on the eastern Atlantic skipjack stock in 1999. The ICCAT/SCRS considers that, in spite of the characteristics of this species, growth overfishing of skipjack has probably been reached, at least in specific areas such as in the Equatorial areas. It is not clear to what extent this applies to the entire stock. In 2002 a non-equilibrium production model showed a possible decline in the yield of the stock following the introduction of FADs, however SCRS notes that the MSY estimates are considered too preliminary to be utilized as a measure of the state of the stock. In the same way, the model estimated a possible generalized increase in the efficiency of the fishing gears of about 5% annually for this species.

RECENT MANAGEMENT ADVICE: While there are no definitive conclusions on the status of this stock, current results suggest that there may be over-exploitation within the FAD fishery. However the SCRS also point out that the voluntary Protection Plan for Atlantic tuna has resulted in a reduction in the skipjack catches associated with FADs (between 1997 and 1999) and conclude that maintaining this closure could have a positive effect on the resource.

STECF COMMENTS: STECF agrees with the advice from ICCAT and reiterates the importance of effective enforcement of the moratorium on FADs recommended in November 2000.

10.12. Skipjack (*Katsuwonus pelamis*), Western Atlantic

FISHERIES: Catches in the West Atlantic in 2002 amounted to 21,374 t, a 32% decrease with respect to 2001 (31,362 t). The catches of skipjack tuna in the western Atlantic are taken almost exclusively by surface gears particularly baitboats (18,700 tonnes) and, to a lesser extent by purse

seiners (2,100 tonnes). The most important fishery is the baitboat fishery of Brazil, whose only target species is skipjack and to a lesser extent Venezuela. The catches taken by EU vessels on this stock have been, historically, negligible.

In 2002 the current stock structure hypothesis that consists of two separate management units, one in the East Atlantic and another in the West Atlantic, separated at 30°W was reviewed (see Skipjack, eastern Atlantic).

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: A stock assessment was conducted in 1999. Standardized abundance indices (up to 1998) from the Brazilian baitboat fishery and the Venezuelan purse seine fishery showed, in both cases, a stable stock status.

RECENT MANAGEMENT ADVICE: No management recommendations were proposed by the ICCAT.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

10.13. Marlins, spearfish and sailfish (Atlantic Ocean)

FISHERIES: The average catches of blue and white marlin, spearfish and sailfish in the Atlantic Ocean over the last decade amounts to 7,400 tonnes. The corresponding catch in 2002 is 6,212 tonnes comrising 2,324 tonnes of blue marlin, 794 tonnes of white marlin, 2,249 tonnes of sailfish and 805 tonnes of spearfish.

The group are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seiners (including EU purse seiners catching a few hundreds tonnes yearly), by some artisanal gears which are the only fisheries targeting marlins (Ghana, Cote d'Ivoire, including EU ones in the Antillas) and also by various sport fisheries located in both sides of the Atlantic. This group of species is becoming important in the Atlantic because of their charismatic status and the sport fisheries lobby (and because of the latter's active financial support to the ICCAT scientific researches on these species). The increasing use of anchored FADs by various artisanal and sport fisheries is increasing the vulnerability of these stocks.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: BLUE MARLIN: there is uncertainty in the assessment related to the historical data that is not well quantified. However, given that the 2000 assessment estimated that over-fishing was still occurring and that productivity (MSY and a stock's capacity to replenish) was lower than previously estimated, it is expected that landings in excess of estimated replacement yield would result in further stock decline.

WHITE MARLIN: The 2000 assessment for the Atlantic white marlin stock concluded that the stock was over-fished but acknowledged that there was significant uncertainty in the evaluation of

stock status. A further assessment was conducted in May 2002, however the available data was not informative enough to provide an estimate of stock status with high certainty. The ICCAT/SCRS concluded that biomass of white marlin has been below B_{MSY} for more than two decades and that the stock has been over-fished for many years. The 2000 assessment estimated that biomass in the late 1990s was about 15% of B_{MSY}, and that fishing mortality was increasing and reaching more than 5 times F_{MSY}. The MSY estimates of 2,200 tonnes made in 1996 were reduced to 1,300 tonnes in the 2000 assessment. The current assessment suggests that the total Atlantic stock in 2000 remains overfished and continues to suffer over-fishing.

SAILFISH: The most recent assessments of sailfish were conducted in 2001. For the first time separation of sailfish/spearfish allowed assessments to be attempted on sailfish only data. All quantitative assessment models used in 2001, however, produced unsatisfactory fits. For the western Atlantic stock while recent catch levels for sailfish/spearfish combined seem sustainable, it is not known whether the current catch level is below, or at maximum sustainable yield.

In the eastern Atlantic, there is concern for the status of this stock, because of decreases in abundance indices and estimated catches from coastal fisheries.

No assessments have ever been conducted on longbill or Mediterranean spearfish because of the lack of reliable catch or abundance index data.

RECENT MANAGEMENT ADVICE: ICCAT recommends that steps be taken to reduce the catch of blue marlin as much as possible. Steps such as release of live fish from fishing gear, reductions in fleet-wide effort, a better estimation of dead discards, and establishment of time area closures, along with scientific observer sampling for verification could be considered. Observer programmes have been also recommended.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

10.14. Small tunas (Black skipjack, Frigate tuna, Atlantic bonito, Spotted Spanish mackerel, King mackerel), Atlantic and Mediterranean

FISHERIES: There are over ten species within the ICCAT category of small tunas, which includes Blackfin tuna (*Thunnus atlanticus*), Bullet tuna (*Auxis rochei*), Frigate tuna (*Auxis thazard*), Bonito (*Sarda sarda*) , Plain bonito (*Orcynopsi s unicolor*) , Serra Spanish mackerel (*Scomberomorus brasiliensis*), Cero (*Scomberomorus regalis*) King mackerel (*Scomberomorus cavalla*), Scomberomorus unclassified (*Scomberomorus* spp.), Atlantic black skipjack (*Euthynnus alletteratus*), West African Spanish mackerel (*Scomberomorus tritor*), Atlantic Spanish mackerel (*Scomberomorus maculatus*) and Wahoo (*Acanthocybium solandri*), but only five of these account for 85% of the total catch by weight each year, according to the official statistics. Some of these species are fished also by Comunnity fleets and the catches reported to ICCAT in 2002 are at the following levels: 4,729 tons of Blackfin in the Atlantic, 7,002 tons in the Atlantic and 22,961 tons in the Mediterranean for Bonito, 14,208 tons in the Atlantic and 2,689 tons in the Mediterranean for Atlantic Black Skipjack, 10,332 tons in the Atlantic and 6,459 tons in the Mediterranean for the Frigate tuna, 950 tons in the Atlantic for the Bullet tuna; as concerns the late species, there is the strong suspicion that Mediterranean catches are not reported. Small tunas are exploited mainly by coastal fisheries and often by artisanal fisheries, although substantial catches are also made, either as target species or as by-catch, by purse-seiners, mid-water trawlers, handlines, driftnets, surface drifting long-lines and small scale gillnets. Seeveral recreational fisheries also target small tunas. Declared catches have increased since the 1950s to the end of the 1980s (peak of 144,000 tonnes in

1998) and then declined (less than 100,000 tonnes recently) to about 91,000 tonnes in 2002. The small tuna fisheries in the Mediterranean accounted for about 33% of the total reported catch in the last decade. It is commonly believed that Mediterranean catches are strongly affected by unreported or underreported data. Since 1991, the use of FADs by tropical purse-seiners may have led to an increase in fishing mortality of small tropical tuna species. The same fishing technique has been employed for a long time in the Mediterranean to catch dolphin fish (*Coryphaena hippurus*) but also small tunas; there are no statistics on these catches, even if it is known that the FAD fishery is now quite widespread in the Mediterranean according to the data provided to the ICCAT/GFCM joint expert working group in 2002. Data on the catch composition, biology, effort and trends are extremely poor, particularly for the Mediterranean, even if some new data have been made available by the new EC data collection system. The small tuna fishery seems to be quite important for the coastal fishermen, both economically and as a source of proteins.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, which operates also through the GFCM/ICCAT joint expert working group.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Current information does not generally allow for an evaluation of stock status for most of these coastal pelagics. The only data concerns the Atlantic Spanish mackerel and king mackerel, where the adoption of management measures improved the stock status.

RECENT MANAGEMENT ADVICE: No management recommendations have been presented by ICCAT due to the lack of data and analyses.

STECF COMMENTS: STECF agrees with the advice from ICCAT and recommends that the Commission make the necessary effort to report much more comprehensive data sets. It is worthy of note that the current EC data collection programme includes only the Atlantic bonito and no other species in this group, a number of which are relevant, both in terms of quantity and economic value.

10.15. Marlins, spearfish and sailfish (Bill fishes) - Mediterranean

FISHERIES: The Mediterranean fisheries catch mostly one species, the Mediterranean Spearfish (*Tetrapturus belone*), usually a by-catch in longline and driftnet fishery, but one of the target species for the harpoon fishery and occasionally in sport fishing activity. Catches are unofficially known to occur in all the Mediterranean States where driftnet and longline fishing is currently carried out. The landings are unknown, although they seem to have increased in the most recent years, maybe reaching a level of about 100 tons. All the other billfish species are only very rarely present in most of the Mediterranean sea, but recent data shows that catches could occur in the western basin, particularly around the Strait of Gibraltar.

SOURCE OF MANAGEMENT ADVICE: The advisory body ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: No attempt has been made until now to analyse the status of the Mediterranean Spearfish, due to the lack of data.

RECENT MANAGEMENT ADVICE: ICCAT have not provided any kind of management recommendations for this stock.

STECF COMMENTS: Billfishes are charismatic species and their stock status should be followed carefully, even if they are not generally a target species for commercial fleets. The Mediterranean Spearfish should be strictly monitored, due to the high fishing pressure on other target species and to the possible increase of catch levels.

10.16. Luvarus (Luvarus imperialis) – Mediterranean

FISHERIES: The Luvarus is usually a species not considered among the catches of the Mediterranean fisheries, but this poorly known species occurred as a commercial by-catch in several driftnet fisheries, particularly between May and June. Catches may be significant in some periods; this species can exceed 80kg. To date landings have not been officially reported by any Country, although this species commands a high price on the market.

SOURCE OF MANAGEMENT ADVICE: The advisory body is FAO/GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No attempt has been made until now to analyse the status of the Luvarus stock, due to the total lack of data. The ban on the use of driftnets by EC fleets since January 1, 2002, could results in a partially positive effect for the stock.

RECENT MANAGEMENT ADVICE: GFCM have not provided any kind of management recommendations for this stock.

STECF COMMENTS: The Luvarus is a quite poorly known species. Its natural history was much better known at the beginning of the last centuray, while now data are completely lacking. Due to the low density of the species and to the old age classes involved in the fishery, it should be important to collect basic data about the fishery and the species, even if it is not generally a target species for commercial fleets.

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11. Highly migratory fish (Indian ocean)

As a general remark, all the highly migratory species in the Indian Ocean are now managed by the Indian Ocean Tuna Commission (IOTC), an FAO body. This Commission face a number of difficulties, some of which are related to the number of States taking part in these fisheries. Despite improvements, statistical tables are still not available for all fisheries.

11.1. Albacore (Thunnus alalunga)

FISHERIES: Since the mid-1960s, total yields varied between 15,000 and 30,000 tonnes, but suddenly increased up to 40,000 tonnes during the last 3 years (1998 to 2000). The great majority of the catches are due to longliners, which caught big albacore (>80 cm). Taiwan is the main country exploiting this stock. Difficulties between Japan and Australia (over southern bluefin) have delayed the convening of a temperate working group and consequently the albacore stock has never been assessed (neither by the IPTP before 1997, nor by the IOTC).

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The status of this stock remains unknown.

RECENT MANAGEMENT ADVICE: IOTC did not provide management recommendations for this stock, but the scientific committee was concerned by the sharp increase in the catches since 1998.

STECF COMMENTS: STECF recommends that albacore in the Indian Ocean be assessed as soon as possible.

11.2. Yellowfin tuna (Thunnus albacares)

FISHERIES: From the mid-1960s to 1983, yields were stable at about 50,000 tonnes. There was a sharp increase during the 8 following years due to the arrival of EU purse seiners in the Indian Ocean. Since 1992, the yields remain relatively stable and fluctuate between 250,000 and 300,000 tonnes. In 2001 total catch declined to 281,000 t, the lowest level since 1991. This stock is firstly exploited by purse seiners, then by longliners and artisanal fishery (including baitboat and gillnet). There are some concerns regarding purse seine fishing using floating FADs, which has led to a rapid increase in the catch of juveniles yellowfin.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: An assessment took place in 2002. Various methods have been applied and they suggested that MSY would be around 300,000 tonnes and that the current catches are close to, or possibly above, the MSY level. A continuation of the recent rapid increase in the catches and effort would imply that the fishery would exceed MSY.

RECENT MANAGEMENT ADVICE: It is recommended that the fishing effort does not increase in the near future and that there is a reduction in the fishing mortality on juvenile yellowfin tuna.

STECF COMMENTS: STECF agrees with the advice from IOTC and stresses the importance of reducing the catches of juveniles.

11.3. Bigeye tuna (Thunnus obesus)

FISHERIES: Bigeye tuna is predominantly caught by industrial (long line and purse seine) and occassionally by artisanal fisheries. Longline fisheries started to target bigeye in the 1970s and mainly catch adults > 80 cm. There was a rapid development of the purse seine fisheries during the 1990s in association with drifting and floating FADs. These fleets mainly catch small fish < 80 cm. Reported total catches in the Indian Ocean of bigeye tuna peaked during 1997-99 at 144-150,000 t per year. Catches fell to 129,000 t in 2000 and 111,000 t in 2001. This decline is most pronounced in purse seine catches, but is also seen in longline catches. An important part of the longline catch is due to longliners of non-reporting flag states.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: An assessment took place in 2001. The population is currently above MSY, which has been estimated at 90,000 tonnes. The overall fishing mortality was estimated to be currently just below F_{MSY}, but recent catches have substantially exceeded MSY. Projections with constant catch at the1999 level induce over-exploitation with a rapid decline in both the spawning stock bioamss and catches. Projections assuming a constant fishing mortality at the 1999 level result in a decline in the catches, which then remain stable around MSY. These results are, however, impaired by various uncertainties, among which the recruitment level (which has been assumed independent of the spawning stock biomass), the growth and the lack of catch-at-size data for various fisheries.

RECENT MANAGEMENT ADVICE: Regarding the current rapid increase in the catches and the results of the 2001 assessment, it was recommended that catches from all gears be reduced as soon as possible along with a reduction in the fishing mortality on juvenile bigeye tuna.

STECF COMMENTS: STECF agrees with IOTC advice and stresses the importance of reduce the catches of juveniles.

11.4. Skipjack (Katsuwonus pelamis)

FISHERIES: During the 1970s, the catches were around 50,000 tonnes, but rapidly increased during the 1980s and 1990s to reach 400,000 tonnes in 1999. The trend in catches indicate a large and continuous increase in the catches of skipjack tuna since the mid-1980's (reached 400,000 tonnes in 1999), particularly due to an expansion of the FAD-associated fishery. There is no sign that the rate of increase is diminishing in recent years. Skipjack is caught in similar proportion by industrial (mainly purse seine fishing under floating FADs) and artisanal fisheries (especially the bait boats from the Maldives, which is probably the oldest live bait boat fishery in the world).

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The status of this stock has not yet been analyzed by the IOTC. However, in 2003 IOTC carried out a length-based cohort analysis to analyse the catches and length frequencies. The purse seine and the baitboat fisheries take the greatest catch around 40-50 cm while catches taken from gilnets fisheries ranges from 70-80 cm. The average weights of the skipjack taken from various areas have been more or less the same since 1991. In the Somalia and Western Seychelles area catches have been increasing recently and so too the nominal CPUE trends. In each of these areas, with the exception of west Seychelles in 2002, the nominal CPUE has been relatively stable since the late 1980's. Since this is a period during which is believed that effective purse-seine effort has increased substantially it is likely that the true abundance in these areas has decreased. As these areas may be a source of skipjack recruitment to the Maldives artisanal fishery, there is the potential for an interaction to occur between these fisheries. The IOTC scientific committee has expressed concern because such a rapid and strong increase in the catches cannot be maintained without posing a danger to the stock, even for a species generally resistant to exploitation. There is also some concerns regarding the massive use of FADs that could affect the growth of this species.

RECENT MANAGEMENT ADVICE: There is no immediate concern about the status of skipjack tuna as the stock is assumed to be healthy. However IOTC recommended planned research to address the question of potential risks of interactions between industrial and artisanal fisheries and the use of FADs.

STECF COMMENTS: STECF agrees with IOTC recommendations.

11.5. Swordfish (Xiphias gladius)

FISHERIES: Swordfish in the Indian Ocean is mainly caught by longline and secondarily by driftnets. Yields of swordfish were less than 5,000 tons during the 1970s and 1980s, but sharply increased during the 1990s to reach about 35,000 tonnes in 1998 and 1999. By-catches and discards (mainly sharks and billfish) are important in these fisheries. The reported landings remain uncertain because of the poor quality of the statistics of the dominant fishery, i.e., the Taiwenese longline fishery (which reports more than 50% of the total landings). The main problems that affect the data available for sworfish, as well as all billfish, are: gaps in time series, aggregation and misidentification, under-reporting of discards and lack of size-frequency data.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC/ Working Party on Billfish (WPB) which stated that the stocks of swordfish in the Indian Ocean should be closely monitored. The situation of the resource is highly complex, with local depletion apparently contradicting trends in different areas. The catches of swordfish have increased seven-fold in the last ten years. WPB suggested that if further increases in catch and effort occur, it is likely that they will be unsustainable. Given the life history characteristics of swordfish, it is also likely that it will not be possible to detect over-fishing in time to correct serious damage to the stock.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: A meeting on billfish took place in 2001 and special efforts have been made to assess the status of the swordfish stock. An attempt was made to fit a production model, but without success. Some indicators showed evidence of significant declines in the CPUE of swordfish for the Japanese fleet, particularly over the last decade, in the SW Indian Ocean and there is also evidence for localised depletion around La Réunion.

RECENT MANAGEMENT ADVICE: The IOTC/WPB recommends that, until the missing data are obtained and a stock assessment is achieved, and although a reduction of catch and effort is the preferable measure, at least no increases in catch and effort should be allowed.

STECF COMMENTS: STECF agrees with the advice from IOTC.

11.6. Marlins, spearfish and sailfish (Billfish)

FISHERIES: The total billfish catches remain uncertain because of potential under-reporting. The reported landings (excluding swordfish) are much higher than in the Atlantic and could have reached 40,000 tonnes (or more) during the last years. The most common species are: sailfish (~12,000 t), blue marlin (~8,000 t), striped marlin (~4,000 t) and black marlin (~2,000 t). Billfish are mostly, but not always (e.g., recreational fishing), taken as by-catches from tuna and swordfish longline fisheries (which include various EU fleets).

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: A meeting on billfish took place in 2001, but no assessment could be carried out because of the critical lack of data. The 2000 IOTC /WPB, in a very preliminary analysis, based on limited CPUE data sets, reported an apparent negative trend for the Black Marlin, an increasing trend for the Blue Marlin and an increasing vulnerability for the Striped Marlin. However, these series are likely to be strongly biased and it was agreed that deeper analysis with larger data sets are necessary.

RECENT MANAGEMENT ADVICE: IOTC has not provided any management recommendation for these stocks, but has strongly recommended that better estimates of catches and discards of billfish, by species and by gear, by size and sex, be reported. It is also recommended that past and future catch of marlins taken as by-catches by purse seiners be estimated.

STECF COMMENTS: STECF agrees with IOTC recommendations.

11.7. Seerfish (*Scomberomolus* spp., Spanish mackerels)

FISHERIES: The Indian Ocean fisheries catch about 15,000 to 20,000 tonnes of seerfishe annually. Theses species are primarily taken by artisanal gears in coastal waters and are an important source of proteins for several coastal communities. Seerfishe are not taken by EU vessels in significant quantities.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: IOTC have not provided management recommendations.

STECF COMMENTS: STECF has no comments.

12. Highly migratory fish (North-East East and Western-Central Pacific)

Unlike ICCAT or IOTC, IATTC meetings are restricted to a small number of scientists. The scientific reports and the management recommendations are the responsibility of the IATTC chairman and access to the database is limited. Another difference is related to technical aspects. Contrary to ICCAT and IOTC where various models are run and outputs compared, IATTC runs only one model for all the stocks, A-SCALA, which has yet to be validated. The WCPO Commission also has a very limited number of scientists taking part in its meetings and the outputs about migratory fishes are very limited.

12.1. Northern Pacific Bluefin tuna (*Thunnus thynnus*)

FISHERIES: North Pacific bluefin tuna is primarily exploited by Japanese and US fleets. Catches range between 10,000 and 15,000 tonnes annually. This stock, which has never been exploited by EU vessels, is not really studied nor followed as its distribution is wider than IATTC area. No new data are available, except for a catch of 1,218 tonnes reported to IATTC in 2003.

SOURCE OF MANAGEMENT ADVICE: There is no advisory body for this species.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: STECF has no comments.

12.2. Eastern Pacific Yellowfin *(Thunnus albacares)*

FISHERIES: In term of yield, yellowfin is the most important tuna species in the area. Since the mid1980s the annual catches showed a moderate variability and ranged between 250,000 and 300,000 tonnes, except in 2001 when they reached 400,000 tonnes and in 2002 when they reached a peak of about 414,000 tonnes. Yellowfin tuna is primarily caught by purse seine; catches of longline and live bait boat are generally low. An important proportion of the yellowfin catche is harvested in association with dolphins. This association is quite unique in the world, but yellowfin tuna is also caught in free schools and increasingly under FADs. Some EU vessels are active in this fishery.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Since 1984, the yellowfin stock appears at or above MSY (about 280,000 tonnes) under the present fishing pattern. Results suggest that recruitment would have been rather low until 1985 and higher since 1986. However, these apparent changes in recruitment could be spurious and due to changes in catchability, an increase in fishing efficiency and fishing area which are not taken into account in the modelling assumptions. This stock appears close to full exploitation, but projections indicate that the high catches and high F of 2001 and 2002 are not sustainable.

RECENT MANAGEMENT ADVICE: Since 1962 IATTC has implemented a TAC, which can be increased under the supervision of the IATTC Director. In 2002, IATTC recommended that current fishing mortality should not be allowed to increase.

STECF COMMENTS: STECF agrees with the recommendation of the IATTC.

12.3. Eastern Pacific Skipjack *(Katsuwonus pelamis)*

FISHERIES: Catches have varied roughly between 50,000 and 250,000 tonnes over the time series. Catches in 2002 reached about 154,000 tonnes. Fishing zones of skipjack have also shown a great variability during the same period. Part of this variability is due to the fact that yellowfin is often preferred to skipjack in the area. Skipjack is primarily caught by purse seiners from Mexican and Equadorian fleets along with the EU and other south American countries..

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: This stock has been assessed in 2001 and 2002, but these assessments are still considered preliminary since they gave dissimilar results. The results of the 2002 assessment looks, however, more reasonable. One main point is that skipjack recruitment is highly variable in this area and induces fluctuations in the biomass, so that it is difficult to estimate the status of this stock with A-SCALA. However, it seems that the fishery did not induce a major decline in the biomass.

RECENT MANAGEMENT ADVICE: IATTC has given no management advice.

STECF COMMENTS: STECF has no comments.

12.4. Western and Central Pacific Yellowfin *(Thunnus albacares)*

FISHERIES: The development of this fishery is recent in comparison to many other tuna fisheries. Since 1990, the yellowfin tuna catches varied between 320,000 and 485,000 tonnes. Purse seiners harvest about 50%, while longline and pole-and-line fleets comprise 15% and 3% respectively. EU tuna fleets have not been active in the past in this fishery, but this situation could change in the near future. The catches of juvenile yellowfin in the Philippine and Indonesian domestic fisheries have also increased significantly since 1990, with these increases continuing to 2002 (over 450,000 t). The low catch rates observed during 2002 in the purse-seine

fishery are considered unusual for an *El Nino* event. The longline catche 2002 catch is estimated to be 77,177 t, or 18% of the catch by all gears. During 2002, the pole-and-line fisheries took 17,770 t (4% of the total) while 'other' fisheries (largely taken by fisheries in the Philippines and Indonesia) accounted for 171,270 t (38% of the total).

SOURCE OF MANAGEMENT ADVICE: While there is no advisory body for this species the Oceanic Fishery Programme of the Secretariat of the Pacific Community (SPC) has performed a comprehensive assessment of this stock in 2002. The primary assessment tool was MULTIFAN-CL (a sophisticated statistical model that takes into account explicitly the spatial heterogenity and migration patterns by incorporating tagging data).

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The fit of the model to the data was good. The results displayed a strong increase in the purse seine catchability. The recruitment strongly increased during the late 1970sand 1980s, then slightly declined during the 1990s. Consequently, the total biomass increased until the early 1990s, but declined since the mid-1990s. Fishing mortality rates steadily increased over the time series for the adults and since 1992 for juveniles. The maximum equilibrium yield varied between 300,000 and 400,000 tonnes and MSY between 290,000 and 500,000 tonnes, depending on the assumptions on the recruitment levels (i.e., high or low). In conclusion, this stock is neither being overfished nor is it in an overfished state, but the current trends indicate that this is becoming closer to full exploitation and any future increase in fishing mortality would not result in any long-term increases in yield and may move the yellowfin stock to an over-fished state. However, the assessment also indicates that the equatorial regions are likely to be fully exploited.

RECENT MANAGEMENT ADVICE: SPC recommends that to reduce the risk of the yellowfin stock being over-fished, further increases in fishing mortality (particularly on juvenile specimens) in the WCPO should be avoided.

STECF COMMENTS: STECF has no comments.

12.5. Pacific Bigeye (Thunnus obesus)

FISHERIES: The stock structure of bigeye stock remains unclear and one single Pacific stock is currently assumed. The total reported landings to IATTC regularily increased from about 40,000 tonnes in 1970 to 80,000 tonnes in 2000 (they reached 100,000 tonnes in some years). Longliners account for the major part of total catches, but only those of Japan are reported, so that longline catches are probably under-reported to IATTC. The purse seine fisheries, including EU vessels, are now catching large amounts of small bigeye under floating and drifting objects (FADs). The total bigeye tuna catch in the WCPO was 108,000 t in 2002 and representing 62% of the total Pacific catch in the same year. Available statistics indicate that 60% of the WCPO catch was taken by longline, and most of the remainder by purse seine (21%) and by the domestic fisheries of Indonesia and Philippines and others (18%). Catches in the IATTC area reached about 34,000 tonnes in 2002. The exact trend and amount of this fishery is difficult to estimate, especially

during past years, because small bigeye have been often recorded as yellowfin in many fisheries operating in the Pacific (east and west).

SOURCE OF MANAGEMENT ADVICE: While there is no advisory body for this species the SPC and IATTC are initiating various assessments of this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: IATTC and SPC have undertaken a stock assessment on the eastern component of Pacific bigeye and WCPO updated it in 2003. Last assessment indicated that the biomass is rather stable since the mid-1980s at around 350,000 tonnes, but declined substantially during the last year and is now less than Bmsy. The recruitment appears poor for the last 4 years; as judged by the rarity of small fish in association with FADs. Projections displayed large uncertainties and a yield-per-recruit analysis indicated that the stock can sustain higher fishing mortality rates when longline rather than purse seine is the dominant fishery (this is because purse seiners catch smaller fish). The 2003 stock assessment is, for key management benchmarks, inconsistent with the 2002 assessment, concluding that over-fishing was occurring. It was concluded that the status of this stock remains uncertain.

RECENT MANAGEMENT ADVICE: IATTC concluded that no drastic management actions are needed, but a reduction in fishing effort under floating objects (FADs) of 2 to 3 months would be precautionary. IATTC recognized that the recent measures on size limits appear inadequate. Given the results of the last (2003) assessment, including uncertainties, WCPO-SCG recommends that the precautionary approch should be applied, and fishing mortality should not be increased.

STECF COMMENTS: STECF agrees with the recommendation of the IATTC and additionally recommends that a further comprehensive stock assessment of this stock be conducted using the best methods and data available, with the purpose of reduceing existing uncertainties.

12.6. Western and central Pacific skipjack *(Katsuwonus pelamis)*

FISHERIES: Skipjack tuna catches increased steadily since 1970, more than doubling during the 1980s. The yields were relatively stable during the 1990s and ranged from 800,000 to 1,300,000 tonnes. A Japanese pole-and-line fleet previously dominated the fishery, which is now dominated by purse seiners. Over the past 4-5 years, the catch has been at record high levels exceeding 1.2 Million t annually and accounting for more than 60% of the annual catch of principal tuna species landed from the region. In 2002, an estimated catch of 1.3 Million ttuna was landed, the highest on record. Seventy-three percent (962,700 t) was taken by purse seine gear, 21% (280,600 t) by pole-and-line gear and 6% (70,000 t) by other gears.

SOURCE OF MANAGEMENT ADVICE: While there is no advisory body for this specieshe Oceanic Fishery Programme of the Secretariat of the Pacific Community (SPC) has performed a comprehensive assessment of this stock in 2002 (using also MULTIFAN-CL).

PRECAUTIONARY REFERENCE POINTS: No precautionsry reference points have been proposed for this stock.

STOCK STATUS: The fit of the model to the data was good. The results displayed a strong increase in the purse seine catchability, while this of pole-and-line decreased. The recruitment has been higher since the mid-1980s, which seem to be related to the higher frequency of *El Niño* events. Biomass increased firstly in the mid-1980s in response to recruitment, then in the late 1990s. Fishing mortality is lower for juveniles and has increased for both adults and juveniles until 1997 and decreased since then due to increase in the stock biomass. The maximum equilibrium yield varied between 620,000 and 950,000 tonnes, depending on the assumptions made about recruitment levels. Overall, the results suggest that this stock is neither being overfished nor is it in an overfished state, but the current trends indicate that this is becoming closer to full exploitation. Continued catches at the 1.2 million t level is sustainable with continued high levels of recruitment which are believed to be determined principally by environmental factors rather than a strong spawner-recruit relationship. In conclusion, stock size and fishery performance are firstly driven by recruitment variability, which is influenced by environmental conditions (El Niño).

RECENT MANAGEMENT ADVICE: no management advice.

STECF COMMENTS: STECF has no comments.

12.7. Northern Pacific Albacore *(Thunnus alalunga)*

FISHERIES: This stock is fished by longliners (from Taiwan, Japan and USA) and by surface fleets (USA). EU vessels have never fished this stock. . Catches of 33 tonnes have been reported to IATTC in 2002.

SOURCE OF MANAGEMENT ADVICE: While there is no advisory body for this species the National Marine Fisheries Service (NMFS) monitors the stock.

PRECAUTIONARY REFERENCE POINTS: None.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF has no comments.

12.8. Southern Pacific albacore *(Thunnus alalunga)*

FISHERIES: Total catches of this stock have been quite stable since the early sixties at around 30,000 tonnes and only slightly increased during the last 3 years to about 40,000 tonnes. Total catches in 2002 reached 51,000 t, the second highest catch in the post-drift net period. Longliners are the main vessels targeting this stock (including some EU vessels from French Polynesia).

SOURCE OF MANAGEMENT ADVICE: While there is no advisory body for this species the Oceanic Fishery Programme of the Secretariat of the Pacific Community (SPC) has performed a comprehensive assessment of this stock in 2002 (using also MULTIFAN-CL).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The fit of the model to the data was good. The recruitment estimates displayed large short and long-term variations. Recruitment has generally been high prior to 1980, low during the1980s and higher again during the 1990s. Biomass has reflected recruitment variations and has declined to historic lows in the late 1980s and recovered to some extend during the 1990s. Fishing mortality is lower for juveniles and has increased strongly for adults since the mid-1980s. The maximum equilibrium yield, which has been estimated for the 1994-1999 period to 38,000 tonnes, is close to the catches over the same period. Recent application of a high resolution environmental and population dynamics simulation model (SEPODYM) to South Pacific albacore has provided some preliminary results on the possible mechanisms for recruitment variability. Recruitment as estimated by MULTIFAN-CL appears to be negatively correlated with *El Nino* events, which may explain low recruitment rates in the 1980s and 90s. In some fisheries (i.e. Samoa) there is evidence of CPUE declines that may indicate localized depletion and/or gear competition

RECENT MANAGEMENT ADVICE: No management advice, except the SCG-WCPO general guidelines, concerns the situation in small islands.

STECF COMMENTS: STECF has no comments.

12.9. Pacific swordfish (Xiphias gladius)

FISHERIES: The stock structure of swordfish in the Pacific is poorly known. Pacific swordfish is exploited by few fisheries, mainly surface longline, and yields are about 30,000 tonnes annually. No new data are available in 2002.

SOURCE OF MANAGEMENT ADVICE: the advisory board is the IATTC.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of this/these stock(s) is unknown, but the East Pacific population does not show signs of overfishing.

RECENT MANAGEMENT ADVICE: IATTC has no management recommendations.

STECF COMMENTS: STECF has no comments.

12.10. Southern bluefin tuna (*Thunnus thynnus maccoyi*)

FISHERY: This circumpolar stock is exploited in the Atlantic, Indian Ocean and Pacific by longliners and purse seiners (primarily from Japan, Australia and New Zealand). Australian and Japanese fleets have been exploiting this stock for more than 40 years. During this period, the Japanese longline fishery (taking older aged fish) recorded its peak catch of 77,927 tonnes in 1961 and the Australian catches of young fish by surface fishery peaked at 21,501 tonnes in 1982. New Zealand, Chinese-Taipei and Indonesia have also exploited southern bluefin tuna, and Korea started a fishery in 1991. The proportion of catch made by the surface fishery peaked around the 1980s at the level of close to 50% of total catch, but declined afterward to 13%. The catches of Australia, Japan and New Zealand have been controlled with quota since 1985. The current catch limits are 5,265 tonnes for Australia, 6,065 tonnes for Japan, and 420 tonnes for New Zealand, which has remained at the same level since 1990. However, the catches by nations other than the aforementioned three have increased steadily (about 4,689 tonnes in 1996). 2002 preliminary estimates a total catch of about 16,000 tonnes. EU vessels have never exploited this stock.

SOURCE OF MANAGEMENT ADVICE: The advisory body is CCSBT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Various assessment models were utilized in 2001. The results consistently indicated a decline in recruitment with recruitments in the 1990s less than half of those in earlier years. The estimated parental biomass showed substantial differences in absolute levels as well as relative trends according to assessment procedures and model hypotheses but models were much more consistent regarding trends in abundance during the last decade. The parental biomass is notably lower than the 1980 level (i.e., the management target level for stock recovery). Projections under the current catches resulted in either increasing or decreasing biomass trends depending on model assumptions and input data. The current global catch levels appeared to be roughly close to replacement yield. Overall, few of the scenarios resulted in recovery to the 1980 parental biomass level by 2020 under the current catches. An updated review of various indicators at the Eighth Scientific Committee of CCSBT in 2003 concludes that there is no reason to change the conclusion of the 2001 assessment, noting concern on the apparent coincidence of a number of indicators of poor recruitment in 1999/2000.

RECENT MANAGEMENT ADVICE: Global quota at 11,750 tonnes (applicable only to Australia, Japan and New Zealand). The management recommendations given by CCSBT have been hampered during recent years by political problems between Japan and Australia & New Zealand. The ICCAT SCRS noted that the ICCAT statistical system will continue to be important for monitoring the fishery for this species in the Atlantic Ocean. While the CCSBT established in May 1994 has competence on the management of this species as a whole in the three oceans, ICCAT is responsible for the management of southern bluefin tuna in the Atlantic Ocean.

STECF COMMENTS: STECF has no comments.

12.11. Pacific Billfishes (Spearfishes, Marlins and Sailfishes)

FISHERY: SPC's Oceanic Fisheries Programme (OFP) generates annual estimates of commercial billfish catches, but currently not on recreational billfish catches. A system for reporting catches by recreational fishing clubs in the WCPO was established by the OFP. Available data does not include all of the fisheries involved. Data on fishery are not comprehensive of all the fisheries involved.

SOURCE OF MANAGEMENT ADVICE: The advisory body are IATTC, SPC and WCPO.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: An asessment for the Striped marlin was carried out in 2002, indicating a possible separate population of this species off Ecuador and Mexico. The results are still considered provisional, given the possibility of a also due to the possible strong influence of environmental factors.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF has no comments.

13. Resources in the Antarctic

Resources in the Antarctic are managed under a convention administered by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). 14 CCAMLR member countries participate in the fisheries (Australia, Chile, France, Japan, Republic of Korea, New Zealand, Poland, Russia, South Africa, Spain, Ukraine, UK, USA and Uruguay). The review of Antarctic resources, below, is based on CCAMLR (2002).

13.1. Patagonian toothfish (*Dissostichus* spp.)

The total catch of toothfish in the CCAMLR Convention Area during 2001/2002 season was 12,817t (11,455 t of *D. eleginoides* and 1,362 t of *D. mawsoni*), compared with 13,725 t in the previous year. Catches outside the Convention Area were 25,054 t, compared with 33,918 t in the previous year. The estimated unreported catch for all subareas and divisions in the Convention Area was 10,898 t. This compares to an estimated IUU catch of 8,802 t in the 2000/01 season. Out with exploratory fisheries, toothfish are prosecuted in two areas:

13.1.1. Patagonian toothfish (Dissostichus eleginoides) in Subarea 48.3

FISHERIES: The total catch of *Dissostichus eleginoides* in the Subarea 48.3 in 2001/2002 was 5,618 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR The assessment is based on CPUE and assessing long-term annual yields using a Generalised Yield Model (GYM) that incorporate time series of recruitments. Several concerns were expressed over the high degree of uncertainty in estimates of recruitment, natural mortality rate, selectivity at age, and the significant impact of the estimates on the variability of the final yield.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock in Sub area 48.3 is considered fully exploited.

RECENT MANAGEMENT ADVICE: The catch limit for the 2002/2003 season was 7,810 t as indicated by the long-term yield analysis.

STECF COMMENTS:

13.1.2. Patagonian toothfish (Dissostichus eleginoides)in Subarea 58.5.2

FISHERIES: The total catch of *Dissostichus eleginoides* in Subarea 58.5.2 was 1,812 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The assessment is based on CPUE and assessing long-term annual yields using GYM that incorporate time series of recruitments.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock in Sub area 58.5.2 is considered fully exploited.

RECENT MANAGEMENT ADVICE: The catch limit for the 2002/2003 season was 2,879 t as indicated by the long-term yield analysis.

STECF COMMENTS:

13.2. Antarctic icefish (*Chamsocephalus gunnari*), Subarea 48.3

FISHERIES: During the 2001/2002 season the catch of *C. gunnari* was 2,656 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The assessment was derived from a short-term cohort projection method, using abundance and age structure estimated from surveys.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock remains at a low level.

RECENT MANAGEMENT ADVICE: The precautionary catch limit for the 2002/2003 season was 2,181t.

STECF COMMENTS:

13.3. Lantern fish (*Electrona carlsbergi*), Subarea 48.3

FISHERIES: The last year in which there were catches from *E. Carlsbergi* fishery was 1991/92 (51,865 t). There was no catch of lantern fish in this area in 2001/2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The fishery has not been assessed since 1994. The WG-FSA is going to revise the assessment at its 2003 meetig.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The current status of the stock is unknown.

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure 223/XX is 109,000 t.

STECF COMMENTS: None.

13.4. Krill (Euphausia superba) Area 48

FISHERIES: In the 2001/2002 season, a total of 118,705 t of krill have been reported, which represents an increase from the 93,572 t caught in the previous year. The catches was taken by Japan, Republic of Korea, Poland, Ukraine and the USA.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. A long-term precautionary yield based on pre-explotation biomass (B_0) under recruitment and predator criterion (γ_1 and γ_2) is used to obtain the potential yield.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Results from the 2000/01 season indicated above-average krill abundance and recruitment in the Elephant Island area, resulting from successful spawning during 1999/2000. A second year of high recruitment was also predicted for the 2001/02 season. In this season the recruitment index was one of the highest values observed since the strong 1994/95 year class.

RECENT MANAGEMENT ADVICE: Under conservation measure 32/XXI the total catch of krill in 2001/2003, in Area 48 was limited to 4 million tonnes, subdivided as follows:

Subarea	Potential yield (000,000 t)
48.1	1.008
48.2	1.104
48.3	1.056
48.4	0.832

STECF COMMENTS:

13.5. Krill (*Euphausia superba*), Division 58.4.1

FISHERIES: There was no catch of krill in this area in 2001/2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: A previous survey in the region provided a B_0 estimation of 4.83 million tonnes.

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure 106/XXI is 440,000 t.

STECF COMMENTS: None.

13.6. Krill (*Euphausia superba*), Division 58.4.2

FISHERIES: There was no catch of krill in this area in 2001/2002.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The Working Group on Ecosystem Monitoring and Management endorsed the need to carry out surveys as soon as is practicable in Division 58.4.2, to provide a new biomass estimate.

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure 45/XXI is 450,000 t.

STECF COMMENTS: None.

13.7. Antarctic squid (*Martialia hyadesi*), Subarea 48.3

FISHERIES: There was no catch in 2001/2002 **SOURCE OF MANAGEMENT ADVICE:** The main management advisory body is the CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No information available.

RECENT MANAGEMENT ADVICE: No advice.**STECF COMMENTS:**

13.8. Crabs (Paralomis spinosissima and Paralomis formosa), Subarea 48.3

FISHERIES: A single Japanese vessel undertook commercial pot fishing for crab in 2001/2002. The total catches were 56 t and 57 t of *P. spinosissima* and *P. Formosa* respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No information available.

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure F08/XXI is 1,600 t.

STECF COMMENTS: None.

14. Elasmobranch Resources

14.1. Elasmobranch Resources (Northeastern Atlantic)

14.1.1. General Comments

FISHERIES: Prior to the generic TAC introduced in 1999 for "skates and rays" in the North Sea, the only controls on elasmobranch fisheries in the North-east Atlantic were TACs for basking shark (*Cetorhinus maximus*) and porbeagle (*Lamna nasus*) agreed between Norway and the EU for Norwegian vessels fishing in EU waters. Within UK waters, selected Sea Fisheries Committees had local by-laws for a minimum landings size for skates and rays. There has, therefore, been no obligation for fishermen to record catches in the logbooks used for monitoring quota uptake of TAC species.

As a consequence, there is a lack of historic information on the fisheries that take elasmobranchs. Statistical information by species is also limited because few European countries differentiate between species in landings statistics and they are often collectively recorded as sharks, "dogfish and hounds" or "skates and rays". The main exception is France, for which more detailed landings statistics are available, and show that cuckoo ray (*Leucoraja naevus*) and thornback ray (*Raja clavata*) are the most important batoids landed. Similarly, Iceland report species-specific landings data for starry ray (*Amblyraja radiata*) and common skate (*Dipturus batis*).

The majority of elasmobranchs species landed are taken as a by-catch in various trawl, seine, line and setnet fisheries that are aimed primarily at teleost fishes. Nevertheless, spurdog and skates and rays are an important by-catch and landings of these species are of high value. Furthermore, a number of small-scale fisheries using longline (for shark) or large meshed tangle nets directed at spurdog or skates operate, and trawl and line fisheries have been developing for deep-water sharks since 1990.

Furthermore, recreational fisheries, including charter angling, for elasmobranchs may be an important component of the tourist industry in some areas.

SOURCE OF MANAGEMENT ADVICE: The Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues in Bergen, March 1997, included elasmobranchs in the species groups for which stock assessments, or other appropriate stock indicators, are required to ensure the sustainability of fish stocks and associated fisheries in the North Sea. ICES indicated that it would attempt to provide assessments and establish target and limit reference points for elasmobranchs within a ten-year time frame.

Members of the ICES Working Group on Elasmobranch Fishes (WGEF) initiated an EU-funded project to summarise current knowledge of the biology and fisheries of elasmobranchs in the North-East Atlantic, and to develop assessment methods that may be applicable for

elasmobranchs (DELASS project). During this project, preliminary assessments were aimed at nine case-study species representing a variety of taxonomic and ecological profiles:

- Pelagic shark: Blue shark (*Prionace glauca*)
- Coastal dogfishes: Spurdog (*Squalus acanthias*) and lesser-spotted dogfish (*Scyliorhinus canicula*)
- Deep-water dogfishes: Portuguese dogfish (*Centroscymnus coelolepis*), leafscale gulper shark (*Centrophorus squamosus*), kitefin shark (*Dalatias licha*) and black-mouth dogfish (*Galeus melastomus*)
- Coastal skates: Thornback ray (*Raja clavata*) and cuckoo ray (*Leucoraja naevus*).

It is hoped that ICES will be able to give advice on biological safe limits within the next few years. For the NAFO area, the Fisheries Commission requested the Scientific Council in 2000 to summarise all available information on elasmobranch catches and surveys, and to quantify the extent of exploitation of these resources. In September 2002, NAFO organised an international symposium on elasmobranch fisheries which was held in Santiago de Compostela.

PRECAUTIONARY REFERENCE POINTS: The ICES Working Group on Elasmobranch Fishes (WGEF), which deals with the assessment and/or collection of biological data and information on sharks, dogfish, skates and rays, agreed at its meeting in May 1997 that insufficient data were available to evaluate the response of the respective stocks to exploitation using conventional assessment procedures. The lack of species-specific landings data for most species means hampers most assessment methodologies, and problems of validating age and growth in elasmobranchs preclude age-based assessments. To date, no advice has been given on the status of commercial stocks. However, the population dynamics of these species are easier to predict than those of most teleosts, due to the deterministic relationship between stock and recruitment and the relatively uniform survival rate of juveniles and adults. It may, therefore, be relatively easy to determine limit reference points (defined as replacement mortalities, and already estimated for spurdog) using basic information on age at maturity, fecundity and rate of change in population size at different mortalities.

No biological reference points have been set for elasmobranchs in the NAFO area.

STOCK STATUS: There is evidence that some of the larger-bodies elasmobranch species have experienced declines in abundance in the North Sea and adjacent waters. Although data exist for several demersal species, there has been no comprehensive analysis of trends in survey CPUE or length composition. Although there are good historic data on landings of some species, for example basking shark and spurdog, there have been substantial changes in the intensity and pattern of exploitation of many species in the last 20 years, which make assessment of population trends particularly difficult.

Information has been provided on the geographic distribution of the more common species in the various NAFO subareas, and whilst there are no absolute abundance estimates for any species, biomass indices are available from bottom trawl surveys in some subareas for spurdog, and seven skate species from at least 1970. Large-bodied skates (Lmax > 100 cm), which include barndoor skate (*Dipturus laevis*) and thorny skate (*Amblyraja radiata*) are currently at a low biomass levels, whilst there has been a recent increase in biomass of small-bodies skate species, such as little skate (*Leucoraja erinacea*), clearnose skate (*Raja eglanteria*) and rosette skate (*Leucoraja garmani*). In general, landings in the skate fisheries reached a peak in Canadian waters in the late

1980's and in American waters in the 1990's, primarily due to increased targeting of these species. Spurdog landings from all subareas peaked in the early 1970's and again in the mid-1980's, declined rapidly thereafter, falling to less than 20,000 t in 1994 (a drop of more than 50% from the 43,000 t reported in 1987). According to Muñoz-Chàpuli et al. (1993), there was a gradual decline in landings reported from the Scottish-Norwegian area, followed by a similar trend in the North Sea, though increases in landings have been reported to the west of the UK.

On a global scale, FAO compiles fishery statistics which included reported landings of elasmobranchs, and published a Technical Paper (No. 380) in 1999 which comprises 27 case studies on elasmobranch fisheries and their management around the world. A "Preliminary evaluation of the status of shark species" points to the problems in assessing shark, dogfish and catshark populations; chief among which are a lack of fisheries data, biological data and of suitable models. Each exploited species is put into one of 5 status categories, ranging through those whose catches have not decreased historically (4 spp), those that have life history characteristics that make them especially vulnerable to overfishing (20 spp), those which have shown substantial declines in catches and/or have become locally extinct (12 spp), to those which were formally abundant but have become rare (0, so far), and those for which there is no relevant data (123 spp).

RECENT MANAGEMENT ADVICE: Elasmobranch fisheries *per se* are essentially unregulated and unmanaged within the Northeast Atlantic. There are potential problems in introducing effective management measures that will target elasmobranch species, which tend to be taken as a by-catch in multi-species fisheries, when management of the exploitation of other species inhabiting the same grounds may be a priority. Nevertheless, the possible benefits of implementing management measures (e.g. minimum and maximum landing sizes, and measures designed to protect nursery and breeding grounds) need to be fully investigated. In the NAFO area, some directed fisheries for Porbeagle shark, spurdog and skate are regulated by quota controls.Spurdog (*Squalus acanthias)* in the north-east Atlantic.

*14.1.2. Spurdog (*Squalus acanthias*) in the North-east Atlantic*

FISHERIES: The main fishing grounds for spurdog are: Norwegian Sea (Sub-area II); North Sea (IV); Northwest Scotland (VI) and the Celtic Sea (VII). Some landings are also from the Skagerrak and Kattegat (Sub-area IIIa) and Iceland (V). The UK, France, Ireland and Norway are the major exploiters of spurdog, with annual landings typically in excess of 1,000 t. Smaller quantities are also landed by Germany, Portugal, Belgium, Denmark, Poland, Iceland, Sweden and Spain.

Although most spurdog are now taken as by-catch in otter trawls and seines aimed principally at whitefish, directed fisheries for this species continue to operate locally and seasonally. Landings of this species remain difficult to quantify due to differences in the level to which they are identified in national landing statistics. Landings which are specifically identified as *S. acanthius* probably represent a minimum estimate, while a maximum estimate includes categories such as "Squalidae", "dogfish" or "dogfish and hounds" which may include a number of other species (eg. deep-water squalids, spotted dogs, smoothhound and tope). Landings averaged about 35,000 t throughout the 1980s, then steadily declined to an average of about 15,000 t by the late 1990s. The landings for 2000-2002 are uncertain.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on spurdog in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes, which proposes management units and comments on the status of the stock. Spurdog are subject to an EU precautionary annual TAC in ICES Sub-areas II (EC Waters) and IV.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for spurdog in the Northeast Atlantic.

STOCK STATUS: The STECF-SGRST Working Group Report on Elasmobranch Fishes estimates that the stock of spurdog in the Northeast Atlantic is severely depleted. A Bayesian assessment method suggests that the stock is depleted to 6% of virgin biomass. An alternative assessment method, the frequentist method, suggests that the spurdog stock is at 39% of carrying capacity.

RECENT MANAGEMENT ADVICE: There is no specific management advice for spurdog in the NE Atlantic.

STECF COMMENTS: STECF agrees with the STECF-SGRST Working Group Report on Elasmobranch Fishes, that the stock of spurdog in the Northeast Atlantic is severely depleted.

14.1.3. *Catsharks and nursehounds (Scyliorhinus canicula* and *Scyliorhinus stellaris) in the north-east Atlantic*

FISHERIES: The lesser-spotted dogfish *Scyliorhinus canicula* is common on all coasts, from Mediterranean latitudes to south Norway. It is taken primarily as a by-catch in demersal fisheries targeting other species and a large proportion of the catch is discarded, although in some coastal areas there are seasonal small-scale directed fisheries for *S. canicula.* Landings of this species remain difficult to quantify due to differences in the level to which they are identified in national landing statistics.

The nursehound (*Scyliorhinus stellaris*) is found on rough, even rocky grounds to the south and west of the UK, extending to the Mediterranean. Because it is comparatively scarce, it has only a minor contribution to commercial fisheries. There are no reliable estimates of total international catches or landings.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on spurdog in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for *S. canicula or S. stellaris* in the Northeast Atlantic.

STOCK STATUS: Except for the Cantabrian Sea, there are no reliable assessments of the status of *S. canicula* in the NE Atlantic due to the lack of catch information. An assessment of *S. canicula* in the Cantabrian Sea indicates an increase in the stock. Possible explanations for this increase in abundance of lesser-spotted dogfish is the tradition of dumping most of the catch

alive, plus the fact that other discarded fish might be providing additional food sources to the dogfish.

There is no information on the status of *S. stellaris* in the NE Atlantic.

RECENT MANAGEMENT ADVICE: There is no specific management advice for *S. canicula or S. stellaris* in the NE Atlantic.

STECF COMMENTS: STECF has no comments.

14.1.4. *Basking shark (Cetorhinus maximus) in the north-east Atlantic*

FISHERIES: Historically basking sharks in the NE Atlantic have been exploited by vessels from Norway, Ireland and Scotland. Since the mid-1940s, catches have varied considerably. Between 1948 and 1984, annual catches ranged from about 1000 to 1500 individuals. Since 1984 catches dropped from 980 to 36 individuals in 2001.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on basking shark in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for *basking shark* in the Northeast Atlantic.

STOCK STATUS: There are no firm estimates of the status of basking shark in the NE Atlantic. However, the stock is considered depleted. The IUCN red data list classifies basking shark as endangered in the NE Atlantic. Landings have decreased despite its continued high value and because of its low fecundity, it is considered vulnerable to fishing.

RECENT MANAGEMENT ADVICE: The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) lists basking shark *Cetorhinus maximus* in Appendix III, which requires "regulation of species populations to keep them out of danger". Basking shark is also listed in Appendix II of CITES (Convention on international trade in endangered species), meaning that international trade in its products should be accompanied by permit and a 'no-detriment finding' that states that the harvest of the species is sustainable. The UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks calls for Parties to protect marine biodiversity, minimise pollution, monitor fishing levels and stocks, provide accurate reporting of and minimise by-catch and discards, and gather reliable, comprehensive scientific data as the basis for management decisions. It mandates a precautionary, risk-averse approach to the management of these species when scientific uncertainty exists. The Agreement also directs States to pursue co-operation in relation to listed species. Basking shark is listed in the agreement. A Biodiversity action plan for basking shark has been developed in the UK and it has been nominated for inclusion in OSPAR (2002).

Since 2002, there has a complete ban on the landings of basking shark from within the EU waters of ICES Sub-areas IV, VI and VII (Annex ID of Council Regulation (EC) 2555/2001).

STECF COMMENTS: STECF has no comments.

14.1.5. *Blue shark (*Prionace glauca*) in the north-east Atlantic*

FISHERIES: Blue shark is taken mainly as a by-catch in surface longline fisheries for tuna and billfish as far south as the west coast of Africa. This fishery has developed rapidly since the 1940s and it is estimated that 2,400 t of blue shark were taken in 1984, up to 82% of which were discarded due to their low value. During the late 90's the total landings of pelagic sharks from the swordfish fishery had risen to over 35,000 t, with about 85% of the landings comprising blue shark. In recent years the by-catch landings of blue shark from the North Atlantic have decreased due to ICCAT regulation measures regarding swordfish..

Further north, blue sharks are taken by swordfish longline vessels operating from northern Spain (Mejuto, 1985), and a small Spanish longline fishery targets blue shark mainly between June and November in the Bay of Biscay (ICES area VIII). In addition, France, UK and Ireland have had gill-net fisheries for albacore tuna *Thunnus alalunga* beyond the slope of the continental shelf, in which blue sharks are taken as a by-catch.

In the summer months, blue sharks move north to cooler waters as far as the south coast of England and southern, western and northern coasts of Ireland. They have been the target of recreational anglers from ports in south-west England since the early 1950s, though the catches taken by this fishery have fallen considerably since 1960 (Vas, 1990).

Apart from the European fisheries described above, the most important source of mortality on blue sharks probably arises where they are taken as a by-catch in the high seas longline and driftnet fleets targeting tuna and billfish from the nations Japan, Taiwan, Korea and Russia. These fisheries operate throughout the blue shark's geographical range, including the Mediterranean (De Metrio *et al.*, 1984). There is usually no requirement for these fisheries to record their blue shark catch and, because the entire catch is not retained on all fishing trips, the available landing data might not be indicative of stock trends. Due to the increasing price paid for shark fins, however, it is becoming less clear whether the blue (and other pelagic) shark is the target or by-catch species in these fisheries.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on blue shark in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes. ICCAT as an assessment meeting schedual for 2004.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for blue shark in the Northeast Atlantic.

STOCK STATUS: The STECF-SGRST Working Group Report on Elasmobranch Fishes estimates that blue shark in the Northeast Atlantic are heavily exploited as target and by-catch and the stock is depleted. It is classified as near threatened in the IUCN Red list.

RECENT MANAGEMENT ADVICE: There is no species specific management advice for blue sharks in the NE Atlantic.

STECF COMMENTS: There is a need for long-term database of shark data. STECF recommends that all EU fleets operating in the Northeastern Atlantic region provide required input data on catch, effort and catch-at-size to ICCAT for the blue shark, in time for the 2004 schedual (late April) assessment meeting. EC should encourage other nations to report their shark catch data too.

14.1.6. *Porbeagle (*Lamna nasus*) in the north-east Atlantic*

FISHERIES The porbeagle (*Lamna nasus*) has been exploited commercially since the early 1800s, principally by Scandinavian fishermen and is subject to a number of fisheries along its migratory route. This includes most of the ICES area, especially the Faeroes (Vb), Skagerrak (IIIa), North Sea (IVa-c), English Channel (VIId-e), Celtic Sea and south-west Ireland (VIIg-k), Bay of Biscay (VIII) and Portugal Mainland and Azorean waters (IX and X). Smaller numbers are also taken from the Irish Sea (VIIa), west coasts of Ireland and Scotland (VIIb-c and VIa-b), Bristol Channel (VIIf), Iceland (Va) and Norwegian Sea (IIa). Landings off Spain tend to be greater during the spring and autumn, with a drop in the summer.

Porbeagle sharks are often taken as a by-catch in trawls, seines, pelagic and bottom gill nets and by surface longlines set for billfish and tunas. Traditional line fisheries directed at porbeagle (which also take occasional tope and blue sharks) in the northern North Sea and off the Scottish coast have involved specialised vessels from Norway and, to a lesser extent, Denmark and the UK, and French vessels fishing to the south and west of England. Landings by Norway first reached a peak of 3,884 t in 1933, and about 6,000 t were taken by the Norwegian fleet in 1947, when the fishery reopened after the Second World War.

Porbeagle are currently landed by many European countries, principally Denmark, the Faeroes, France, Norway and Spain. Smaller quantities are landed by the Channel Islands, Iceland, Portugal, Sweden, Germany, Ireland and the United Kingdom. According to the FAO Yearbook of fisheries statistics, porbeagle landings in 1994 by all countries fishing the Northeast Atlantic totalled 985 t, of which Norway landed only 25 t. Annual landings during the period 1995 - 1999 have been in the range of 400 - 700 t.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on porbeagle in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS: The STECF-SGRST Working Group Report on Elasmobranch Fishes estimates that porbeagle in the NE Atlantic is extremely depleted and biologically vulnerable. Porbeagle is subject to the UN agreement on highly Migratory Stocks and the UK Biodiversity priority list. It is classified as Vulnerable in the IUCN Red data List.

RECENT MANAGEMENT ADVICE: There is no species specific management advice for porbeagle in the NE Atlantic.

STECF COMMENTS: STECF has no comments.

14.1.7. *Tope (*Galeorhinus galeus*) in the north-east Atlantic*

FISHERIES In European waters, tope (*Galeorhinus galeus*) is not a target species from a comercial fishery, though some recreational anglers specialise in tope catching. Tope is mainly taken as a by-catch in bottom trawl, net and line fisheries of all countries bordering the Northeast Atlantic, and especially by French vessels fishing in the English Channel, Western Approaches and northern Bay of Biscay. According to French catch statistics for 1987, it ranked third (at about 600 t, some 6% of the total shark catches) behind spurdog and lesser-spotted dogfish. Tope are caught by Spanish vessels in the western Cantabrian Sea (Galicia), and around 80% of the landings are from longline vessels, the remainder from trawl and small gillnets. Tope also feature in catch statistics for mainland Portugal and the Azores. There are no reliable estimates of the total catch of tope from the NE Atlantic.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on tope in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS: The STECF-SGRST Working Group Report on Elasmobranch Fishes estimates that tope is biologically vulnerable and that some populations are extremely depleted. Tope is listed in the UK Biodiversity priority list and is classified as Vulnerable in the IUCN Red data List.

RECENT MANAGEMENT ADVICE: There is no species specific management advice for Tope in the NE Atlantic.

STECF COMMENTS: STECF has no comments.

14.1.8. *Portuguese dogfish (*Centroscymnus coelolepis*) in the north-east Atlantic*

FISHERIES Portuguese dogfish are caught in virtually all deep water fisheries in the NE Atlantic although catch data is patchy and incomplete. Landings of Portuguese dogfish have been routinely grouped together with leafs-cale gulper shark and reported as siki.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on Portuguese dogfish in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for Portuguese dogfish in the Northeast Atlantic.

STOCK STATUS: CPUE for Portuguese Dogfish and leaf-scale gulper shark indicate a decline in abundance in V, VI and VII. However, there are no accurate landings data for Portuguese dogfish alone. The stock status remains unknown.

RECENT MANAGEMENT ADVICE: The STECF-SGRST Working Group Report on Elasmobranch Fishes has advised that management unit for Portuguese dogfish in the Northeast Atlantic should include ICES Division Vb, Sub-areas VI, VII, VIII and Hatton Bank (part of VI and XII, the Mid-Atlantic Ridge (Part of sub-areas XIV, XII and Divisioin Va). Separate management units should include Division IXa, X (Azores) and CECAF 34.1. A third management unit should include the Mediterranean.

STECF COMMENTS: STECF has no comments.

14.1.9. *Leaf-scale gulper shark (*Centrophorus squamosus*) in the north-east Atlantic*

FISHERIES Leaf-scale gulper shark are caught in virtually all deep water fisheries in the NE Atlantic although catch data is patchy and incomplete. Landings of this species have been routinely grouped together with Portuguese dogfish and reported as siki.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on leafscale gulper shark in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for leafscale gulper shark in the Northeast Atlantic.

STOCK STATUS: CPUE for Portuguese Dogfish and leafscale gulper shark indicate a decline in abundance in V, VI and VII. However, there are no accurate landings data for leafscale gulper shark alone. The stock status remains unknown.

RECENT MANAGEMENT ADVICE: The STECF-SGRST Working Group Report on Elasmobranch Fishes has advised that management unit for leafscale gulper shark in the Northeast Atlantic should include Division Vb, Sub-areas VI, VII, VIII and Hatton Bank (part of VI and XII), the Mid-Atlantic Ridge (Part of sub-areas XIV, XII and Division Va. There should be a separate management units in Division IXa, X (Azores) and CECAF 34.1.

STECF COMMENTS: STECF has no comments.

14.1.10. *Kitefin shark (Dalatias licha) in the north-east Atlantic*

FISHERIES Kitefin shark are caught in the deep water fisheries in ICES Sub-areas VIII, IX and X and the Mediterranean although catch data is patchy and incomplete. Landings of this species have mostly been reported with other species as *Squalidae*.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on kitefin shark in the Northeast Atlantic is the STECF-SGRST Working Group Report on Elasmobranch Fishes.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for kitefin shark in the Northeast Atlantic.

STOCK STATUS: CPUE for Portuguese Dogfish and leafscale gulper shark (which include also kitefin shark) indicate a decline in abundance in V, VI and VII. However, there are no accurate landings data for kitefin shark alone. According to the report of the STECF-SGRST Working Group on Elasmobranch Fishes, the assessment indicates a strong decline in biomass which may suggest local depletion.

RECENT MANAGEMENT ADVICE: The STECF-SGRST Working Group Report on Elasmobranch Fishes has advised that the management units in the NE Atlantic should include Division Vb, Sub-areas VI, VII, VIII and Hatton Bank (part of VI and XII)), the Mid-Atlantic Ridge (Part of sub-areas XIV, XII and Divisioin Va). A second management unit should include in Division IXa, X (Azores) and CECAF 34.1.The Mediterrean should be considered as a separate management unit.

STECF COMMENTS: STECF has no comments.

14.1.11. Skates in the North Sea

SPECIES:

Starry ray	*Amblyraja radiata*
Common skate	*Dipturus batis*
Long-nose skate	*Dipturus oxyrinchus*
Cuckoo ray	*Leucoraja naevus*
Thornback ray	*Raja clavata*
Spotted ray	*Raja montagui*

DISTRIBUTION OF SKATES:

Collectively, skates have a wide distribution in coastal waters of the Northeast Atlantic, though individual species can be localised in a relatively small area where their preferred habitat occurs.

The most abundant skate species in the North Sea is starry ray (*Amblyraja radiata*). cuckoo ray (*Leucoraja naevus*), is a relatively small-bodied species (Lmax = 75cm) that lives in shallow to moderate depths from 20 m down to about 150 m in the north-west sector of the North Sea. Thornback ray (*R. clavata*) has a more coastal distribution, being found in water depths down to 60 m. It occurs in a number of local concentrations in the North Sea, between which there appears to be a regular exchange of individuals (Walker *et al*, 1997). All rays have a commercial value, except for starry ray (*A. radiata*), though even this species is landed incidentally in the Danish industrial fisheries and is taken in Icelandic fisheries.

Common skate (*Dipturus batis*) tends to be found in water from 30 to 600 m deep, whilst the long-nose skate (*D. oxyrinchus*) is found in deeper water from 150 to 900 m, although juveniles can be found in shallower water (Wheeler, 1969). The distribution of the latter species is not as extensive as that of the common skate, being found off southern Norway and around Scotland. In the past, the common skate was considered to be extensively distributed throughout the central and northern North Sea, but in the last few decades this species appears to have retreated to the very northern North Sea and is currently caught only off the Shetlands (Walker, 1995).

FISHERIES: Prior to the generic TAC introduced in 1999 for all skate and ray species in the North Sea, there has been no obligation for fishermen to record catches in the logbooks used for monitoring quota uptake of TAC species. As a consequence, there is a lack of information on the fisheries for rays. Statistical information by species is also limited because few European countries differentiate between species in landings statistics and they are collectively recorded as skates and rays. The main exception is France, for which the cuckoo ray and the thornback ray are the most important species landed. After France, the UK lands a greater weight of mainly

thornback, cuckoo, blonde and spotted rays than any other European country. The majority of rays landed by both these countries, and from the Netherlands, Belgium, Denmark, Germany and Sweden, are taken as a by-catch in otter trawls and seines aimed principally at gadoids and flatfish. There are, however, a number of small-scale fisheries using large meshed tangle nets directed at thornback ray, and there have been directed longline fisheries for common skate.

Ray fisheries occur in coastal waters and tend to be seasonal, and size selection in towed gears is minimal owing to the shape of rays, though selection on board has occurred to comply with the market's preference for larger fish. Rays have been subjected to intensive exploitation in the North Sea, and landings decreased significantly during the 1930s, but increased after World War II, during which period fishing had almost ceased. In the southern North Sea, landings have declined since 1948, whereas in the northern and central area the major decline started around 1965. Walker (1994) reports that, despite an increase in fishing effort, landings dropped from 12 to 5 thousand tonnes between 1954 and 1974. Since the mid-1970s, total landings of rays from the North Sea have remained more or less constant and, in recent years, Norwegian landings from the northern North Sea and Norwegian Sea have seldom exceeded one thousand tonnes.

SOURCE OF MANAGEMENT ADVICE: The Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues in Bergen, March 1997, included skates and rays in the species groups for which stock assessments, or other appropriate stock indicators, are required to ensure the sustainability of fish stocks and associated fisheries in the North Sea. ICES indicated that it would attempt to provide assessments and establish target and limit reference points for elasmobranchs within a ten-year time frame.

PRECAUTIONARY REFERENCE POINTS: The ICES Working Group on Elasmobranch Fishes (SGEF), which deals with the assessment and/or collection of biological data and information on skate and ray species, agreed at its meeting in May 1997 that insufficient data were available to evaluate the response to exploitation of ray species by the conventional assessment procedures, and no advice has been given on the status of the stocks. However, the population dynamics of these species are easier to predict than those of most teleosts, due to the deterministic relationship between stock and recruitment and the relatively uniform survival rate of juveniles and adults. I may, therefore, be relatively easy to determine limit reference points (defined as replacement mortalities) using basic information on age at maturity, fecundity and rate of change in population size at different mortalities.

STOCK STATUS: The life history of the common skate, its large size and commercial importance, make it the most susceptible of the *Raja* species to exploitation, and its virtual absence in catches from the North Sea indicates that the population is severely overfished and that the stock is unable to sustain itself through recruitment. It also appears that other large-bodied skate species have experienced declines in abundance in the North Sea, where the thornback ray was once the most abundant ray species, the smaller starry ray (*A. radiata*) now comprises 80% of the biomass of the Rajidae (Walker, 1995; Walker and Heessen, 1996). ICES (ICES, 1995) reports that no rays were caught along the Dutch coast from 1958 to 1994 in an area in which the thornback ray had previously been common. Though the data exist for several ray species, there has to date been no analysis of survey data for distribution, CPUE or length composition changes. The DELASS project includes a preliminary assessment for thornback ray

in the southern North Sea among the case studies. It is hoped that ICES will be able to give advice on biological safe limits within the next few years.

RECENT MANAGEMENT ADVICE: Elasmobranch fisheries *per se* are essentially unregulated and unmanaged within the Northeast Atlantic. The problem of introducing effective management measure targeting one species, or group of species, in multi-species fisheries without affecting the exploitation of other species inhabiting the same grounds, has particularly acute implications for the sustainability of skate stocks.

14.2. Pelagic sharks (Central and Southeastern Atlantic)

FISHERIES: Off the West African coast there are local artisanal fisheries and industrial fisheries for tuna and tuna-like species by EC vessels, which are known to have significant by-catches of sharks. A significant part of which are discarded at sea. Information and data which can be used to describe the fisheries of pelagic sharks in the Central and South Atlantic and their evolution are, therefore, generally scarce compared to those for teleost fisheries, though this situation has improved through ICCAT efforts. The species of sharks caught in tuna fisheries consists mainly of blue shark Prionace glauca, hammerheads, mainly Sphyrna lewini and S. zygaena (juveniles and adults) and short-fin mako Isurus oxyrinchus. Other regularly caught species are Carcharhinus sp., Mustelus mustelus, Leptocharias smithii and thresher shark Alopias vulpinus.

SOURCE OF MANAGEMENT ADVICE: No advisory body for these species. However, ICCAT by-catch WG have been doing efforts to improve shark by-catch data. An assessment meeting is schedual for 2004, which will cover some of the species.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: There is a need for long-term database of shark data. STECF recommends that all EU fleets operating in the Atlantic region provide required input data on catch, effort and catch-at-size to ICCAT for shark by-catch species (namely blue, porbeagle and short-fin mako sharks), in time for the 2004 schedual (late April) assessment meeting. EC should encourage other nations to report their shark catch data too.

14.3. Elasmobranchs (Mediterranean)

A long list of elasmobranch species has been reported to occur in the Mediterranean fisheries. According to the official statistics provided to FAO, a total of 11,265 tonnes of elasmobranch catches have been reported in 1999 in the whole Mediterranean Sea. The most important landings have been reported by Turkey (2,115 MT), Tunisia (2,018 MT), Greece (1,602 MT), Italy (1,557

MT) and Spain (1,466 MT), but there is the strong suspect that reported catches are only a undefined portion of the real catches. The peak of catches was reached in 1987, with about 25,000 tonnes.

Under this situation, it is quite difficult to better define the most important stocks, even due to the data mixing in the statistics (67 different species are taken by the Mediterranean fisheries). The following list of species has been defined as a starting point for a better future definition, also taking into account the issues raised by the ICCAT, GFCM and the STECF-SGRST.

*14.3.1. Basking shark (*Cetorhinus maximus*)*

FISHERIES: The Basking shark is a by-catch in several fisheries. According to the most recent information, this species was mainly taken by the drift-net fishery in the past (drift-nets have been banned sice January 1, 2002 from the EU fleets). Catch data from drift-nets are only poorly available, but some observers data in 1990-91 assessed this species as 0.1% in number and 4.2% in weight of the total drift-net catches. Drift-net catches estimates 110 MT (246 specimens) of basking shark catches in 1994 and 179 MT (395 specimens) in 1995. Over 500 specimens have been reported to be caught in the last century by several other fishing gear in the Mediterranean, mostly by set gillnets and trammels. According to the FAO data, basking shark accounted about 9.2% of the total elasmobranch catches in the Mediterranean in 1998 and 1.7% in 1999. Due to the very low market interest, most of the specimens are rejected at sea or released alive.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data available.

RECENT MANAGEMENT ADVICE: The Mediterranean is considered as a separate management unit. The Basking shark is a protected species in the Mediterranean, according to the Barcelona Convention and the Bern Convention, also listed in Appendix II of CITES.

STECF COMMENTS: STECF recommends a better reporting of the Basking shark catches from all the fisheries involved, with the purpose to assess the possible impacts. The EC drift-net ban will certainly results in a direct conservation measure for this species.

*14.3.2. Shortfin Mako (*Isurus oxyrinchus*)*

FISHERIES: This pelagic species is sometimes taken by several fishing gear, always as a by-catch, but it is often retained on board and sold on the market for its good price. Data on catches are extremely poor: shortfin mako represented 0.7% in number of individuals of the total Italian drift-net catches , reaching an average of 5 to 10 tonnes in 1990-91. Further studies conducted on large pelagic long line fisheries reports an incidence of 8.7% on the elasmobranch total long-line catches in 1998 and 3% in 1999. CPUE data in 1998-99 varied according to the target species of the long-line fishery, from 1.1% in kg and 0,01 in number per 1000 hooks in the swordfish long-

line, to 0,07in kgin average among the whole large pelagic long-line activity in Spain, Italy and Greece.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM, but this species is also under the ICCAT responsibility.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. The Shortfin Mako shark is considered as a vulnerable species and listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III). It is also considered a high priority species.

RECENT MANAGEMENT ADVICE: data should be collected in the ICCAT area.

STECF COMMENTS: STECF recommends a better reporting of the Shortfin Mako catches from all the fisheries involved, with the purpose to assess the possible impacts. The EC drift-net ban should possible result in a decreasing in catches for this species.

*14.3.3. Porbeagle (*Lamna nasus*)*

FISHERIES: This pelagic species is sometimes taken by several fishing gear, always as a by-catch, but it is often retained on board and sold on the market for its good price. Data on catches are extremely poor. Studies conducted on Spanish, Italian and Greek large pelagic long line fisheries reports an incidence of 0.2% in Kg on the total elasmobranch long-line catches in 1998 and 5.6% in 1999. According to the available data, 448 specimens (17 tonnes) of Porbeagle were caught by Italian the large pelagic fisheries in 1995. CPUE data in 1998-99 shows 0.8 in kg and 0,01/1000 hooks in number among the whole Italian large pelagic long-line fisheries.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM, but this species is also under the ICCAT responsibility.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. The Porbeagle shark is considered as a vulnerable species, in some areas in a state of extreme depletion, and listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III). It is also considered a high priority species.

RECENT MANAGEMENT ADVICE: data should be collected in the ICCAT area.

STECF COMMENTS: STECF recommends a better reporting of the Porbeagle catches from all the fisheries involved, with the purpose to assess the possible impacts. The EC drift-net ban should possible result in a decreasing in catches for this species.

*14.3.4. Blue shark (*Prionace glauca*)*

FISHERIES: This pelagic species is often taken by several fishing gear, always as a by-catch and sometimes marketed. Data on catches exists but they are very partial. Studies conducted on Spanish, Italian and Greek large pelagic long line fisheries reports an incidence of 68.3% on the total elasmobranch long-line catches in weight in 1998 and 81.9% in 1999. According to the available data, 2157 specimens (80 tonnes) of blue sharks were caught by Italian the large pelagic fisheries in 1994 in two areas (Tyrrhenian Sea and Strait of Sicily), reaching a total of 3193 specimens (157 tonnes) in 1995. In 1994, the Blue shark represented 4.7% of the total catch in pelagic long-line activities. CPUE data are very variable: it was 0.03 in Italian drift-nets in 1991, while, in the period 1998-99 shows values of 1.24/1000 hooks in swordfish long-line, 0.45 in the US-type swordfish long-line, 0.07 in albacore long-line and 0.25 in bluefin tuna long-line.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered to host a separate stock of Blue shark, to be managed as a separate unit. The Blue shark is listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III), even if it is the most common shark taken by pelagic fisheries.

RECENT MANAGEMENT ADVICE: data should be collected in the ICCAT area.

STECF COMMENTS: STECF recommends a to improve the data collection on the Blue shark from all the fisheries involved, with the purpose to assess the status of this stock. The EC drift-net ban should possible result in a decreasing in catches for this species.

*14.3.5. Thresher shark (*Alopias vulpinus*)*

FISHERIES: This pelagic species is sometimes taken by several fishing gear, always as a by-catch, but it is often retained on board and sold on the market for its good price. Data on catches are extremely poor and sometimes includes another species (*Alopias superciliosus*), much more rare in the Mediterranean. Studies conducted on Spanish, Italian and Greek large pelagic long line fisheries reports an incidence of 1% in weight on the total elasmobranch long-line catches in 1998 and 1.7% in 1999. According to the available knowledge, CPUE data are very variable: the value was 0.002 kg/1000 m in Italian drift-nets in 1991, while, in the period 1998-99 shows values of 0.006 kg/1000 hooks in swordfish long-line and 0.02 kg in the US-type swordfish long-line.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF recommends the collection of basic information on the catches, to better understand the current situation. The EC drift-net ban should possible result in a decreasing in catches for this species.

*14.3.6. Tope shark (*Galeorhinus galeus*)*

FISHERIES: This pelagic species is sometimes taken by several fishing gear, always as a by-catch, but it is often retained on board and sold on the market. Data on catches are extremely scarce, often mixed with other species. Studies conducted on Spanish, Italian and Greek large pelagic long line fisheries reports an incidence of 0.84% on the total elasmobranch long-line catches in 1998 and 0.81% in weight in 1999. According to the available knowledge, CPUE data are very variable: in the period 1998-99 shows values of 0.003 kg/1000 hooks in swordfish long-line and 0.01 in the US-type swordfish long-line.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. It is considerd as a medium priority species.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF recommends the collection of basic information on catches, to better understand the current situation. The EC drift-net ban should possible result in a decreasing in catches for this species.

*14.3.7. Smooth hammerhead (*Sphyrna zygaena*)*

FISHERIES: This pelagic species is rarely taken by several fishing gear, always as a by-catch, and sometimes retained on board and sold on the market. Data on catches are extremely scarce. Studies conducted on Spanish, Italian and Greek large pelagic long line fisheries reports an incidence of 0.36% in weight on the total elasmobranch long-line catches in 1998 and 3.34% in 1999. CPUE data are very rarely available: in the period 1998-99 shows values of 0.4 kg/1000 hooks in kg and 0.01 in number in swordfish long-line. Total catches are only available for the Tyrrhenian Sea and the Strait of Sicily in 1994 and 1995, within the range of 2 to 5 tonnes per year.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: Due to the little information available, the stock should be managed for the Mediterranean and the Atlantic together.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF recommends the collection of basic information on catches, to better understand the current situation. The EC drift-net ban should possible result in a decreasing in catches for this species.

14.3.8. Carcharhinus *spp.*

FISHERIES: In Mediterranean waters the genus *Carcharhinus* is represented by 7 different species (taxonomic problems possibly exist for the species), many of which occur primarily in the western parts, close to the Gibraltar Straits (FAO statistical sub-area 1.1) and North African coasts. This genus contains several coastal and oceanic species, and they are often taken as by-catch. In Lybia they can sometimes be considered as target species. Management units are suggested for all species known to occur in the Mediterranean, except for the blacktip shark *C. limbatus*, which is a Lessepsian migrant (i.e. had invaded the eastern Mediterranean from the Red Sea) and not native to EC waters

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: Sandbar shark (*Carcharhinus plumbeus*) is one of the most widely distributed members of this genus in the Mediterranean, and it has important nursery grounds in certain areas (e.g. in FAO sub-area 3.1). As a preliminary measure, three separate management units are proposed (FAO statistical areas 1, 2 and 3).

Spinner shark *Carcharhinus brevipinna* and blacktip shark *C. limbatus* are both widely distributed throughout the Mediterranean, although they may be more common along the coasts of North Africa. The suggested management unit for those two species is the Mediterranean.

Bignose shark *Carcharhinus altimus,* copper shark *C. brachyurus*, and dusky shark *C. obscurus* are all species that occur in the Northeast Atlantic and western Mediterranean, although occasional specimens are recorded from eastern Mediterranean basins. Each of these species should be managed for the Northeast Atlantic, including the Mediterranean.

Silky shark *Carcharhinus falciformis* is an oceanic species that is occasionally reported from the Mediterranean and off Spain. This species should be managed as a North Atlantic population, which includes the Mediterranean.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF recommends the collection of basic information on catches, to better understand the current situation.

*14.3.9. Sixgill shark (*Hexanchus griseus*)*

FISHERIES: This large demersal species is occasionally taken by several fishing gear, always as a by-catch, and sometimes retained on board and sold on the market. Data on catches are extremely scarce. Studies conducted during the MEDIT project (1994-1999) assess the standing stock biomass in the Mediterranean at about 440 tonnes. Deep commercial trawl surveys (1998-99) in the western Italian basins show yields of about 1.2 kg/hour in average, with a peak of 4.7 kg/h in the Tyrrhenian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: Due to the little information available, the stock should be managed for the whole Mediterranean.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF recommends the collection of basic information on catches, to better understand the current situation of this long-living species.

*14.3.10. Spurdog (*Squalus acanthias*)*

FISHERIES: This demersal species is commonly taken by trawlers and often retained on board and sold on the market. Data on catches are good in some countries (i.e.: Greece) or poor in others, according to the various statistical systems adopted. Total catches of spurdog in Greece reached 36.8 tonnes in 2000, 28 tonnes in 2001 and 30.9 tonnes in 2002. Studies conducted during the MEDIT project (1994-1999) assess the standing stock biomass in the Mediterranean at about 6682 tonnes. Deep commercial trawl surveys (1998-99) in the western Italian basins show yields of about 0.14 kg/hour in average, with a peak of 0.64 kg/h in the Sardinian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data

RECENT MANAGEMENT ADVICE. Due to the information available, the stock should be separately managed in the Western Mediterranean, in the Eastern Mediterranean and in the Black Sea.

STECF COMMENTS: STECF recommends the collection of data on catches, separated for the management unit proposed.

*14.3.11. Lesser spotted dogfish (*Scyliorhinus canicula*)*

FISHERIES: Trawlers and set gillnets very commonly taken this demersal species which is often retained on board and sold on the market. Data on catches are good in some countries (i.e.: Greece) or poor in others, according to the various statistical systems adopted. Total catches of Lesser spotted dogfish in Greece reached 17.3 tonnes in 2000, 20.5 tonnes in 2001 and 19.2 tonnes in 2002. Studies conducted during the MEDIT project (1994-1999) assess the standing stock biomass in the Mediterranean at about 8396 tonnes, the highest value among all the elasmobrach species.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data, but this species is considered vulnerable but with a medium-low priority.

RECENT MANAGEMENT ADVICE. Due to the information available, the Mediterranean stock should be managed according to the local populations identified.

STECF COMMENTS: STECF recommends the collection of data on catches and basic biological data to better define the stock status and the local populations.

*14.3.12. Blackmouth catshark (*Galeus melastomus*), Mediterranean*

FISHERIES: This deep demersal species is very commonly taken by trawlers and sometimes retained on board and sold on the market. Data on catches are usually poor and often mixed with other species. Studies conducted during the MEDIT project (1994-1999) assess the standing stock biomass in the Mediterranean at about 6891 tonnes, one of the highest value among all the elasmobrach species. Deep commercial trawl surveys (1998-99) in the western Italian basins show yields of about 1.3 kg/hour in average, with a peak of 2.7 kg/h in the central Tyrrhenian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data.

RECENT MANAGEMENT ADVICE. None.

STECF COMMENTS: STECF recommends the collection of basic data on catches.

*14.3.13. Blue stingray (*Pteroplatytrigon violacea*)*

FISHERIES: This species is very commonly taken by pelagic gears (long-lines, drift-nets) as a by-catch but more rarely also by trawlers; it is sometimes retained on board and sold on the market. Data on catches are usually extremely poor. Studies conducted during the MEDIT project (1994-1999) based on trawl surveys assess the standing stock biomass in the Mediterranean at only 5 tonnes, due to the fact that this species is much more common in surface fisheries. On the opposite, this species represented 9.3% in weightof the total catches obtained by swordfish long-lines in 1991 in the Tyrrhenian Sea. The CPUE shows values of 15.9 kg/1000 hooks in kg and 3.53 in number in the large pelagic fishery in the Tyrrhenian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data.

RECENT MANAGEMENT ADVICE. None.

STECF COMMENTS: STECF recommends the collection of basic data on catches, due to the high number of specimens reported in surface fisheries.

*14.3.14. Skates (*Rayformes*)*

FISHERIES: Fifteen species of skate occur in the Mediterranean Sea (*Dipturus batis, D. oxyrhynchus, Leucoraja circularis, L. fullonica, L. melitensis, L. naevus, Raja asterias, R. brachyura, R. clavata, R. miraletus, R. montagui, R. polystigma, R. radula, R. undulata* and *Rostroraja alba*), including several species of Atlantic skate that are distributed in the western Mediterranean only, with fewer species occurring in the eastern Mediterranean. As in Atlantic regions, the genus *Raja* dominates in coastal waters, with *Leucoraja* spp. and *Dipturus* spp. abundant further offshore. For example, Italian fisheries operating in deep-waters (350-800 m) take *D. batis, D. oxyrinchus,* and *L. circularis*. There are two endemic skates present: the Maltese ray (*Leucoraya melitensis*) and speckled ray (*Raya polystigma*). For *Raja asterias*, a nursery ground in the Tyrrhenian sea was reported. All these species are very commonly taken by trawlers and by artisanal coastal fishery gears; they are sometimes retained on board and sold on the market. Data on catches are usually extremely poor and mixed. Studies conducted during the MEDIT project (1994-1999) based on trawl surveys assess the standing stock biomass in the Mediterranean of all these species at 16,744 tonnes in total. The most common species is the *Raya clavata*, having a standing stock biomass of 8,151 tonnes..

SOURCE OF MANAGEMENT ADVICE: The advisory body is GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: no data.

RECENT MANAGEMENT ADVICE. None.

STECF COMMENTS: STECF recommends the collection of basic data on catches, due to the importance of their total volume.

14.4. Pelagic sharks (Indian and Pacific Oceans)

FISHERIES: Purse seiners and longliners carrying EU flags are fishing in the Indian and Pacific oceans, targeting tunas and swordfish.

Sharks and rays (elasmobranches) are commonly caught as target species and as by-catches in each of these two oceans. Total catches of elasmobranches declared during recent years to FAO are at levels of 230,000 t. and 300,000 t. in the Indian and Pacific oceans. It is well known that these official figures are probably widely underestimated because large quantities of sharks are not recorded in log books nor reported by flag countries (unreported landings and unreported discards). This lack of data is due to various reasons, mainly because sharks are increasingly discarded and their fins sold to Asiatic market.

Shark species living in the pelagic ecosystems are mainly caught as by-catches by tuna fisheries.

Most of these sharks are discarded after removal of their fins.

Species and quantities of sharks caught by tuna fisheries are highly dependent of the fishing gear and of its handling as well as of the fishing zone and season.

Catches of sharks by purse seiners are never recorded in the log book or landing forms. Observer data have been collected on purse seiners on discards of elasmobranches in the Indian Ocean as well as in the Eastern and Western Pacific.

Catches of sharks by longliners are of much greater importance in biodiversity and quantities. Sharks are most often a large proportion of the total catches by longliners, but most of them tend to remain poorly reported. The longline fisheries which are targeting swordfish at night in shallow waters are often catching very large quantities of various sharks: catches of sharks by this fishery can easily reach 15% (in numbers) of total catches. Sharks and rays taken by longliners do show a wide spectrum of species taken, as a function of fishing mode (deep or shallow) and fishing area (longliners do fish in a wide spectrum of temperate and tropical ecosystems). Blue shark is probably the species most often caught by longliners, but various other species, such as thresher, hammerhead and mako sharks, can be of significant importance in some areas. Most of the shark species are discarded after finning, but some of them are kept and sold (i.e. mako shark).

SOURCE OF MANAGEMENT ADVICE: Most sharks stocks are not covered by any international advisory body, and statistics and stock status remain poorly followed by scientists, despite of the fact that many sharks tend to be fragile stocks which are easily overfished because of their biological characteristics. IOTC (Indian Ocean) is discussing the creation of a WP on by-catch. The lack of data from the IO may improve through IOTC efforts. SPC and IATTC often

discuss shark by-catch issues. FAO is trying to improve the data collection in each Country within the IPOA for Sharks.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: SPC and IATTC (Pacific Ocean) have made several recommendations regarding shark by-catch species. Efforts have been made recently in Australia to try and reduce the incidence of shark carcass discarding. US have a shark finning prohibition, which bans the practice of removing the fins from a shark and discarding the carcass. IATTC has consolidated several resolutions on by-catch, which includes: promptly release of all sharks caught by purse seine vessels; National Paties with longline fleets should provide required information on shark by-catch; techniques and/or equipment should be developed to facilitate shark release from the different fishing gears.

STECF COMMENTS: There is a need for long-term database of shark data. STECF recommends that all EU fleets operating in the Indian and Pacific Oceans provide required shark by-catch data to the IOTC, IATTC and SPC. EC should encourage other nations to report their shark catch data too.

15. European eel

Fisheries: The European eel (*Anguilla anguilla* (L.)) is found and exploited in fresh, brackish and coastal waters in almost all of Europe, in northern Africa and in Mediterranean Asia. Eel fisheries are found throughout the distribution area. Fisheries are generally organised on a small scale (a few fishermen catching 1-5 tonnes per year) and involve a wide range of gears. The fisheries are managed on a national (or lower, regional or catchment) level. Landings peaked around 1965 at 40,000 tonnes, since when a gradual decline occurred to a historical low of 20,000 tonnes in the late 1990s. Recruitment remained high until 1980, but declined afterwards, to a historical low level of only 2 % of former levels in 2001, followed by a non-substantial rise in 2002 and 2003. Aquaculture of wild-caught recruits (glass eel) has been expanding since 1980, in Europe as well as in eastern Asia (using European glass eel). Other anthropogenic factors (habitat loss, contamination and transfer of diseases) have had negative effects on the stock, most likely of a magnitude comparable to exploitation.

Source of management advice: Management advice has been provided by ICES/ACFM and FAO/EIFAC. Only a few quantitative assessments of local fisheries are available. Advice is based on descriptive studies (Concerted Actions, Working Groups), outlining the status of stock and fisheries and discussing management options.

Stock status: The eel stock is outside safe biological limits and the current fishery is not sustainable. There is no stock-wide objective stated for this stock, but the need to conserve the spawning stock is undisputed. No single management action aiming at conservation has been applied in the past, at any management level.

Recent management advice: ICES and EIFAC recommend the development of an international management plan for the whole stock, and that exploitation (and other anthropogenic sources of mortality) is to be reduced to the lowest possible level until such a plan is agreed upon and implemented. This can only be achieved by internationally co-ordinated management actions, implemented at the national or regional scale. Development of a stock recovery plan will require and stimulate co-operation of national and regional managers, but un-coordinated management actions in isolated areas are not likely to lead to a recovery of the stock.

STECF comments: STECF supports the advice of ICES and EIFAC. Though the total production of eel fisheries and aquaculture is low in comparison to many commercial marine fish species, the wide distribution and small scale of this fishery makes the impact on rural economies considerable (employment is in the order of magnitude of 20,000).

15.1. European Eel (*Anguilla anguilla*), Mediterranean

FISHERIES: European Eel is a shared resource among Mediterranean countries. Eel exploitation occurs exclusively within national boundaries, in continental waters, without any interaction between economic zones, typical Eel fisheries being mainly small-scale. The spawning process takes place in international waters, and all oceanic life stages are unexploited.

It is assumed that only one spawning population exist, i.e. that the population is panmictic and that the species is a shared resource by practically all European and Mediterranean countries. Targets stages of Eel fisheries throughout its entire distribution area varies from recruiting glass Eel to escaping silver Eel. It has been pointed out that large scale fisheries are and account for less than 5% of the total European catch. The remaining fisheries can be considered small-scale throughout Europe and Mediterranean and can be commercial or recreational (Dekker, 2002),.

As a general picture glass eel catch was estimated as 920 t and the total yield from European in 22,000 to 30,000 t.

Mediterranean eel exploitation is extremely specialist, and in most situations eel is a single species catch , without by-catch. In other conditions, such as lagoon, eel is exploited together with other euryhaline species. Similarly to the rest of Europe, target stages for eel fisheries in the Mediterranean are glass eel, yellow and silver eel. (STECF, 2002).

SOURCE OF MANAGEMENT ADVICE: Management advice has been provided by ICES/ACFM and FAO/EIFAC. Only a few quantitative assessments of local fisheries are available. Advice is based on descriptive studies (Concerted Actions, Working Groups), outlining the status of stock and fisheries and discussing management options. The management advisory body for European eel in the Mediterranean is the GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: An estimate of the whole glass eels for the Mediterranean does not seem feasible. Official landing statistic does not discriminated among stages, while national institutions seem lacking because of high rates of illegal fishing, not reporting or underreporting in most countries. Mediterranean glass eel yield is any way for sure only a minor quota of the whole European catch. However, the apparent decline in production reported for all Europe is confirmed for the Mediterranean area (Dekker, 2002). A clear picture of the situation can be given for Italy, owing to the fact that continuos monitoring has been carried out within University research financed by the Ministry of Agriculture. Yield of glass ell decline from early 90´ and dropping drastically from 1995. In the following years catches shown fluctuations.

A decreasing trend can be evidenced for yellow and silver production, in particular for Mediterranean (ICES, 2001).

RECENT MANAGEMENT ADVICE: No recent management advice has been given

STECF COMMENTS: STECF has no comments.

16. Regional Mixed fishery Advice for the ICES area.

Beginning in 2002 and continuing in 2003 ICES is in the process of changing its biological advice for demersal fisheries from stock oriented advice towards fisheries oriented advice. The background for this shift is the realisation that TAC management based on single species (stock) fisheries is inadequate for management of today's demersal fisheries.

ICES states, that formulating the biological advice in relation to mixed fisheries is a two-step procedure. First, limits for the exploitation of each species on basis of its status, consistent with the Precautionary Approach are established. The second step is to identify the major constraints within which mixed fisheries should operate and through this analysis identify the additional constraints that further limit (or regulate) the fishing possibilities.

The first step, i.e. assessing the state and the limits to exploitation of the individual stocks are presented in the stocks sections are included in the results of the assessments of the single stocks produced by various assessment models by ICES. The second step includes estimation of constraints by species for the various mixed fisheries to be used in the management. Tools for such estimation procedures are already available and are being further developed. However, a major problem here is insufficient data on species composition of the landings and in particular catches (including discards) from most of the more important mixed fisheries. This lack of information appears at present to be the major obstacle for implementation of a realistic mixed fishery management.

16.1. Mixed Fisheries Advice for Demersal fisheries in Division IIIa (Skagerrak- Kattegat), in Subarea IV (North Sea) and in Division VIId (Eastern Channel)

In its management advice for the demersal stocks in the North Sea ICES is taking into account the mixed nature of most demersal fisheries. The management advice must consider both the state of individual stocks and their simultaneous exploitation in the fisheries. With the exception of sole in the Eastern Channel (Division VIId), the stocks of cod, plaice and sole in Division IIIa, Sub-area IV and Division VIId are all classified as outside safe biological limits. These stocks are the overriding concerns in the management advice of all demersal fisheries:

- for cod in Division IIIa, North Sea and Eastern Channel ICES recommends a zero catch;
- for plaice in the North Sea ICES recommends a recovery plan that will ensure a safe and rapid recovery of SSB to a level in excess of Bpa;
- for other plaice stocks than the North Sea plaice and for sole stocks fishing should be restricted within Fpa.

Demersal fisheries in Division IIIa (Skagerrak- Kattegat), in Subarea IV (North Sea) and in Division VIId (Eastern Channel) should in 2004 be managed according to the following rules, which should be applied simultaneously:

They should fish:

- without by-catch or discards of cod
- within a recovery plan for North Sea plaice. Until a recovery plan has been implemented that ensures rapid and sure recovery of SSB above Bpa, fishing mortality should be restricted to the lowest possible level and well below Fpa. Management must include measures that ensure that discards of plaice be significantly reduced and quantified;
- within the biological exploitation limits for all other stocks (see text table above).

Furthermore, unless ways can be found to harvest species caught in mixed fisheries within precautionary limits for all those species individually then fishing should not be permitted.

STECF COMMENTS: STECF has no comments.

16.2. Mixed Fisheries Advice for Northern Shelf demersal fisheries

ICES is taking the interaction of the mixed demersal fisheries in Sub-area VI into account in its advice. The management advice must consider both the state of individual stocks and their simultaneous exploitation in the fisheries. In the Northern shelf area there are several stocks which are outside safe biological limits, i.e. cod in Division VIa, Northern Hake and whiting in Division VIa. Also, anglerfish in Sub-area IV and Sub-area VI is harvested outside safe biological limits. Furthermore, Haddock in Division VIb is at a historical low level. These stocks are the overriding concerns in the management advice for all demersal fisheries in this area:

- for cod stock in Division VIa ICES recommends a zero catch;
- for hake the fishing should be restricted within a recovery plan. Such a plan should cover all areas and fisheries in which Northern hake is fished;
- for anglerfish and whiting the fishing mortality stocks fishing should be restricted within Fpa;
- for haddock in VIb the catches should be reduced to the lowest possible level.

Demersal fisheries in Subarea VI should in 2004 be managed according to the following rules, which should be applied simultaneously:

They should fish:

- without catch and discards of cod in Subarea VI;
- in accordance with a recovery plan for northern hake or within an effectively implemented TAC for hake covering all areas where northern hake is caught;
- within the biological exploitation limits for all other stocks (see table above);
- no directed fishery for haddock in Division VIb;
- substantially reduce catches of hake in accordance with a recovery plan or such that the total catch of hake is less than 13 800 t over the (entire) distributional area of the stock.

Furthermore, unless ways can be found to harvest species caught in a mixed fisheries within precautionary limits for all those species individually, then fishing should not be permitted.

STECF COMMENTS: STECF has no comments.

16.3. Mixed Fisheries Advice for Irish Sea demersal fisheries.

ICES is taking the interaction of the mixed demersal fisheries in The Irish Sea (Sub-area VIIa) into account in its advice. The management advice must consider both the state of individual stocks and their simultaneous exploitation in the fisheries. In the the Irish Sea shelf area there are several stocks which are outside safe biological limits, i.e. cod, whiting, and sole, which are the overriding concerns in the management advice. The advice for these stocks (cod, whiting, and sole) therefore determines the advice for management of all demersal fisheries:

- for cod the advice is for zero catch until SSB has been rebuilt above B_{lim};
- for whiting the advice is for zero catch until SSB has been rebuilt above B_{lim};
- for sole the advice is to reduce fishing mortality by at least 10% to increase SSB above B_{pa} in the short term.

ICES recommends, that mixed fisheries characteristics be taken into account when managing demersal fisheries in the Irish Sea. Only demersal fisheries which can demonstrate that they fish without catch or discards of cod and whiting may be permitted.

The demersal fisheries in the Irish Sea should therefore be managed such that the following three rules apply simultaneously:

1. The fishing of each species should be restricted within precautionary limits as indicated in the table of individual stock limits above;
2. The catch of cod and whiting is zero;
3. The total catch of sole is less than 790 t.

Furthermore, unless ways can be found to harvest species caught in a mixed fishery within precautionary limits for all those species individually then fishing should not be permitted.

STECF COMMENTS: STECF has no comments.

16.4. Mixed Fisheries Advice for Demersal fisheries in Celtic Sea, areas West of Ireland and Bay of Biscay.

ICES advice regarding the management of demersal fisheries West of Ireland (Divisions VIIb,c), in the Celtic Sea and Southwest of Ireland (Divisions VIIf,g,h,j,k), Western Channel (Division VIIe), and northern parts of the Bay of Biscay (Divisions VIIIa,b,d,e) takes into consideration the mixed nature of these fisheries. According to ICES, the following stocks outside safe biological limits: hake – Northern stock , cod in Divisions VIIe-k, Celtic Sea plaice (Divisions VIIf and g), sole in Division VIIe (Western Channel), and sole in Divisions VIIIa,b (Bay of Biscay). The state of these stocks is the overriding concern in the management and therefore determines he advice for management of all demersal fisheries simultaneously:

1. For hake (Northern stock), cod VIIe-k, sole VIIe, sole VIIIa,b and plaice VIIf,g either catches in 2004 as indicated by the exploitation limits given in Sections 2.29-2.32, 2.19.2, 2.98, 2.101, 2.77), or recovery plans to define the limits within which the fisheries can take place and which ensure a large reduction in F in 2004;

2. Fishing should for each species be restricted within precautionary limits as indicated in the table of individual stock limits above.

Furthermore, unless ways can be found to harvest species caught in mixed fisheries within precautionary limits for all those species individually then fishing should not be permitted.

STECF COMMENTS: STECF has no comments.

16.5. Mixed fisheries advice for Iberian waters (Div. VIIIc and Sub-areas IX and X)

The characteristics of the mixed demersal fisheries in the Iberian Region is given below. Note, that some species (e.g. southern horse mackerel) are exploited by both pelagic and demersal fisheries and that the blue whiting in these areas are caught with bottom trawls:

- Both megrim species are caught together in fisheries, which also take a large number of other commercial species, including southern hake. The decreasing catch of hake has modified the target species of some of the fleets and has reduced the effort on these species in recent years.

- A portion of the catch of L. piscatorius and L. budegassa is taken together with other species in mixed trawl fisheries.

- Southern horse mackerel are mainly exploited by Spanish and Portuguese purse seiners and by Portuguese trawlers. While the purse seiners mainly catch juvenile fish, the catches taken by trawlers comprise also older fish. There is a significant by-catch of *Trachurus mediterraneus* and *Trachurus picturatus*, mainly in the trawl fishery.

- For blue whiting most of the catches are taken in the directed pelagic trawl fishery in the spawning and post-spawning areas (Divisions Vb, VIa,b, and VIIb,c). Catches are also taken in a directed and a mixed fishery in Subarea IV and Division IIIa and in the pelagic trawl fishery in the Subareas I and II, and in Divisions Va and XIVa,b. These fisheries in the northern areas have taken 340 000–1 390 000 t per year in the last decade, while catches in the southern areas (Subarea VIII, IX, Divisions VIId,e and g-k) have been stable in the range of 25 000–34 000 t. In Division IXa blue whiting is mainly taken as a by-catch in mixed trawl.

The stocks of anglerfish (2 species), southern hake and *Nephrops* are outside safe biological limits. These stocks are the overriding concern in the management advice. The demersal fisheries in the Iberian Region should therefore be managed such that the following rules apply simultaneously:

1. For southern hake there should be no catch;

2. for Anglerfish and *Nephrops* rebuilding plans should be established that will ensure rapid rebuilding to safe biological levels and which ensure large reductions in F in 2004. Such rebuilding plans should imply no catch or discards of southern hake;

3. The fishing for each species should be restricted within the precautionary limits as indicated in the table of individual stock limits above.

Furthermore, unless ways can be found to harvest species caught in a mixed fishery within precautionary limits for all those species individually then fishing should not be permitted.

ICES notes, that this advice presents a strong incentive to fisheries to avoid catching species outside safe biological limits. If industry-initiated programs aim at reducing catches of species outside safe biological limits to levels close to zero in mixed fisheries, then these programs could be considered in the management of these fisheries. Industry-initiated programs to pursue such incentives should be encouraged, but must include a high rate of independent observer coverage, or other fully transparent methods for ensuring that their catches of species outside safe biological limits are fully and credibly reported.

All fisheries should be considered in the management; the major fisheries in the area are:

Bottom trawl fishery targeting Nephrops, but also taking hake and anglerfish as their main bycatch.

Bottom trawl fishery for mixed fish, i.e. hake, anglerfish, megrim, horse mackerel, and blue whiting.

- Artisanal gillnet fishery for mixed demersal fish, i.e. hake, anglerfish, megrim.

- Baca trawl fleet for blue whiting, hake and horse mackerel and Nephrops, megrims.
- Trawl for horse mackerel by a small bycatch of other species (not Nephrops).
- Pair trawl for blue whiting.
- Fixed-net fisheries (Rasco directed at monkfish, Beta and Volanta directed at hake).
- Long line fishery for hake and other demersal species.
- Artisanal fleet taking miscellaneous species.

STECF COMMENTS: STECF notes that recovery plans proposals for hake and *Nephrops* in the Iberian region (ICES Divisions VIIIc and IXa) have been proposed (SGMOS) but not yet implemented. As anglerfish (two species) are mainly caught within the same fisheries that catch hake and *Nephrops*, the implementation of those recovery plans should also reduce fishing mortality on anglerfish.

The proposed recovery plans have the following elements :

1. An overall effort reduction scheme applied to all vessels which land hake and *Nephrops* in Divisions VIIIc and IXa. This should achieve an annual reduction in effort of 10% relative to the previous year.
2. The closure of selected *Nephrops* fishing grounds to all fishing.

STECF recommends that the proposed hake and *Nephrops* recovery plans be implemented.

17. Overview of Mediterranean fisheries

There are several reports about the status of stocks and the characteristics of Mediterranean fisheries, but the most updated and agreed at the international level are the GFCM reports, the STECF report SEC(2002)1374 and the STECF-SGMED (24-28 March 2003).

Mediterranean fisheries are relatively unique compared to other EU fishing regions primarily due to the high number of artisanal fishing activities, the very low presence of industrial fishing, the high variety of fishing gears used, the multi-species targets, and the high number of species accepted by the markets. In addition, themajority of fish are sold fresh because of market preferences and there is relatively little processing (filleting or freezing) of the catch.

The main characteristic of the Mediterranean fisheries is the very high number of small vessels and diversity of fishing techniques used by artisanal (skipper owner) fishermen throughout the coasts of bordering countries and islandss. This feature is important from both a socio-economic and a management standpoint, and rules and regulations need to take into account this large diversity. This large fleet of small vessels land their catches to many small and sometimes isolated ports and beaches, which not only creates problems with regard to enforcement and control, but also makes recording of catches rather difficult.

Fisheries statistics in the Mediterranean have been relatively poor for many years and while the situation has improved in recent years, they are still largely incomplete.

The overall health and productivity of the Mediterranean fisheries has been relatively stable over many decades.The main important change occurred after the II Word War with introduction of engines in an increasing number of vessels and artificial fibres for nets and lines. These innovations had a large influence on the the general fishing pattern of the fisheries; allowing exploitation of off-shore and deep water resources and permitting vessels to spend more time at sea.

Currently, small scale artisanal fisheries are an important activity in many parts of the EU Mediterranean waters. There are also important fishing activities carried out by larger vessels (bottom and pelagic trawlers, long-liners, purse-seiners, etc.) which provide the largermarkets with larger quantities of sea products. The industrial (corporate) fishery is limited to the tuna purse-seiners and to the very recent activity of tuna farming.

Local fishing patterns and exploitation rates may be an important issue for management of mediterranean stocks. This implies that fishery data should be collected on a fine scale in order to take into account the variability catches and exploitation rates. Most of the Mediterranean species are not well defined either in terms of stock units or management units.

Management of fishery in the EU Mediterranean Countries was originally under national jurisdiction. National management regimes were then supplemented by EU regulatons. The management of tuna and tuna-like species is under the responsibility of the ICCAT (The EC is an active member), while management advice for some shared stocks is provided at Mediterranean level by GFCM. The GFCM is currently in the process of changing the form of most of its

management advice from stock-oriented advice to fisheries-oriented advice. Management in the Mediterranean is primarily by effort control and minimum catching or landing size. TACs and quotas are restricted to internationally agreed TACs for bluefin tuna , and national quota limits for clams off the Italian Adriatic coast and for some small-pelagic stocks under Spanish jurisdiction.

Stock assessment for most of the species are under the responsibility of the GFCM-SAC. The current list of species for which the GFCM undertakes assessment and provides advice is as follows:

Hake (*Merluccius merluccius*)

- Stock in Geographical Sub Area 7 Gulf of Lions (Assessed in 2002)
- Stock in Geographical Sub Area 9 Ligurian and northern Thyrrhenian (Assessed in 2003).

Red Mullet (*Mullus barbatus*)

- Stock in Geographical Sub Area 9 Ligurian and northern Thyrrhenian (Assessed in 2002)
- Stock in Geographical Sub Area 10 Southern and central Thyrrhenian (Assessed in 2003)
- Stock status in Geographical Sub Area 3 Southern part of Alboran Sea (Assessed in 2003).

Red Shrimp (*Aristeus antennatus*)

- Stock in Geographical Sub Area 1 Northern Alboran Sea (Assessed in 2003).
- Stock in Geographical Sub Area 5 Balearic Island (Assessed in 2003).
- Stock in Geographical Sub Area 6 Northern of Spain (Assessed in 2003).

Anchovy (*Engraulis encrasicolus*)

- Stock in Geographical Sub Area 1. Northern Alboran Sea. (Assessed in 2002)
- Stock in Geographical Sub Area 6, Northern Spain. (Assessed in 2002)
- Stock in Geographical Sub Area 7~6.north, Gulf of Lions and North Catalonia (Assessed in 2003 by hydroacoustic methods)
- Stock in Geographical Sub Area 17 Northern Adriatic (Assessed in 2003).
- Stock in geographical Sub Area 22 Aegean Sea (Assessed in 1999 and submitted in 2002)

Sardine *(Sardina pilchardus)*

- Stock in Geographical Sub Area 1. Northern Alboran sea (Assessed in 2002).
- Stock in Geographical Sub Area 3 Southern Alboran Sea (assessed in 2003).
- Stock in Geographical Sub Area 6, Northern Spain (Assessed in 2002).
- Stock in Geographical Sub Area 7 Gulf of Lions (Assessed in 2003).
- Stock in Geographical Sub Area 16 Sicily Channel (Assessed in 2003)
- Stock in Geographical Sub Area 17 Northern Adriatic (Assessed in 2003).
- Stock in geographical Sub Area 20+22 Eastern Ionian Sea and Aegean Sea (Assessed in 2002)

Horse mackerel (*Trachurus trachurus)*

- Stock in Geographical Sub Area 3 Southern part of Alboran Sea (Assessed in 2003).

Deep water rose shrimp (*Parapenaeus longirostris)*

- Stock in Geographical Sub Area 3 Southern part of Alboran Sea (Assessed in 2003).

Red and blue shrimp (*Aristeomorpha foliacea)*

- Stock in Geographical Sub Area 1 I Sardinia (Assessed in 2002).

Norwegian lobster (*Nephrops norvegicus)*

- Stock in Geographical Sub Area 9 Ligurian and northern Thyrrhenian (Assessed in 2002).

Stock assessment for the large pelagic species are under the responsibility of the ICCAT-SCRS and the updated list is the following:

Bluefin Tuna (*Thunnus thynnus*)

- Stock in Eastern Atlantic and Mediterranean (Assessed in 2000).

Swordfish (*Xiphias gladius*)

- Stock in the Mediterranean Sea (Assessed in 2003).

The EU Mediterranean Fleet comprises 40,976 vessels, with 12,346 (about 30%) vessels below 6 meters overall length . This is likely to be an underestimate since, in some Countries, fishing vessels less than 5 meters overall length are not included in the fishing vessel register.

A. Bottom trawling

Minimum mesh size is 40 mm stretched for all EU member states fleets in Mediterranean according to the regulation EU 1626/1994. Fishing is forbidden in depth less than 50 m or at a distance less than three miles from the coast. Fishing effort restrictions exists in all the member states.

All the bottom trawl fisheries in Mediterranean are multi-species fisheries. Two main categories can be identified.

a) Shelf fishery (down to 200m) targeting: red mullets, hake, poor cod, sparids, sole, horse mackerels, anglerfishes, small pelagics (pelagic trawls), octopuses, cuttlefish, squids, mantis shrimp, caramote prawn.

b) Slope fishery (deeper than 200m) targeting: hake, blue whiting, anglerfish, norway lobster, rose shrimp, deep red shrimps.

Besides these main species the catch usually includes many other species (more than 60) and nearly all of them are landed and contribute to the income of the fishing fleets.

Spain

The Spanish bottom trawl fleet consists of 1060 vessels. The fleet mainly operates in the Spanish fishing grounds, although a limited number of units traditionally go fishing to the Gulf of Lions. In a general way the fleet can be segmented in two groups: trawlers developing their activity mainly in the continental shelf ("Arrastreros de plataforma") and those operating in the continental slope ("Arrastreros de talud"). The trawlers are stern trawlers. The activity of bottom trawlers is limited to a maximum of 5 days per week and some 12 hours per day. Pelagic trawling

is forbidden. Additionally, bottom trawling is usually stopped for 60 days per year mainly in spring.

France

French Mediterranean otter trawlers are 144 and they may indifferently practise bottom trawling and pelagic trawling according to specific fishing strategies targeting either pelagic fish or bottom and demersal fish or both. These strategies lead to specialise each fishing unit as much as possible, according to the nature of their landings There are three main groups of trawl metiers: bottom trawling, pelagic trawling and mixed trawling. Regional regulation limits the trawl fishing activity to a period of maximum 17 hours during the day and to working days. The bottom trawlers work around 200 or 220 days/year, from 1200 to 2000 h of fishing time/year/boat.

Italy

In Italy there are 4,170 fishing vessels for trawling. Most of them are bottom trawlers and 679 have multiple licences, also using other gears. Among these bottom trawlers, approximately 146 use beam trawls mostly in the Adriatic. About 140 pelagic trawlers are also included here. Bottom trawling is allowed 5 days per week with local regulations regarding the number of hours per day in these 5 days. Additionally, bottom trawling is usually stopped for 45 days in summer. Specific local closed areas to trawls are enforced.

Greece

The trawlers fleet of Greece consists of 459 vessels and some of them have licence also for purse seining.. According to the data of the Ministry of Agriculture the number of the bottom trawlers decreased from 1990 to 2001 by 14.3%, the gross tonnage increased by 12.7% and the engine power decreased by 14%.The bottom trawl fishery is closed in the entire area from 1st June until 30 September every year. There are some others local restrictions concerning closed gulfs where bottom trawling is forbidden during all the year or during longer period. For example, in Amvrakikos and Pagassitikos Gulf bottom trawl fishery is closed all over the year and in Patraikos and Korinthiakos Gulfs the fishery is open six months.

B. Purse seining for small pelagics

Main target species are anchovy, sardine, mackerels, horse mackerels, bogue. Generally fishing take place close to the coast, in depth down to 150 m using lights. Daily purse seine fishing in Greece is targeting migratory species.

Spain

The purse seine fleet from the South Mediterranean Region (SMR) continuously decreased in the last two decades, reaching a total of 321 vessels in 2003. The purse seine is not authorised in water shallower than 35 m. The minimum distance between boats is 500 m. Fishing only 5 days a week.

France

This fleet which involved more of 150 units in the 70th, today is reduced to only 44 vessels, and most of them are in wood and of more of 25 year old. The crew is composed of 4 to 8 men.

Italy

The purse seine fleet is of 506 vessels, most of them using lights and then called "*Lampara"*. Purse seine fishing is allowed 5 days a week and stopped on full moon days.

Greece

The purse seines fleet of Greece consists of 302 vessels. From 1991 the number of vessels was reduced about 15%. Purse seines are distinguished into two major types: day fishing and night fishing with lights. There are no significant differences between the two types as far as the equipment and vessel construction is concerned. The most important difference is related to the mesh size of the net (14 mm for the night and 40 mm for the day, full mesh both). Seining is forbidden inside 300 m from the coast and/or in depth less than 30 m. There is a close season from 15th of December to the end of February of the next year for the night purse seines and from 1st of July to 31st of August for the day purse seiners. In some areas there are local restrictions (e.g. in Amvrakikos Gulf is closed all the year). It is prohibited purse seining during full moon 2 day before and 2 after. The intensity of the light must be up to 2,000 candles per light.

C. Large pelagic fisheries

The large pelagic fisheries is carried out by a composite fleet of Mediterranean vessel: large tuna purse-seines, normal purse-seines, surface drifting long-lines, small vessels using trolling and hand-lines and a very small fleet of traditional harpoon vessels in the Strait of Messina and in Greece. All the vessels over 24 metres fishing for tunas are registered by ICCAT. Originally, there was a huge fleet of drift-net vessels, able to get important catches of swordfish and albacore, but all the drift-nets were banned by the EU Countries since 1st January 2002. The fishing activity is carried out all the year round, but it changes according to the target species and the local habits. Target species are Thunnus thynnus, Thunnus alalunga, Xiphias gladius, Euthynnus alletteratus, Auxis thazard, Auxis rochei, Sarda sarda and other tuna-like species. The regulation is currently done by the ICCAT and it includes bluefin tuna catch quota, closed areas and season, the prohibition to use aircrafts in June and size limits for the Bluefin tuna. The EC also issued several regulations, including the maximum length for long-lines. Other regulations are existing at a national level. Recently, a new activity has been developed in many Mediterranean Countries: the tuna farming. This is mostly an economic activity for fattening wild bluefin tuna and sells them on the Japanese market at the highest price.

D. Small scale fisheries

Small scale fisheries are a very important segment all over the Mediterranean. Their significance varies among countries. The inshore fisheries are targeting a high number of species. Many vessels shift metier during the same year. The allocation of the effort to fishing gear used or to a single target species is extremely difficult. The available data on catch and size composition,

discards etc. are very poor, sporadic and geographically restricted. For important species (e.g. lobster) there are almost no data.

The inshore fisheries are much more species selective than bottom trawl, and some of them can be characterized as single species metiers (e.g. *Pagellus bogaraveo*). Although these gears are selective for small sized species, for long sized species (e.g. *Dentex dentex*) the selectivity is significantly reduced. In addition, compared to towed gears, the inshore fisheries gears can usually operate on any kind of substrate and consequently there are no natural shelters for the target and for the by-catch species. Some stocks have collapsed locally (e.g. *Pagellus bogaraveo*, *Polyprion americanum*) under the exploitation of small scale fishing gears.

Trammel nets are the most important gear of the inshore fishery. This gear is used all over the year in nearly all the places. There are different kinds of trammel nets regarding to technical characteristic and according to target species. Some metiers are dispersed almost in all the Mediterranean but there are other metiers having just a local interest. Target species of the trammel nets are *Merluccius merluccius, Penaeus kerathurus, Solea vulgaris, Diplodus sargus, Mullus surmuletus, Mullus barbatus, Pagellus erythrinus, Dentex dentex, Sepia officinalis* and other Sparidae species.

Gill nets are very common fishing gears, used from the majority of the inshore fishery fleet. The extent of the gear's use change from port to port. In some places it is used all over the year while in other places it is used during short time periods. Target species of the gill nets are, *Mullus barbatus, Mullus surmuletus, Boops boops, Caranx sp, Pagellus erythrinus, Sarda sarda, Sepia officinalis, Sparidae,Scomber scombrus, Scomber j. colias, Scomber sp., Sphyraena sphyraena, Merluccius merluccius,* and *Atherina hepsetus.*

Bottom long-lines are used in all the Mediterranean seas. The technological features, the length, the fishing period and the depth vary according to the target species. For species of Sparidae family fishing take place along the coast with long-lines with small hooks, for hake in depths 300-600 m and for sharks in depths down to 1000 m. Most common target species are: *Anguilla anguilla, Dentex dentex, Diplodus sargus, Epinephelus spp, Melluccius merluccius, Mustelus spp, Pagellus erythrinus, Sparus aurata, Pagrus pagrus,* Sparids.

Hydraulic dredges are used for clam fishing in Italy, almost all based in the Adriatic. This type of fishing is strictly regulated and is aimed to collect mostly *Chamelea gallina* and the regulations in force envisage a fixed number of licenses for each port of registry. In Spain towed dredges are used for clam fishing. In Greece some vessels are using dredges for bivalves.

Various other gears as traps, pots, fyke net, harpoons, jiggling hooks, etc., targeting mullets, octopus, norway lobster, cuttlefish etc., have local interest in many Mediterranean areas.

18. Overview of EU fisheries in the SW Atlantic

A. Overview of EU fisheries in the SW Atlantic

The fishing grounds of the Patagonian Shelf support some of the most important fisheries in the world, with cephalopods (*Illex argentinus* and *Loligo gahi*) and hakes (*Merluccius hubbsi* and *Merluccius australis*) being the main commercial species for fleets from coastal states, EU and Far East countries. The great abundance of marine resources between 35º and 54º South, is associated with the Subtropical Convergence formed by the Brazil and Falkland/Malvinas currents. The mixing of the flow of La Plata river and the western branch of the Falkland/Malvinas Current generates areas of high plankton production on the shelf.

In addition to the vessels fishing in the EEZ's of Argentina and Uruguay, several hundred ships with EU, Russian, Japanese, Korean or Taiwanese flags, usually operate in the waters surrounding the Falklands/Malvinas and on the high seas. The majority of such vessels registered in Far East countries, are jiggers fishing for squid.

These fishing grounds are currently some of the most important to the EU long distance bottom trawl freezer fleet. The fleet operating in the SW Atlantic is composed of about 30 vessels flying the Spanish flag, and another 20 that operate under joint ventures with Falkland Island vessels. There are also vessels from Portugal, Greece, Italy, etc, that operate sporadically in these fishing grounds. It is estimated that these fleets generate approximately 2,000 direct offshore jobs, and more than 10,000 indirect onshore jobs. The value at first sale of the catches of the Spanish fleet in this area is estimated at around 411 MEURO per year. There is also an additional fleet of about 100 boats operating in joint ventures in Argentinean waters. The fishing pattern is thought to be directed by market requirements and demands. There is also a seasonal effect of abundance and fishing aims to take advantage of the seasonal abundance of each group of species. Fishing around the Falklands takes place in two main seasons, corresponding to the first and second halves of the calendar year.

These fisheries are carried out by bottom trawlers and comprise target and by-catch species. The most important commercial target species are cephalopods (*Illex argentinus* and *Loligo gahi*) and hakes (*Merluccius hubbsi* and *M. australis*). By-catch species include hoki (*Macruronus magellanicus*), southern blue whiting (*Micromesistius australis*) and red cod (*Salilota australis*). Small numbers of high value species and caught by Spanish vessels in Falkland Island waters, including Patagonian toothfish (*Dissostichus eleginoides*) and kingclip (*Genypterus blacodes*). Spanish vessels also take part in the fishery for skate and ray species that takes place to the north and west of the islands. Different quantities of all these species are caught in all areas where the fleet operates, and different proportions of discards have been recorded. One of these discard species, red cod (*Patagonotothen ramsayi*), is currently under investigation by a consortium lead by Spanish industry (ANAMER) and including scientists from IEO (Spain), Imperial College (UK), Aberdeen University (Scotland) and the Falkland Islands Fisheries Department (FIFD) to determine sustainable catch limits and its marketability.

The area around the Falklands in which Spanish vessels operates can be divided into three main fishing areas: within the Falkland Island Inner Conservation Zone (FICZ), the Falkland Island Outer Conservation Zone (FOCZ) and the High Seas, outside the Argentinean EEZ and the Falkland Island Maritime Zones. The activity in the High Seas is reduced to those portions of the continental shelf and slope extending from the Argentinean EEZ: a small patch around 42º S and a bigger area comprised between parallels 43º 30' and 48º S.

Spanish vessels also take part in the fishery for Toothfish (*Dissostichus eleginoides*) around the sub-Antarctic island of South Georgia.

Until now, the only areas with regulation measures are the Argentinean and Uruguayan EEZ's and inside the Falkland Islands Interim and Outer Conservation Zones (FICZ/FOCZ). Partial stock assessments of hake have been made in Argentinean waters and around the Falkland Islands. Although there is a bilateral Argentine/UK agreement, the South Atlantic Fisheries Commission (SAFC) is attempting to facilitate the exchange of fishery data between the two countries. One of the difficulties for the assessment and management of these straddling stocks, is that there is currently no International Commission to which all states participating in the fishery are signatories.

Merluccius hubbsi is a migratory species, spawning along the Atlantic coast of South America and migrating both along the coast and into deeper waters linked to the Brazil/ Falklands confluence and areas of localised upwelling, where food is abundant. Spawning is thought to take place in at least two areas, the Bonaerense spawning ground in Uruguayan waters (autumn spawning) and off the coast of Argentina (summer spawning). The congeneric *M. australis* (also known as *M. polylepis*) is rarely caught in the high seas north of the Falklands Islands but is a significant component of Falklands fishery catches, although fishery statistics do not distinguish between the two species.

B. Physical and oceanographic features in the Patagonian Shelf

The Patagonian Shelf is the widest in the Southern Hemisphere and one of the few areas in the world where the continental shelf extends beyond the 200 nautical miles limit; the continental shelf until 200 m depth has an area of 300,300 nautical square miles even in its majority is less than 100 m depth; the continental slope (200-1000 m) has an approximate surface of 58,000 nautical square miles.

In the northern part the platform is narrow increasing its width further to the south, reaching the maximum breadth (869 km) around parallel 51º S. In the northern part, the slope until 50 fathoms is smooth (0.5 m/km) being steeper between 50 and 100 fathoms; in the south, the slope is higher from 0 to 50 fathoms (1m/km) and smoother between 50 and 100 fathoms (0.3 m/km) at the latitude of Puerto Deseado (47º 45' S – 65º 55' W).

The Patagonian Shelf is greatly influenced by the Subtropical Convergence formed by the Brazil and Falkland/Malvinas currents. The Falkland/Malvinas current is actually an offshoot of the Antarctic Circumpolar Current, a branch that veers northward along the South American continental shelf. The boundary between the cold Malvinas Current water and warmer inshore water parallels the coast until about the latitude of Buenos Aires, where the Malvinas encounters the Brazil Current. This interaction creates a very complicated fluid dynamics problem: the flow

of the Falkland/Malvinas Current is turned into the South Atlantic Ocean, while the warm Brazil Current waters are pushed toward the coast. The exact location of this boundary varies with the seasons.

All the aforementioned species are highly influenced by the oceanographic conditions of the area including inter- and intra-annual variability. Shortfin squid (*Illex argentinus*) perform yearly large migratory movements from the South of Brazil to Falklands, maybe related to its life cycle. Common squid (*Loligo gahi*) is more confined to a relative small area within Falklands waters, named Loligo-box, but with great explosions of abundance in Autumn (March to May). Finfish use to take advantage of the current dynamics, moving southward in summer together with the Brazilian current and northward in winter making use of the subantarctic current.

C. Spanish Fisheries in the SW Atlantic

These fisheries are carried out by bottom trawlers and comprise target and by-catch species with different proportions of discards. Target species may be discarded for several reasons such as size, bad condition, etc; discarding of non-target species have reduced since the early 1990s when a market was found for these species.

The fishing grounds on the Patagonian Shelf where Spanish vessels operate, can be split into two main fishing zones, one around the Falkland/Malvinas islands in what are known as Falkland Islands Interim and Outer Conservation Zones (FICZ and FOCZ respectively) and the second one in the High Seas, outside the Argentinean EEZ (Figure 1).

The activity of the Spanish vessels in the High Seas is restricted to these areas of the continental shelf and slope extending from the Argentinean EEZ, i.e. a small patch around 42º S and a bigger area comprised between parallels 43º 30’ and 48º S, namely “Area 42 and 46” respectively. The fishing grounds around the islands have been divided in three sub areas Malvinas North (MN), Malvinas West (MW) and Malvinas South (MS).

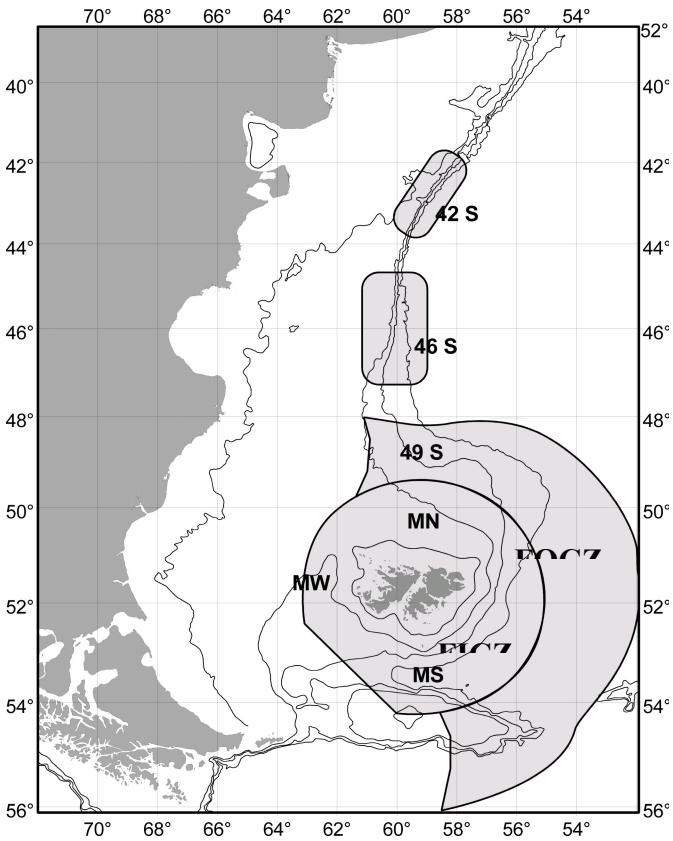

Figure 1. - Main fishing areas in the Patagonian Shelf for the Spanish fishing fleet

D. Catch and effort evolution

Both catches and effort increased from 1983 to a maximum in 1990, coincident with the closure of Namibian fisheries. Between 1990 and 1993, catches and effort decreased at the same time as the development of the Greenland halibut fishery in the NW Atlantic. Catches and effort have stabilised at the 1993 level. CPUE has varied by area and season.

Hake CPUE in International waters (area between 44 and 47º S) increased from 1988 reaching a maximum in 1993 (around 850 kg/h). Since then CPUE has declined to a relatively stable level of about 300-400 kg/h.

Figure 2 shows the evolution of estimated hake catches by Spanish vessels in the Patagonian Shelf since the start of the fishery in 1983. Catches increased from about 7.000 tons in 1983 to a peak of about 102,000 t in 1990 coincident with a similat relative increase in the number of vessels participating in the fishery. The data indicate that hake was the main target of this fleet at that time.

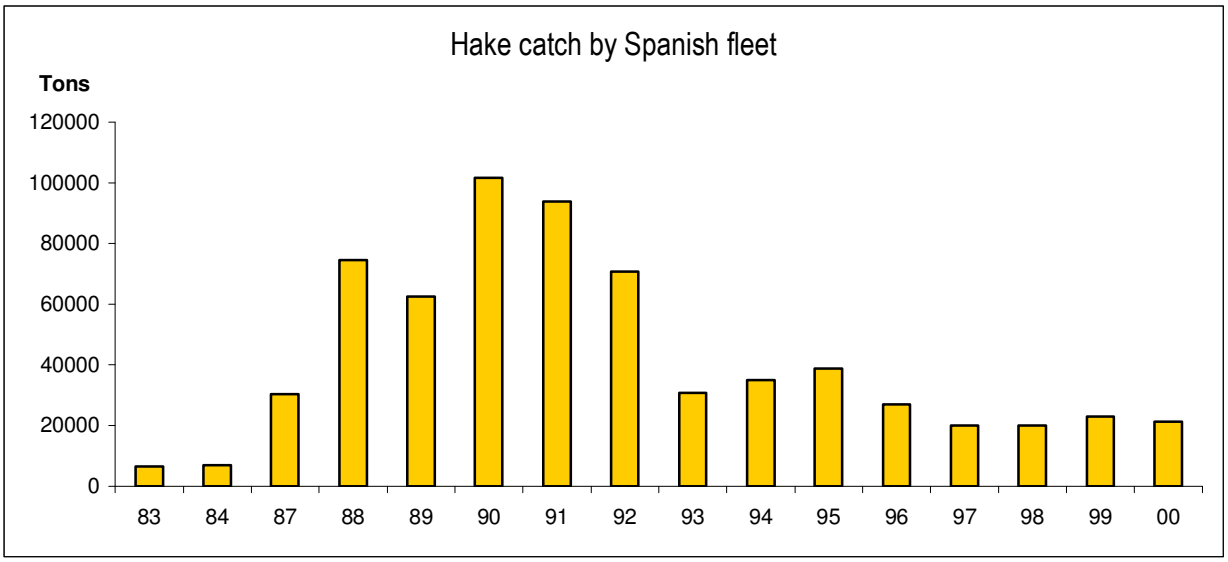

Figure 2. - Estimation of total Hake catch (Tons) by the whole Spanish fishing fleet

The maximum value in hake catches may also reflect the fall in the market for squid at that time resulting in greater targeting of hake. In a similar way to the trend in effort, catches declined after 1990, falling to about 30,000 tons in 1993. Since 1993hake catches by the Spanish fishing fleet have averaged about 20.000 t/ year. Low catches of hake in 1983 and 1984 may be due to misreporting and the decrease in 1989 could be a result of removal of 8 vessels from the fleet.

After 1990, there was a slight increase in effort (Figure 3), peaking in 1995 in response to the recovery of the market for squid and redeployment of some vessels from the NW Atlantic to the SW Atlantic when the opportunities for Greenland Halibut in the NAFO region were reduced in 1995.

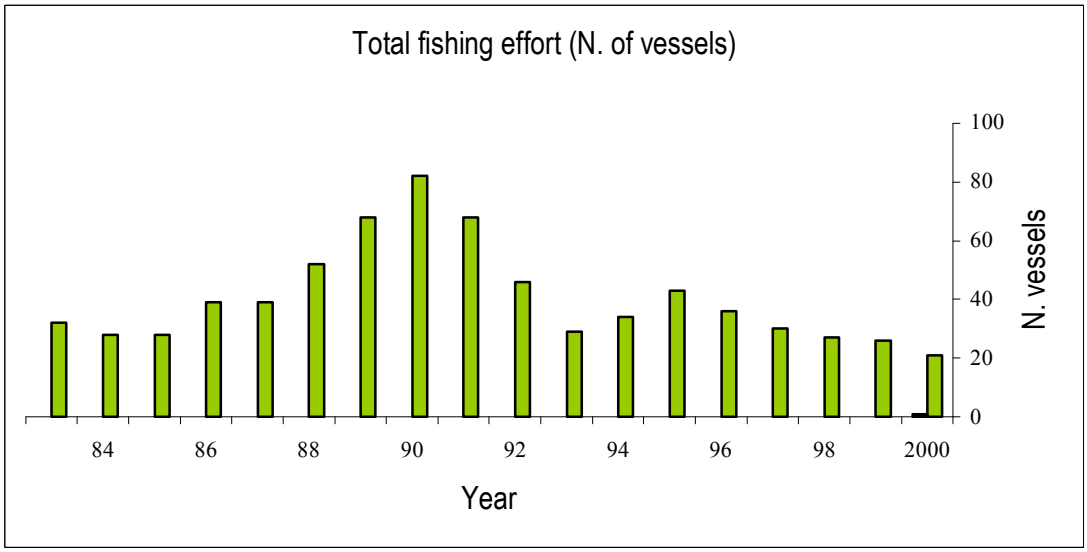

Figure 3. Fishing effort in number of vessels (all categories together)

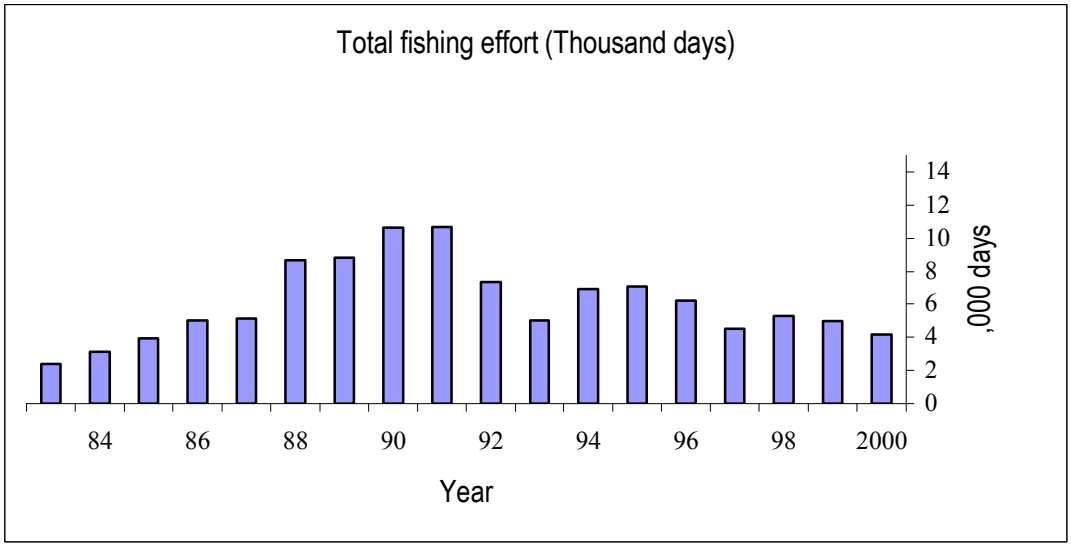

Figure 4. Fishing effort in thousand of days (all categories together)

The reduction in effort by Spanish boats operating in the SW Atlantic fishing grounds from 1990 to 2000 can be attributed to three main causes:

- the drop of the squid market
- the development of a new fishery for Spanish vessels targeting for Greenland halibut in the North West Atlantic
- the compliance with the Common Fisheries Policy by Spain, by reducing its fleet during 1989-1999 in accordance with the rules of the Financial Instrument for Fisheries Guidance (FIFG) of EU DG Fisheries, under Multi Annual Guidance Programmes (MAGPs) as shown in Figure 6.

After the recent reduction of the TAC for Greenland halibut in the NAFO fisheries, an increase of fishing effort in the Patagonian fishing grounds by Spanish vessels is expected for 2004.

E. Evolution of catches in the hake fishery

The annual mean catch of the different fleets is around 600,000 tons of hake. An increase of the catches and effort was observed from 1983 to a maximum in 1990 coinciding with the closure of Namibian fisheries. After that, catches and effort decreased corresponding with the development of the Greenland halibut fishery in the NW Atlantic, until its stabilisation from 1993. At the start of the fishery in 1983, catches were around 7,000 tons. During following years, catches increased reaching its maximum value in 1990 with more than 100,000 tons. A severe decline of catches was observed from 1990, falling to slightly up to 30,000 tons in 1993. From this moment and with the exception of the small recovery in 94-95 (35,000 and 38,700 t respectively), hake catches are stabilised around 20,000 – 25,000 t/ year

F. Effort evolution

Effort increased constantly, in total number of vessels and total fishing days from the start of the fishery until 1990, declining since that year. A slight effort reactivation was produced between 1994 and 1995, coinciding with the squid market recovery and the fishing crisis in the Greenland halibut fishery.

After the recent reduction of the TAC for Greenland halibut in the NAFO fisheries, an increase of fishing effort in the Patagonian fishing grounds by Spanish vessels is expected for 2004.

G. Evolution of CPUE (hake)

CPUE in International waters (area comprised between 44 and 47º S) increased since 1988 reaching the maximum value in 1993 (around 850 kg/h). Since them a decline has been observed being now stable at values about 300-400 kg/h.

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20. List of Acronyms

ACFM	The Advisory Committee on Fishery Management
ASPM	Age structured population model
BRP	Biological Reference points
CCAMLR	Committee for the Conservation of Antarctic Marine Living resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CECAF	Committee for Eastern Central Atlantic Fisheries
CPFD	Catch per fishing day
CPS	Commission du Pacifique Sud
CPUE	Catch per unit effort
DEPM	Daily egg production method
DFO	Department of Fisheries and Oceans
EIAA	Economic Interpretation of the ACFM Advice
EEZ	Exclusive economic zone
EPO	Eastern Pacific Ocean
F	Fishing mortality
FAO	Fisheries and Agriculture Organization
FAD	Fishing Attracting Device
FARWEST	Fisheries Assessment Research in Western Mediterranean
FIGIS	Fisheries Geographical Information System
FICZ	Falkland Island Inner Conservation Zone
FIFD	Falkland Islands Fisheries Department
FOCZ	Falkland Island Outer Conservation Zone
FRCC	Fisheries Resources Conservation Committee
FU	Functional Units
GFCM	General Fisheries Commission for the Mediterranean
IATTC	Inter American Tropical Tuna Commission
ICA	Integrated catch at age analysis
ICCAT	International Commission for Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Sea
IBSFC	International Baltic Sea Fisheries Commission
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
IEO	Instituto Español de Oceanografía
INIDEP	Instituto Nacional de Investigación y Desarrollo Pesquero
IOTC	Indian Ocean Tuna Commission
LCA	Length-based cohort analysis
LLUCET	Project to study the recruitment and juveniles of hake
LPUE	Landings per unit effort
MBAL	Minimum biologically acceptable level
MEDITS	International Bottom Trawl Surveys in the Mediterranean
MEDLAND	Mediterranean Landings
MSY	Maximum sustainable yield
MSVPA	Multi Species VPA
NAFO	Northwest Atlantic Fisheries Organisation

NEA	North East Atlantic
NEI	Neither Elsewhere Identified
NEMED	*Nephrops* in Mediterranean Sea
PA	Precautionary Approach
PO	Pacific Ocean
RRAG	Renewable Resources Assessment Group
SAC	Scientific Advisory Committee (GFCM)
SAFC	South Atlantic Fisheries Commission
SCRS	ICCAT Standing Committee on Research and Statistics
SCTB	Standing Committee on Tuna and Billfish (western and central Pacific Ocean)
SGRST	STECF Subgroup on Resource Status
SPC	Southern Pacific Commission
SSB	Spawning stock biomass
SSB/R	Spawning stock biomass per recruit
STECF	EC Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
WCPO	Western Centrql Pacific Organisation
WECAF	Committee for Western Central Atlantic Fisheries
WIO	Western Indian Ocean
WP	IOTC Working Parties
WPB	IOTC Working Parties on Billfish
WPTT	IOTC Working Parties on Tropical Tunas
WPO	Western Pacific Ocean
XSA	Extended survivors analysis
Y/R	Yield per recruit

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